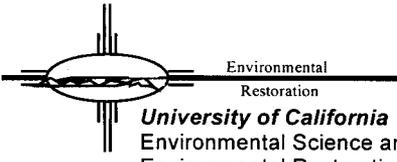


HSWA LANL G/P/99



Environmental  
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Environmental Restoration Program  
Los Alamos, New Mexico 87544  
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**ENTERED**

Date: September 17, 1999  
Refer to: E/ER:99-165

Mr. John Kieling  
NMED-HRMB  
P.O. Box 26110  
Santa Fe, NM 87502

**SUBJECT: LOS ALAMOS NATIONAL LABORATORY PERMIT  
RENEWAL – ER/HSWA INFORMATION SUBMITTAL**

Dear Mr. Kieling:

Enclosed for your use is the Department of Energy/University of California (DOE/UC) Environmental Restoration (ER) Project's Hazardous & Solid Waste Amendments (HSWA) Information submittal. This document is being submitted in support of and to facilitate the Hazardous and Radioactive Material Bureau (HRMB) and DOE/UC's activities to renew the Laboratory's Hazardous Waste Facility Permit.

The DOE/UC submitted its Part B Permit Application to HRMB on January 15, 1999. As asserted by HRMB staff at the DOE/UC HRMB Monthly Waste Management Meetings in December 1998 and January 1999, the DOE/UC is not required to submit a separate HSWA permit application. The HRMB staff also stated that it was their responsibility to develop and issue a permit that incorporates the HSWA standards; however, both parties acknowledged that HRMB may request relevant information at a later date. Those discussions are documented in a letter from the Department of Energy-Los Alamos Area Office to Benito Garcia dated February 3, 1999, (LAAME:3JP-105). Based on those initial discussions and subsequent discussions between the ER Project and the HRMB staff, it was agreed that DOE/UC would submit an information package in lieu of an application. This package will facilitate the HRMB's review of the DOE/UC's permit renewal application.

This letter includes two enclosures, both of which are inside the binder. The "Los Alamos National Laboratory Hazardous and Solid Waste Amendments Information Package," which provides current information on how the ER Project implements corrective actions at the Los Alamos National Laboratory (LANL) and applies exclusively to the ER Project. The document provides specific information on how practices and operations at LANL and past or ongoing activities meet conditions in Module VIII of LANL's Permit. Lastly, the document also proposes language for inclusion in Chapter 3 of LANL's renewed hazardous waste facility permit. An electronic copy has been provided.

2

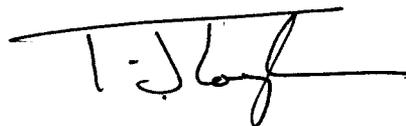
The second enclosure provides a crosswalk between Module VIII of LANL's Permit and the enclosed HSWA Information Package discussed above and is intended as a finding aid for readers of the document. Also, during discussions between you and the ER Project staff on your proposal to meet frequently, weekly if necessary, to discuss and resolve issues directly relevant to the renewal of the Laboratory's permit. The ER project concurs with that proposal and will meet with HRMB staff as often as necessary to help produce a quality product. If you have any questions or require additional information concerning this submittal, please contact Tony Grieggs at (505) 665-0451 or Joe Mose at (505) 667-5808.

Sincerely,



Julie A. Canepa, Program Manager  
Los Alamos National Laboratory  
Environmental Restoration

Sincerely,



Theodore J. Taylor, Program Manager  
Department of Energy  
Los Alamos Area Office

JC/TT/TG/ev

- Enclosure: 1) HSWA Information Package  
2) Module VIII of LANL's Permit

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Permit

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Contract 003CT0008-8L  
Project No. 774830.17  
September 1999

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**Los Alamos National Laboratory  
Hazardous and Solid  
Waste Amendments (HSWA)  
Information Package**

**Revision 0.0**

Prepared by:

Los Alamos National Laboratory  
Environmental Restoration (ER) Project  
Los Alamos, New Mexico 87545

---

Document:	<u>HSWA Information</u>
Revision No.:	<u>0.0</u>
Date:	<u>September 1999</u>

**Los Alamos National Laboratory  
Hazardous and Solid  
Waste Amendments (HSWA)  
Information Package**

**Revision 0.0**

Prepared by:

Los Alamos National Laboratory  
Environmental Restoration (ER) Project  
Los Alamos, New Mexico 87545

September 1999

## ***Executive Summary***

---

The purpose of this “Los Alamos National Laboratory Hazardous and Solid Waste Amendments (HSWA) Information Package” is to provide current information on how the Environmental Restoration (ER) Project implements and will continue to implement corrective actions at Los Alamos National Laboratory (LANL). This information package applies to ER Projects only. The information package has been prepared and submitted to assist the New Mexico Environment Department’s (NMED’s) Hazardous and Radioactive Materials Bureau (HRMB) in preparing the HSWA portion of the renewed Hazardous Waste Facility Permit for LANL. In accordance with the permitting strategy outlined by the HRMB in correspondence dated February 5, 1998, the HSWA portion will be Chapter 3 in the renewed permit. A proposed outline for Chapter 3 of the renewed permit for LANL is presented in Table ES-1.

The statutory basis for the ER Project at LANL is the Resource Conservation and Recovery Act (RCRA), which was enacted in 1976, and substantially amended by HSWA in 1984. RCRA’s hazardous waste provisions govern the day-to-day operations of hazardous waste management, treatment, storage, and disposal (TSD) facilities. A permitting system was established under this law, which set standards for hazardous waste-producing operations at a facility. Section 3004(u) of RCRA, as amended by HSWA, mandates that permits for TSD facilities include provisions for corrective action to address routine or systematic releases from facilities currently in operation and to investigate contamination in areas designated as solid waste management units (SWMU). Because LANL is a TSD facility, compliance with these HSWA provisions is required. The Environmental Protection Agency (EPA) issued the HSWA Module (Module VIII) of the original Hazardous Waste Facility Permit effective May 23, 1990; the HSWA Module was modified effective May 19, 1994, and December 23, 1998. EPA granted corrective action authority to the NMED effective January 2, 1996. Therefore, renewal of the HSWA portion of the permit will be issued by the NMED under the New Mexico Hazardous Waste Act and the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1).

The information presented in this document is organized as follows.

- Section 1.0 discusses standard and special permit conditions.
- Section 2.0 discusses the corrective action process at LANL. Sections 1.0 and 2.0 contain informational text and proposed permit language for incorporation into Chapter 3 of the Hazardous Waste Facility Permit during the permit renewal process. To provide clarity, Sections 1.0 and 2.0 are split-page formatted. The left column provides proposed permit

language and informational text. The right column serves as a [notes] column and provides a location cross-reference to the existing HSWA Permit and indicates whether the left column is proposed permit language or informational text for Chapter 3 of the renewed permit.

- Section 3.0 provides a list of all references used throughout this document.

Five appendices are included in this package.

- Appendix A presents the Proposed Corrective Action Schedule of Compliance.
- The tables in Appendix B provide lists of SWMUs that are subject to RCRA corrective actions at LANL. The tables reflect the recent joint effort with the NMED to consolidate SWMUs for the purpose of corrective action, as required by 20 NMAC 4.2, [Hazardous Waste Fees,] Subpart II, 201.2, Annual Unit Audit. During the consolidation effort, all SWMUs were evaluated and some SWMUs (e.g., ancillary equipment and/or segments of a larger unit) with similar contaminant types and migration pathways were combined, resulting in a significant reduction in the number of units.
- Appendix C discusses the elements of the RCRA Facility Investigation.
- Appendix D discusses the elements of the RCRA Corrective Measures Study.
- Appendix E provides information on existing HSWA Permit conditions related to other regulatory requirements and is included for informational purposes only.

Under the ER Project's original structure, the SWMUs at LANL were grouped into twenty-four (24) operable units, based on geographical and other considerations. Recently, the University of California (UC) adopted a systematic watershed/aggregate approach to characterizing and, where necessary, conducting remediation at LANL, rather than evaluating the numerous SWMUs individually. The approach utilizes a series of criteria to identify a logical delineation of SWMU aggregates within a watershed and then determine prioritization between the watersheds. The watershed/aggregate approach will allow a timely and integrated assessment of risk, provide an assessment of contaminant fate and transport at an appropriate scale, and reduce uncertainties that arise in projects conducted at too small a scale.

Eight major watersheds cross LANL boundaries and drain into the Rio Grande. These major watersheds represent the environmental systems through which SWMU-related contamination may migrate in sediments, surface water, soils, and alluvial groundwater. The U.S. Department of Energy (DOE)/UC has worked with the NMED to establish twenty-seven (27) aggregates within the major

watersheds; each aggregate is fully contained within a single watershed. Evaluating a whole watershed and its aggregates will facilitate an understanding of how contamination from an individual source or combination of sources migrates. It will assure that the nature and extent of contamination is defined for each SWMU within a complete and appropriate context, and will provide a technically sound framework for evaluating the cumulative impacts of contamination on surface water quality, alluvial groundwater quality, human health, and the ecosystem. Another added value of the watershed approach is that ecological risk assessments are easily adapted to this approach. Although some species' habitats cross watersheds, ecological screening can be accomplished before each watershed is evaluated by first evaluating the most contaminated aggregates within a habitat.

In summary, this document provides information to assist the NMED in preparation of the HSWA portion of the Hazardous Waste Facility Permit for LANL. The following types of language/text are provided in Sections 1.0 and 2.0:

- Proposed Permit Language - language which DOE/UC proposes for inclusion in Chapter 3 (the HSWA portion) of the renewed Hazardous Waste Facility Permit,
- Informational Text - text providing information to the NMED concerning practices and operations at LANL, and
- Informational Text/(Ongoing) Met Permit Condition - text providing information which demonstrates that permit conditions from the original HSWA Permit have been or are continuing to be met.

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## **List of Appendices**

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<b>Appendix</b>	<b>Title</b>
A	Proposed Corrective Action Schedule of Compliance
B	Solid Waste Management Units (SWMU) at Los Alamos National Laboratory
C	Elements of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI)
D	Elements of the Resource Conservation and Recovery Act (RCRA) Corrective Measure Study (CMS)
E	Other Regulatory Requirements

## **List of Abbreviations/Acronyms**

---

ACA	Accelerated Correction Action
CLP	Contract Laboratory Program
CMI	Corrective Measures Implementation
CMS	Corrective Measures Study
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ES&H	Environmental, Safety, and Health
ESH-ID	Environmental, Safety, and Health Identification
FSF	Field Support Facility
GWPMPP	Groundwater Protection Management Program Plan
HE	high explosives
HRMB	Hazardous and Radioactive Materials Bureau
HWP	Hydrogeologic Workplan
HSWA	Hazardous and Solid Waste Amendments
IA	Interim Action
IM	Interim Measure
ITS	Integrated Technical Strategy
IWP	Installation Work Plan
LANL	Los Alamos National Laboratory
lbs	pounds
MDA	material disposal area
NFA	No Further Action
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NOD	Notice of Deficiency
OU	operable unit
PCB	polychlorinated biphenyls
ppmv	parts per million by volume
PRS	potential release site
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RSI	Request for Supplemental Information
SAL	screening action level
SOP	standard operating procedure
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TA	technical area
TCA	1,1,1-trichloroethane

TCE trichloroethene

***List of Abbreviations/Acronyms (continued)***\_\_\_\_\_

TSD treatment, storage, and disposal  
UC University of California  
VCA Voluntary Corrective Action  
VCM Voluntary Corrective Measure  
VOC volatile organic compounds

## **Definitions**

---

For the purposes of this “Los Alamos National Laboratory Hazardous and Solid Waste Amendments (HSWA) Information Package,” the following definitions apply. The source of the definition is provided, where appropriate.

**Accelerated Corrective Action (ACA).** A cleanup conducted at a solid waste management unit (SWMU) that has both a clear remediation goal and a clear means of implementing this goal using routine technologies. The ACA process may be conducted using voluntary corrective actions or voluntary corrective measures.

**Action Levels.** Health- and environmental-based concentrations derived using chemical-specific toxicity information and standardized exposure assumptions. Action levels can be developed on a facility-specific basis or can be taken from standardized lists [61 *Federal Register (FR)* 19446]. Contamination found in a particular medium below an appropriate action level would not generally be subject to remediation or further study.

**Administrative Authority (AA).** This term means the New Mexico Environment Department and/or the U.S. Environmental Protection Agency.

**Annual Unit Audit.** A tabulation of each operating unit, unit undergoing closure or scheduled for closure, post-closure care unit, and corrective action unit. (New Mexico Administrative Code, Title 20, Chapter 4, Part 2 [20 NMAC 4.2], Subpart I, effective December 31, 1998 [12-31-98]).

**Corrective Action.** A measure taken to rectify conditions adverse to human health or the environment.

**Corrective Action Unit.** Solid waste management units that are included, or qualify to be included, in the HSWA Chapter of the permit or compliance/corrective action order and have not been approved by the Administrative Authority for No Further Action (NFA) status.

**Corrective Measures.** The approved remedies to address the source and/or migration of contaminants to meet risk-based cleanup goals.

**Corrective Measures Implementation (CMI) Plan.** A plan and specifications to implement the approved remedy at a facility.

**Corrective Measures Implementation (CMI) Report.** A report signifying completion of the remedy approved by the NMED for termination of corrective action.

**Corrective Measures Study (CMS).** A formal process to identify and evaluate remedy alternatives for releases at the facility. (Proposed Subpart S rule in 55 *FR* 30798, July 27, 1990).

**CMS Report.** A CMS Report summarizes the results of the CMS.

## **Definitions (continued)**

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**Facility.** For the purpose of implementing corrective action under the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), Subpart V, 264.101, revised January 1, 1997 [1-1-97], a facility is all contiguous property under the control of the owner or operator seeking a permit under the New Mexico Hazardous Waste Act, NMSA 1978, Sections 74-4-1 through 74-4-14 (20 NMAC 4.1.102).

**Hazardous Constituents.** Any constituent identified in 20 NMAC 4.1.200 [incorporating the Code of Federal Regulations, Title 40 (40 CFR), Part 261, Appendix VIII], any constituent identified in 20 NMAC 4.1.500 (incorporating 40 CFR 264, Appendix IX), any constituent identified in a hazardous waste listed in 20 NMAC 4.1.200 (incorporating 40 CFR 261, Subpart D), or any constituent identified in a toxicity characteristic waste listed in 20 NMAC 4.1.200 (incorporating 40 CFR 261.24, Table 1).

**Hazardous Waste.** Hazardous waste as defined in Section 1004(5) of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §6903(5), codified at 40 CFR, Part 261, and adopted by 20 NMAC 4.1.

**HSWA.** The Hazardous and Solid Waste Amendments of 1984 (Public Law No. 98-616, 98 Stat. 3221), which amended the Resource Conservation and Recovery Act of 1976, 42 U.S.C. §6901 *et seq.*

**Interim/Stabilization Measures.** Contaminated sites often present serious and immediate hazards which the AA or the permittee must address quickly during the corrective action process. This process is called stabilization. The actions used to achieve the goal of stabilization are called interim measures. Interim measures are short-term actions taken to respond to immediate threats to human health or prevent damage or contaminant migration to the environment.

**Land Use.** The category of functional use for the area of land occupied by a SWMU or a group of SWMUs.

**LANL's Hazardous Waste Facility Permit.** A permit to operate under RCRA and the New Mexico Hazardous Waste Act.

**National Pollutant Discharge Elimination System (NPDES).** The national program for issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of the Clean Water Act (20 NMAC 4.1, Subpart IX, 270.2 [1-1-97]).

**New Mexico Environment Department (NMED).** A cabinet department in the Executive branch of New Mexico that administers the laws and exercises the functions relating to the environment (7A NMSA 1978).

## **Definitions (continued)**

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**Plume.** A three-dimensional zone of contamination that contains contaminants that are associated with a release of hazardous waste or hazardous constituents from a SWMU.

**RCRA Facility Assessment.** Usually the first step in the RCRA corrective action process to identify potential and actual releases from SWMUs and make preliminary determinations about releases, the need for corrective action, and stabilization measures.

**RCRA Facility Investigation (RFI).** The investigation that determines if a release has occurred and the nature and extent of contamination at a hazardous waste facility.

**Release.** Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, pumping, escaping, leaching, dumping, or disposing of hazardous wastes or hazardous constituents into the environment. This includes abandoned containers that contain hazardous wastes or constituents.

**Secretary.** The Secretary of the NMED or his/her designee (20 NMAC 4.1.102).

**Solid Waste.** A solid waste as defined in 20 NMAC 4.1, Subpart II, 261.2 [1-1-97].

**Solid Waste Management Unit.** Any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at a facility at which solid wastes have been routinely and systematically released. The definition includes regulated units (i.e., landfills, surface impoundments, waste piles, and land treatment units) but does not include passive leakage or one-time spills from production areas and units in which wastes have not been managed (e.g., product storage areas).

**State.** The State of New Mexico.

**Voluntary Corrective Action (VCA).** An accelerated cleanup process that is typically applied to relatively small-scale sites with obvious remedies, implemented at risk without prior approval of the NMED, and intended to be a final remedy.

**Voluntary Corrective Measure (VCM).** An accelerated cleanup process that is typically applied to relatively small-scale sites with obvious remedies with NMED approval, and intended to be a final remedy.

**Table ES-1**

**Proposed Outline for Chapter 3 of the Renewed Hazardous  
Waste Facility Permit for Los Alamos National Laboratory**

---

Chapter 3      EPA ID# - HSWA Permit

Module 1.0 - Permit Conditions

1.1 - Standard Conditions

- 1.1.1 - Compliance with Permit
- 1.1.2 - Modification of Permit
- 1.1.3 - Schedule of Compliance
- 1.1.4 - Approval/Nonapproval of Submittals
- 1.1.5 - Dispute Resolution

1.2 - Special Permit Conditions

- 1.2.1 - Protection of Regional Aquifer
- 1.2.2 - Identification and Summary of Previous Studies

Module 2.0 - Corrective Action Requirements

- 2.1 - Applicability
  - 2.2 - Corrective Action Program at LANL
  - 2.3 - Notification and Assessment Requirements for Newly-Identified Solid Waste Management Units (SWMU)
  - 2.4 - Notification Requirements for Newly-Discovered Releases from SWMUs
  - 2.5 - RCRA Facility Investigations (RFI)
    - 2.5.1 - Installation Work Plan
    - 2.5.2 - Operable Unit RFI Work Plans
    - 2.5.3 - Canyon Systems Work Plans
    - 2.5.4 - Hydrogeologic Workplan
    - 2.5.5 - RFI Work Plan Schedule of Submittals
    - 2.5.6 - RFI Reports
    - 2.5.7 - Watershed Reports
    - 2.5.8 - Integrated Technical Strategy
  - 2.6 - Stabilization
  - 2.7 - Land Use
  - 2.8 - Accelerated Corrective Actions
    - 2.8.1 - Voluntary Corrective Actions
    - 2.8.2 - Voluntary Corrective Measures
  - 2.9 - Determination of No Further Action
  - 2.10 - Presumptive and Conditional Remedies
  - 2.11 - Corrective Measures Study (CMS)
    - 2.11.1 - CMS Plan
-

**Table ES-1 (Continued)**

**Proposed Outline for Chapter 3 of the Renewed Hazardous  
Waste Facility Permit for Los Alamos National Laboratory**

- 
- 2.11.2 - CMS Implementation
  - 2.11.3 - CMS Report
  - 2.11.4 - Remedy Approvals
  - 2.12 - Risk-Based Decision Making
  - 2.13 - Activities That May Impact SWMUs
  - 2.14 - Reporting Requirements
  - 2.15 - Information Submittals
  - 2.16 - Data Retention
  - 2.17 - Information Repository
- Appendix A – Corrective Action Schedule of Compliance
- Appendix B - List of SWMUs
- Appendix C - RFI Requirements - Elements of the RFI
- Appendix D - CMS Requirements - Elements of the CMS
-

## 1.0 Permit Conditions

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This section provides information and proposed permit language for the Permit Conditions and Special Permit Conditions sections of the Hazardous and Solid Waste Amendments (HSWA) portion of the renewed Hazardous Waste Facility Permit for Los Alamos National Laboratory (LANL). The following types of language/text are provided in Sections 1.0 and 2.0:

- Proposed Permit Language - language which the U.S. Department of Energy (DOE)/University of California (UC) proposes for inclusion in Chapter 3 (the HSWA portion) of the renewed Hazardous Waste Facility Permit,
- Informational Text - text providing information to the New Mexico Environment Department (NMED) concerning practices and operations at LANL, and
- Informational Text/(Ongoing) Met Permit Conditions - text providing information which demonstrates that permit conditions from the original HSWA Permit have been or are continuing to be met.

The permitting strategy for LANL outlined by the NMED Hazardous and Radioactive Materials Bureau (HRMB) in correspondence dated February 5, 1998, indicates that the HSWA portion will be Chapter 3 in the renewed permit.

### 1.1 Standard Permit Conditions

Information and proposed permit language for the Permit Conditions section of Chapter 3 in the renewed Hazardous Waste Facility Permit is presented below. Specific Conditions, Section B of the original HSWA Permit (U.S. Environmental Protection Agency [EPA], 1990), contained sections entitled Waste Minimization, Specific Waste Ban, and Additional Waste Ban Requirements. Information pertaining to these requirements is contained in Appendix E of this

Informational Text

Informational Text

document. The [Specific Conditions] in Section B of the original HSWA Permit (EPA, 1990) also contained sections entitled [Dust Suppression,] [Closure,] and [Operation of Land Disposal.] Information pertaining to these requirements is not addressed in this document. The original [Closure] and [Operation of Land Disposal] conditions are not applicable because there are no permitted surface impoundments at LANL.

### **1.1.1 Compliance with Permit**

In accordance with the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), Subpart IX, 270.30(a), revised January 1, 1997 [1-1-97], DOE/UC will comply with all conditions of Chapter 3 of the renewed permit. DOE/UC will not need to comply with the conditions of Chapter 3 to the extent and for the duration such that noncompliance is authorized in an emergency permit under 20 NMAC 4.1, Subpart IX, 270.61 [1-1-97]. The permit requirements will become effective upon issuance of Chapter 3 of the renewed permit.

### **1.1.2 Modification of Permit**

Chapter 3 of the renewed Hazardous Waste Facility Permit may be modified for cause, as specified in 20 NMAC 4.1, Subpart IX, 270.41 and 270.42 [1-1-97]. Modifications may be initiated by the NMED or a request for a permit modification may be initiated by DOE/UC. This includes modifications to the proposed Schedule of Compliance (see Appendix A). Permit modifications requested by DOE/UC will follow the requirements of 20 NMAC 4.1, Subpart IX, 270.42 [1-1-97], for Class 1, Class 2, or Class 3 modifications.

### **1.1.3 Schedule of Compliance**

DOE/UC will comply with the durations for submission of information and documents, in accordance with Chapter 3 of the renewed permit. If DOE/UC determines that an extension of a due date for a submittal is needed, they will prepare and submit a written request for an extension to the Secretary of the NMED. DOE/UC will work with the NMED to

Informational Text

HSWA Permit, Section B.3;  
Proposed Permit Language  
for Chapter 3, Module 1.0,  
Section 1.1.1

HSWA Permit, Section O;  
Proposed Permit Language  
for Chapter 3, Module 1.0,  
Section 1.1.2

Proposed Permit Language  
for Chapter 3, Module 1.0,  
Section 1.1.3

modify schedules, when necessary.

#### **1.1.4 Approval/Nonapproval of Submittals**

The NMED will review Revision 0.0 of all Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plans and Reports, Stabilization Work Plans and Reports, Corrective Measures Study (CMS) Plans and Reports, and other related documents that require approval. The NMED will then notify DOE/UC in writing of their determination and declaration as administratively complete or incomplete all RFI, Stabilization, and CMS plans and reports and other corrective action documents within 60 days of receipt of each document. The NMED will then complete a technical review, and will approve or not approve all corrective action documents within 180 day of their declaration of administrative completeness. For any submittal that is not approved, the NMED will specify in writing the technical basis for the nonapproval, including citations of applicable regulatory requirements, as appropriate. The NMED will also specify actions required to correct deficiencies. The initial written notification for nonapproval of any document will be a Request for Supplemental Information (RSI). Any subsequent written notification for nonapproval of the same document may be in the form of an RSI or a Notice of Deficiency (NOD).

DOE/UC will then modify the document or respond to the RSI or NO to correct any deficiencies within a timeframe established with the NMED (a minimum of 30 days). If additional time is required, a written request for a time extension will be submitted to the NMED and will include a justification for the extension. If documents are revised, they will be identified with an appropriate document revision number (e.g., Revision 1.0, Revision 2.0).

#### **1.1.5 Dispute Resolution**

DOE/UC will work cooperatively with the NMED to informally and in good faith resolve all disputes and differences of opinion. DOE/UC

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will not invoke dispute resolution for purposes of delay. If, however, disputes arise concerning any aspect of the corrective action process, including but not limited to interpretation of statutory, regulatory, or permit provisions; inability to meet specified deadlines; and/or the NMED's nonapproval or modification of submittals, the following procedures will apply.

DOE/UC will initiate the dispute resolution process by submitting a written statement that invokes the dispute resolution process and sets forth the nature of the dispute and factual data, analysis opinion, or documentation supporting their position. DOE/UC will be entitled to meet with the HRMB RCRA Permits staff manager in person at the Secretary's office or by teleconference, if desired, in order to resolve the dispute.

If DOE/UC and the HRMB RCRA Permits staff are unable to resolve the dispute, DOE/UC may request a decision by the Secretary. This request will be made in writing after DOE/UC determines, in their sole discretion, that they have been unable to resolve a dispute with the HRMB RCRA Permits staff and/or staff manager. Within thirty (30) days of DOE/UC's written request for a decision by the Secretary, DOE/UC will submit to the NMED a written statement of their arguments and explanations of their position. The written statement will include, at a minimum, the specific points of dispute, the position DOE/UC maintains should be adopted and the basis for this position, and if DOE/UC requests an informal conference with the Secretary. DOE/UC's failure to follow the procedures set forth in this paragraph will constitute a waiver of their right to further consideration of the dispute through this dispute resolution process.

The Secretary will consider DOE/UC's written position and the information presented at the informal conference, and will provide a written statement of the NMED's decision based on the record within thirty (30) days of receipt of DOE/UC's written statement. The

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Secretary's written statement will respond to DOE/UC's position and will set forth the regulatory basis for the decision. During the invocation

of this dispute resolution procedure, DOE/UC may, at their discretion, suspend activities associated with the disputed issue.

By invoking this dispute resolution process, DOE/UC will not waive any administrative or judicial remedies to which they are otherwise entitled. The time during which this dispute resolution process is invoked will suspend any statutory and/or regulatory time frames for determining the timeliness of administrative or judicial appeals. The Secretary's decision in the matter will constitute final administrative action by the Secretary for purposes of appeal.

### **1.1.6 Consistency**

DOE/UC will strive for consistency in the formats of documents submitted to the NMED for review. Likewise, the NMED will strive to be consistent in its approach to reviewing and approving or not approving documents. In addition, the NMED can further foster the cooperative nature of the relationship between the NMED and DOE/U by utilizing a uniform and technically-based approach in making decisions that affect the corrective action process at LANL.

## **1.2 Special Permit Conditions**

This section presents how the special permit conditions in Section C of the original HSWA Permit (EPA, 1990) have been and are continuing to be met at LANL.

### **1.2.1 Unsaturated Zone Monitoring**

As required by the special permit condition in Section C.5 of the original HSWA Permit (EPA, 1990), UC has continued pore-gas sampling and resumed vadose-zone plume delineation efforts (i.e., a determination of the nature and extent of the vapor-phase plumes) at Technical Area (TA) 54. In the original HSWA Permit, effective

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monitoring of the unsaturated zone was deemed essential for a successful RFI/CMS, and the information to be collected was considered helpful in providing direction during the RFI. The Environmental Restoration (ER) Project at LANL is currently responsible for these characterization activities, which are being conducted as part of the Operable Unit 1148 RFI Work Plan (LANL, 1992a) implementation. Waste Management Operations began pore-gas monitoring in additional boreholes in 1999; these monitoring data are being incorporated with the ER Project data.

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Permit Condition

As a result of past liquid organic disposal in pits and shafts at Material Disposal Area (MDA) L from the late 1950s through 1985, a subsurface organic vapor plume extends within the mesa both east and west of MDA L. Similarly, as a result of past disposal of solvent-contaminate rags and sludges at MDA G, a much smaller organic vapor plume exist at MDA G. Subsurface monitoring of the vapor plumes has occurred since 1986. The principal vapor-phase contaminants from MDA L include 1,1,1-trichloroethane (TCA), trichloroethene (TCE), and carbo tetrachloride; at MDA G, the principal vapor-phase contaminant is TCA.

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The observed concentrations of TCA and TCE at MDA L are quite variable in time and space, but the plume has not changed significantly during the last decade. The maximum TCA vapor concentration in 1990 was 6,000 parts per million by volume (ppmv); in 1992, it was above 4,000 ppmv; and in 1999, it was 3,500 ppmv. Estimates of the total contaminant mass contained in the plume in 1990 showed that the plume south and west of MDA L contained 850 pounds (lbs) (vapor phase) of volatile organic compounds. TCA comprised the majority of this contaminant mass at 659 lbs, followed by TCE (134 lbs), carbon tetrachloride (28.9 lbs), chloroform (14.2 lbs), and several other compounds. The maximum concentration of TCA at MDA G was 167 ppmv in 1997.

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Data on the nature and extent of contamination in the vapor-phase plumes and associated risk at MDAs L and G is reviewed and summarized in the TA-54 RFI report to be submitted to the NMED on September 30, 1999. UC has also developed a conceptual model of plume migration and will be evaluating corrective measures alternative for the plumes in the TA-54 CMS report.

The intent of the unsaturated zone monitoring special permit condition in Section C.5 of the original HSWA Permit (EPA, 1990) has been met. Sufficient data have been collected to support the RFI and CMS. Therefore, DOE/UC proposes to eliminate the requirement for quarterly pore-gas monitoring from Chapter 3 of the renewed permit.

### **1.2.2 Perched Zone Monitoring**

Several alluvial wells and boreholes to monitor the perched zone have been installed, as required by the special permit condition in Section C.1 of the original HSWA Permit (EPA, 1990). The alluvial wells and boreholes were installed in Pueblo, Los Alamos, Sandia, Mortandad, Potrillo, Fence, and Water Canyons. The installations were completed in 1990 in accordance with EPA's RCRA guidelines (Purtyman and Stoker, 1990; Stoker, 1990; LANL, 1992b) and water quality samples are collected whenever water is present. Water levels are measured quarterly and the data are reported annually in LANL's Environmental Surveillance reports (e.g., see Section 5.D of "Environmental Surveillance at Los Alamos during 1997" [LANL, 1998a]). These data have been and will continue to be reported in annual Environmental Surveillance reports. Therefore, this condition should not be included in Chapter 3 of the renewed permit.

### **1.2.3 Vertical Extent of Saturation**

As required by the special permit condition in Section C.6 of the original HSWA Permit (EPA, 1990), subsurface investigations have been conducted in Mortandad Canyon to determine the vertical extent of saturation in the canyon. Existing data have been collected to

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HSWA Permit, Section C.1  
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HSWA Permit, Section C.6  
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establish the hydraulic conductivity of the alluvium in Mortandad Canyon and the moisture characteristic curves, porosity and bulk density, and hydraulic conductivity on the upper Bandelier Tuff (LANL, 1998b). Proposed additional activities are described in Appendix 4 of the "Hydrogeologic Workplan" (LANL, 1998b). The proposed activities include collecting additional core samples to determine the hydraulic properties and geochemistry of the lower Bandelier Tuff, the Guaje Pumice Bed, and underlying geologic units. Deep wells proposed in the "Hydrogeologic Workplan" for Mortandad Canyon (e.g., well R-15) will provide the opportunity to collect sample for measurement of hydraulic properties and to make water-level measurements at various depths during drilling. The measured water levels will provide an approximate vertical head distribution, from which the direction and magnitude of the vertical gradient can be determined. The combined data will be used to evaluate whether alluvial groundwater moves downward to intermediate perched zones at Mortandad Canyon. Results of such testing are routinely presented in completion reports for the regional wells. Therefore, this permit condition should not be included in Chapter 3 of the renewed permit.

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Permit Condition

#### **1.2.4 Monitoring of Surface Water**

Monitoring of surface water is being conducted and documented by the Water Quality and Hydrology Group at LANL, as required by the special permit condition in Section C.2 of the original HSWA Permit (EPA, 1990). Surface water within the LANL boundary is not a source of municipal, industrial, or irrigation water, but is a source used by wildlife. Surface water samples are collected from regional stations and Pajarito Plateau stations surrounding LANL (e.g., see "Surface Water Data at Los Alamos National Laboratory: Water Year 1998" [LANL, 1999a]). Surface water samples are collected to represent both point and nonpoint source discharges. In addition, regional surface water samples are collected from stations on the Rio Grande, the Rio Chama, and the Jemez River. These waters provide background data from beyond the facility boundary. Surface water samples are analyzed for

HSWA Permit, Section C.2  
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nutrients, metals, radionuclides, volatile organic compounds (VOC), semivolatile organic compounds (SVOC), and polychlorinated biphenyls (PCB), and, for some samples, high explosives (HE) (e.g., see Section 5.B of "Environmental Surveillance at Los Alamos during 1997" [LANL, 1998a]). Surface water sampling will continue and the data reported on an annual basis. Therefore, this condition has been met and should not be included in Chapter 3 of the renewed permit.

### **1.2.5 Monitoring of Groundwater**

Monitoring of groundwater is conducted and documented at LANL in accordance with DOE Order 5400.1 and as required by the special permit condition in Section C.2 of the original HSWA Permit (EPA, 1990). Groundwater samples are collected from the regional aquifer, perched alluvial aquifers in the canyons, and intermediate-depth perched groundwater systems. Sampling locations in the regional aquifer include eight deep test wells, thirteen deep water-supply wells, and numerous springs. Sampling locations in the perched alluvial aquifers include wells in Pueblo, Los Alamos, Mortandad, and Pajarito Canyons, and in Cañada del Buey. In any given year, some of these alluvial observation wells may be dry. Observation wells in Water, Fence, and Sandia Canyons have been mostly dry since their installation in 1989. All but two of the wells in Cañada del Buey are generally dry. Sampling locations in the intermediate-depth perched groundwater systems include two test wells and one spring in Pueblo and Los Alamos Canyons. Samples are analyzed for nutrients, metals, radionuclides, VOCs, SVOCs, PCBs, and, for some samples, HE (e.g., see "Environmental Surveillance at Los Alamos during 1997" [LANL, 1998a]). Groundwater sampling will continue and the data reported annually in Environmental Surveillance reports. Therefore, this condition has been met and should not be included in Chapter 3 of the renewed permit.

### **1.2.6 Protection of the Regional Aquifer**

As required by the special permit condition in Section C.4 of the

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HSWA Permit, Section C.2

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original HSWA Permit (EPA, 1990), UC has adhered to prescribed well and borehole design, construction, and installation requirements to prevent any downward migration of surface contamination along the boring. Additional wells are proposed in the "Hydrogeologic Workplan" (LANL, 1998b) to further characterize the hydrogeologic setting beneath LANL and to enhance the groundwater monitoring program at LANL. The additional wells will be one of five (5) borehole/well types. The borehole/well types and their borehole advancement and well installation specifications are contained in Section 4.1.1 of the "Hydrogeologic Workplan" (LANL, 1998b).

### **1.2.7 Mortandad Canyon Sediment Traps**

UC has maintained sediment traps in Mortandad Canyon to ensure containment of residual sediment contamination from Mortandad Canyon within the facility boundary, as required by the special permit condition in Section C.3 of the original HSWA Permit (EPA, 1990). The first two sediment traps were constructed in 1976 in the stream channel; a third sediment trap was constructed in 1980. In 1986, the current sediment trap configuration was constructed on and adjacent to the original sediment traps. The sediment traps capacity in 1986 was 833,000 gallons. In 1987, a storm runoff event filled all three sediment traps to capacity. One of the traps was then expanded to bring the total capacity of the three sediment traps to 1.2 million gallons. In 1992, all three sediment traps were cleaned out and the sediments were placed in cleanout piles upslope and away from the stream channel to minimize the potential for remobilization. (See Sections 2.2.3 and 2.3.1 of "Work Plan for Mortandad Canyon" [LANL, 1997a].)

The sediment traps in Mortandad Canyon are identified as Potential Release Site (PRS) No. 00-001. DOE/UC proposes that the special permit condition regarding this PRS in the original HSWA Permit (EPA, 1990) be deleted and that this solid waste management unit (SWMU) be addressed as part of the corrective action process at LANL

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HSWA Permit, Section C.3  
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### 1.2.8 QA/QC Evaluation

UC has extensive field and laboratory quality assurance (QA)/quality control (QC) procedures in place at LANL. Field QA/QC procedures consist of approximately sixty standard operating procedures (SOP) authored by ER Project personnel at LANL (e.g., ER SOP 1.08, Rev. 0, [Field Decontamination of Drilling and Sampling Equipment] [LANL, 1995]). The ER Field Support Facility (FSF) receives sample from field staff.

FSF staff package and ship the samples to commercial analytical laboratories. Staff at the FSF then receive data packages back from the commercial laboratories, validate and verify the data, and perform data entry.

Analytical laboratory QA/QC procedures are maintained by the commercial analytical laboratories and include SOPs for, but not limited to: analytical procedures; holding times and preservatives; equipment calibration and maintenance; detection limits; QC objective for accuracy, precision, and completeness; analysis of QC samples and documentation; data reduction and evaluation; and QA reports to management. Control and reporting of analytical results are an important part of the analytical laboratories' responsibilities. Analytical laboratory data quality assessment procedures include a general description of all data review levels, responsibilities at each level, examples of the documentation accompanying the assessment, analytical data quality criteria used by the reviewers, and the final [signoff] on the data report. Commercial analytical laboratories are audited by the DOE Contract Laboratory Program (CLP) against the analytical statement of work prepared by UC. The CLP provides standard analytical services and is designed to obtain consistent and accurate results of demonstrated quality through use of extensive QA/QC procedures.

The special permit condition in Section C.7 of the original HSWA

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Permit (EPA, 1990) for QA/QC evaluation has been met. Therefore, this condition should not be included in Chapter 3 of the of the renewe permit.

**1.2.9 Identification and Summary of Previous Studies**

As required by the special permit condition in Section C.8 of the original HSWA Permit (EPA, 1990), the most current references of all known geologic, hydrogeologic, and environmental studies relevant to potential contamination or migration of contamination from SWMUs have been and will continue to be provided to the NMED in the Installation Work Plan, the [Hydrogeologic Workplan] (LANL, 1998b), RFI Work Plans and Reports, CMS Plans and Reports, Accelerated Corrective Action Reports, and Environmental Surveillance Reports.

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HSWA Permit, Section C.8

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## **2.0 Corrective Action Process**

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The various elements of the corrective action process at Los Alamos National Laboratory (LANL) are described herein. A description of the corrective action program is provided, notification requirements for solid waste management units (SWMU) are presented, and Resource Conservation and Recovery Act (RCRA) Facility Investigations (RFI) are discussed. In addition, the options of Stabilization, Accelerated Corrective Actions (ACA), and presumptive and conditional remedies are presented, and land use is discussed. Information on determination of No Further Action (NFA) and on the Corrective Measures Study (CMS) process is also provided. Discussions on activities that may impact SWMUs, on reporting requirements, and on the use of risk-based decision making are presented in this section. Finally, information submittals, data retention, and the information repository are discussed.

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### **2.1 Applicability**

The Environmental Restoration (ER) Project at LANL is continuing to implement corrective action as necessary to protect human health and the environment from routine and systematic releases of hazardous waste or hazardous constituents from SWMUs at LANL, regardless of the time at which waste was placed in the unit, in accordance with the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), Subpart V, 264.101(a), revised January 1, 1997 [1-1-97]. The corrective action requirements addressed herein apply to the SWMUs at LANL. These SWMUs are identified in Appendix B. Any newly-identified SWMUs discovered during the course of field investigations, environmental audits, groundwater monitoring, or other means will also be subject to the corrective action requirements addressed herein. SWMUs that are active treatment, storage, or disposal units may be addressed under the closure process or the corrective action process.

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In accordance with 20 NMAC 4.1, Subpart V, 264.101(c) [1-1-97], the U.S. Department of Energy (DOE)/University of California (UC) will also implement corrective actions beyond the facility property boundary where necessary to protect human health and the environment. This requirement will be met unless it is demonstrated that, despite best efforts, DOE/UC was unable to obtain the necessary permission to undertake such actions. On-site measures to address such releases will be determined on a case-by-case basis.

## **2.2 Corrective Action Program at LANL**

Until such time as final regulations are adopted, the corrective action program at LANL will follow guidance contained in the proposed regulations under Subpart S, [Corrective Action for Releases From Solid Waste Management Units at Hazardous Waste Management Facilities] (U.S. Environmental Protection Agency [EPA], 1996). The corrective action program at LANL is designed to investigate contamination from SWMUs. One element of this program is the RFI, which is conducted to characterize known or suspected releases from SWMUs to affected media. Results of the RFI may indicate that the site be proposed for NFA, based on human-health and ecological risk. Results of the RFI may also indicate that an additional element of the corrective action program, the CMS, be conducted to evaluate alternatives that could reasonably be implemented as a remedy. The corrective action program at LANL may implement ACAs (i.e., Voluntary Corrective Actions [VCA] or Voluntary Corrective Measure [VCM]) in lieu of a CMS or presumptive remedies prior to a CMS if a remedy is obvious and a cleanup approach is straightforward. Another element of the corrective action program is the corrective measures implementation (CMI), which is the phase that implements the selected remedy, verifies its efficacy, and establishes ongoing control and monitoring requirements, if needed. All of these corrective action program elements are detailed later in this section.

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### **2.3 Notification and Assessment Requirements for Newly-Identified SWMUs**

DOE/UC will notify the New Mexico Environment Department (NMED) in writing within fifteen (15) calendar days of discovery and confirmation of any newly-identified SWMU. In this notification, DOE/UC will include the location of the SWMU and any available information pertaining to the nature of the release (e.g., media affected, potential hazardous constituents released, and magnitude of the release) If requested in writing by the NMED, DOE/UC will propose a schedule for corrective action for the newly-identified SWMU.

HSWA Permit, Section G

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### **2.4 Notification Requirements for Newly-Discovered Releases from SWMUs**

DOE/UC will notify the NMED verbally no later than twenty-four (24) hours and in writing no later than fifteen (15) days after discovery and confirmation of any newly-discovered release from a SWMU. Discovery of a routine and systematic release of hazardous waste or hazardous constituents can occur when a constituent is detected above background concentrations during field investigations, environmental audits, groundwater monitoring, or other activities being conducted as part of the RFI process. When defining the nature and extent of contamination during an investigation, an increase in area, volume, or depth of a constituent is not interpreted as a newly-discovered release.

HSWA Permit, Section H

Proposed Permit Language  
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Section 2.4

### **2.5 RCRA Facility Investigations**

The purpose of the RFI is to first confirm or deny whether a release has occurred and then, if a release has occurred, determine the nature and extent of any contamination at a SWMU and evaluate the environmental pathways along which contaminants could travel to human and environmental receptors. The RFI is implemented through the RFI work plan's sampling and analysis plan to determine if a release has occurred and, if so, to characterize contamination from the release and determine if corrective actions are required. Because LANL covers a large geographical area and has a substantial number of SWMUs, the

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strategy for executing the corrective action process at LANL was to prepare an installation-wide work plan (the Installation Work Plan [IWP]) to describe the technical approach and follow up with numerous RFI work plans, as described below. Elements of the RFI are detailed in Appendix C.

Informational Text

### **2.5.1 Installation Work Plan**

DOE/UC will prepare and submit a revised IWP to the NMED on an annual basis by March 15 of each year. DOE/UC will revise the IWP annually, as needed, by updating or modifying only those sections or appendices that require revision (e.g., the Annual Work Schedule in Appendix D of the IWP). The most recent IWP (Revision 7) was submitted to the NMED for approval in November 1998 (LANL, 1998c). The work schedule will identify work to be performed during the federal fiscal year, based on site prioritization and available funding. The annual work schedule will also include the delivery date for each work activity, as well as projected work planned for the following two fiscal years. For each annual revision, DOE/UC will work with the NMED to develop this work schedule.

HSWA Permit, Section I.1

Proposed Permit Language for Chapter 3, Module 2.0, Section 2.5.1

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Proposed Permit Language for Chapter 3, Module 2.0, Section 2.5.1

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The IWP for LANL follows the NMED-approved outline for facility-wide work plans. The IWP describes LANL and its environmental setting, and addresses the requirements of the corrective action process. It presents the assessment strategy for conducting corrective action at LANL and describes field sampling for conducting characterization and confirming corrective action. The IWP also presents the mechanisms used to track information and data through the ER Project, details a plan for ensuring health and safety of workers during implementation of ER Project activities, and describes the ER Project's waste management activities. In addition, the IWP describes the ER Project's approach to public outreach and public involvement in the decision-making process.

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Currently, four appendices are included in the IWP. They provide descriptions of the technical areas at LANL, listings of potential release sites (e.g., SWMUs) at LANL, a methodology for calculating human-

health screening action levels (SAL) in mesa-top soils and sediments, and the Annual Work Schedule for the ER Project.

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### **2.5.2 Operable Unit RFI Work Plans**

All SWMUs at LANL were originally organized into twenty-four (24) operable units (OU) to be taken through the RFI process, with one work plan to be submitted for each OU. As shown in Table 2-1, LANL submitted work plans for these 24 OUs to the Administrative Authority between 1991 and 1997.

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HSWA Permit, Section I.2

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The OU RFI work plans typically include a description of the OU and its SWMUs, the OU-specific background information, and the environmental setting of the OU; the technical approach for RFI action for the OU; and recommendations for NFA. These work plans also contain OU-specific plans, including a Project Management Plan, a Quality Assurance Project Plan, a Health and Safety Plan, a Records Management Plan, and a Public Involvement Project Plan.

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### **2.5.3 Canyon Systems Work Plans**

Canyon systems work plans have been and will continue to be developed and submitted to the NMED to evaluate the nineteen (19) major drainages that are, or may have been, affected by LANL operations. The purpose of the canyon systems investigations is to evaluate potential current human health and ecological risks from contaminants within the systems and assess future impacts from the transport of these contaminants. The technical approach and methodology for the environmental investigations of the major canyon systems at LANL are presented in the [Core Document for Canyons Investigations] (LANL, 1997b), which was submitted to the NMED in April 1997 and approved by the NMED in March 1998. To effectively and efficiently plan and conduct the investigations of the canyon systems, the 19 canyons were consolidated into 8 groups. A work plan for Los Alamos and Pueblo Canyons (Group 1) was submitted to the NMED in November 1995, for Mortandad Canyon (Group 2) in September 1997, and for Pajarito Canyon (Group 3) in September 1998

HSWA Permit, Section I.5

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It was originally intended to submit work plans for Cañada del Buey and Sandia Canyon (Group 4) in September 1999, and for Water Canyon and Cañon de Valle (Group 6) and Ancho, Indio, and Chaquehui Canyons (Group 7) during Fiscal Year 2000. Work plans for Guaje, Rendija, Barrancas, and Bayo Canyons (Group 5) and for Potrillo and Fence Canyons (Group 8) were originally scheduled for submittal during Fiscal Year 2001. However, the submittal schedule for these remaining work plans may change as a result of the proposed watershed and aggregate approach. In addition, work plans for the remaining canyons may be combined into one or more work plans so that canyons work in the different watershed aggregates can proceed concurrently, if necessary. DOE/UC will continue to work with the NMED Hazardous and Radioactive Materials Bureau (HRMB) in revising the schedule for these work plans.

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#### **2.5.4 Hydrogeologic Workplan**

DOE/UC prepared and submitted a "Hydrogeologic Workplan" (HWP) to the NMED in December 1996. This work plan (LANL, 1998b) was approved by the NMED in March 1998. The HWP describes proposed activities to be performed to characterize the hydrogeologic setting beneath LANL, and to enhance the groundwater monitoring program at LANL. DOE/UC will continue to work with the HRMB in revising the HWP, as needed. The HWP functions as the implementation plan for the Groundwater Protection Management Program Plan (GWPMPP). An annual report, the "Groundwater Annual Status Summary Report," serves as a status report to update activities being conducted for both the HWP and the GWPMPP.

Informational Text

#### **2.5.5 RFI Work Plan Submittals and Work Schedule**

As stated above, RFI work plans for each OU have been submitted. In addition, the "Core Document for Canyons Investigations" (LANL, 1997b) and some of the canyon systems work plans have been submitted (see Table 2-1).

HSWA Permit, Section I.3

DOE/UC will submit work plans in accordance with the annual work schedule in the IWP. DOE/UC will submit revisions to the IWP annually, including any revisions to the work schedule, by March 15 of each year. Only the sections or appendices that require modifications will be submitted. The IWP work schedule is subject to changes resulting from a number of factors, including consideration of NMED and DOE/UC priorities, as appropriate.

### **2.5.6 RFI Reports**

DOE/UC will prepare and submit RFI reports in accordance with the annual work schedule in the IWP. RFI reports will be prepared using the specific format detailed in the Resource Conservation and Recovery Act Facility Investigation Report: Los Alamos National Laboratory Annotated Outline (LANL, 1998d). The NMED and DOE/UC developed the outline jointly and agreed to use the format for all RFI reports submitted after March 1998.

The purpose of the RFI report is to ensure that investigation data are sufficient in quality and quantity to describe any contamination and potential threat to human health and/or the environment, and to determine if corrective action is necessary. The reports will include an executive summary and, for each SWMU, a site description and operational history, investigatory activities, site assessments, and other applicable assessments. Appendices in the reports will include a list of acronyms and a glossary, an operational and environmental setting, results of quality assurance/quality control activities, analytical suites and results, statistical analyses, risk assessment calculations, and relevant documents.

### **2.5.7 Watershed Reports**

A watershed report will be developed for each of the major watersheds at LANL. Each report will summarize the results of characterization and remedial activities undertaken at SWMUs within the watershed. Data summaries from the canyons, material disposal areas, and remedia

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Proposed Permit Language for Chapter 3, Module 2.0, Section 2.5.5

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HSWA Permit, Section 1.4

Proposed Permit Language for Chapter 3, Module 2.0, Section 2.5.6

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action investigations and remedial activities will be integrated into each report, resulting in a complete picture of ER Project activities and information for that watershed. These reports will also document any hand-off within DOE/UC for long-term monitoring or institutional surveillance. Each watershed report will be aligned with the individual watershed schedules.

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The watershed reports will contain, at a minimum, the following elements:

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- Summary of status for all SWMUs in the watershed.
- Resolution of any remaining SWMUs addressed by the ER Project (e.g., recommendation of NFA) including additional risk/data analysis, sampling points, and/or a residual contamination discussion, if necessary.
- Summary of cumulative risks associated with residual contamination in the watershed.
- Description of surveillance and maintenance requirements to ensure protectiveness and effectiveness of corrective actions within the watershed.
- Description of action thresholds and actions associated with surveillance and maintenance activities.
- Proposed time- and trend-based endpoints for monitoring.
- Hand-off of SWMUs to responsible institutional party (e.g., long term surveillance and maintenance, active sites, and/or facilities).

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### **2.5.8 Integrated Technical Strategy**

The ER Project has developed an Integrated Technical Strategy (ITS) to investigate potential release sites (PRS) more effectively and more efficiently. The primary purpose of this ITS is to provide a consistent approach for the technical implementation of the RCRA corrective action process within the ER Project's watershed approach. The ITS will:

- Focus on decisions to be made on an aggregate and watershed scale, as opposed to the scale of individual PRSs.

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- Successfully integrate risk-based decisions at these larger scales by:
  - Integrating the investigations and work performed by the E Project's three operational focus areas – Canyons, Material Disposal Areas, and Remedial Actions.
  - Providing consistent technical approaches for use by the E Project.
  - Providing a framework for data sharing within the ER Project.
- Provide a framework for evaluating human-health, ecological, surface water, and groundwater considerations within a common decision framework.
- Provide data collection criteria that are based on applicable decision criteria and establish consistent processes and procedure for data management.
- Help ensure integration with Laboratory institutional environmental protection and compliance programs.

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## **2.6 Stabilization**

Stabilization may be implemented, through an interim action (IA) or a interim measure (IM), whenever an obvious risk to human health or the environment is identified. The goals of stabilization are to increase the rate of corrective actions by focusing on near-term activities to control or abate threats to human health or the environment, to address source areas, and to prevent or minimize the further spread of contamination. Stabilization should also be a component of, or at least consistent with, final remedies.

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When determining the need for stabilization, DOE/UC and/or the NMED will consider the potential for human or environmental exposure (current and future), the potential for a situation to deteriorate (e.g., a new release may occur due to storms, floods, or structural failure), the time required to develop and implement final remedies under the corrective action program, and the fact that interim measures should be consistent with a final remedy (and in some situations, may

in fact satisfy the final remedy objective). DOE/UC will determine the need for an IA; DOE/UC and the NMED will determine the need for a IM. The DOE/UC and/or the NMED will also consider the presence of high levels of hazardous constituents in the soil at or near the surface and the potential for release; weather conditions that may cause a release of hazardous constituents; the risk of fire, explosion, or other accidents; the presence of uncontrolled sources; and if a drinking water supply may be impacted. If the NMED determines that stabilization is necessary, they will provide a written request to DOE/UC for preparation and submittal of a stabilization work plan for subsequent NMED approval.

## **2.7 Land Use**

Land use refers to the category of functional use for the area of land occupied by the facility on which a SWMU or group of SWMUs is located. A determination of current and future land use is required in characterizing the exposure setting for a human health risk assessment. The categories of land use are defined as residential, which is also considered unrestricted; commercial/industrial; and recreational. Current land use and future land use are differentiated in that current land use refers to the present and future land use refers to uses planned for a site for at least 30 years into the future.

DOE/UC determines current and future land use for SWMUs for which a CMS is required or an ACA is undertaken. If required by the NMED DOE/UC will demonstrate that a future land use determination represents a reasonably anticipated use for at least 30 years into the future. DOE/UC may demonstrate future land use by a number of mechanisms, including institutional long-range planning documents (e.g., "Environmental Restoration Report to Support Land Conveyance and Transfer under Public Law 105-119" [LANL, 1999b]). DOE/UC will submit to the NMED all proposals for remedial alternatives, in particular those supported by human health risk assessments, according to the current and future land uses.

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## **2.8 Accelerated Corrective Actions**

At LANL, ACAs are generally conducted at SWMUs that have both a clear remediation goal and a clear means of implementing this goal using demonstrated technologies. ACAs allow DOE/UC to implement protective, timely, and cost-effective remediation activities without delay. As an enhancement of the sequential process generally followed under RCRA corrective actions, ACAs may be conducted without proceeding through the CMS and/or CMI process. VCAs and VCMs are processes included under ACAs. Either of these processes may be used for any SWMU. Because the ACA approach replaces the standard RCRA corrective action sequence with a more flexible decision-making approach and allows DOE/UC to proceed with corrective actions on an accelerated time frame, the ACA process can be entered at various points in the standard corrective action process (e.g., before or after an RFI work plan is implemented).

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The purpose of an ACA is to efficiently evaluate a SWMU, determine the nature and extent of contamination, apply an effective remedy, and after corrective action implementation, document information necessary to request a permit modification for NFA. Prior to removal of a SWM from Chapter 3 of the renewed permit, a completed ACA (i.e., VCA or VCM) for that SWMU must be approved by the NMED. DOE/UC will provide the NMED with the opportunity to review the VCAs and VCMs planned for each SWMU.

### **2.8.1 Voluntary Corrective Actions**

VCAs are practical at SWMUs where the remedy is obvious, low cost, and easily implementable, and where cleanup goals are well defined. In general, DOE/UC uses VCAs to address small-scale SWMUs that would not require a CMS to identify and achieve a final remedy. VCAs are designed to provide significant human health and environmental

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benefits with minimal regulatory oversight resource costs.

If DOE/UC and the NMED determine that a VCA is appropriate and should be conducted, DOE/UC will prepare and submit a VCA Plan to the NMED for information purposes. Upon completion of VCA activities at a SWMU, DOE/UC will prepare and submit to the NMED a VCA Report describing the corrective action activities conducted and the cleanup levels achieved. Upon approval of this report, the SWMU that are remediated through the VCA process will be removed from the permit by the NMED in accordance with the permit modification process in 20 NMAC 4.1, Subpart IX, 270.42 [1-1-97].

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### **2.8.2 Voluntary Corrective Measures**

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Like VCAs, VCMs may also be implemented at relatively small-scale SWMUs where the remedy selection is obvious. A VCM is similar to a VCA because it is intended to be a final remedy; however, due to complexity, cost, or location of the corrective action or because of site type or public interest, a greater amount of regulatory oversight is required. If the NMED determines that a VCM should be conducted, DOE/UC will prepare and submit a VCM Plan to the NMED for review and approval. If the NMED does not provide comments on the plan within forty-five (45) days, the VCM may be implemented at risk. Upon completion of VCM activities at a SWMU, DOE/UC will prepare and submit a VCM Report to the NMED, describing the corrective action activities conducted and the cleanup levels achieved. SWMUs that are remediated through the VCM process will be removed from the permit by the NMED in accordance with the permit modification process in 20 NMAC 4.1, Subpart IX, 270.42 [1-1-97].

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### **2.9 Determination of No Further Action**

Based on the results of an RFI, ACA, CMS, CMI, or other relevant actions or information, DOE/UC may submit a Class 3 permit modification request to the NMED for an NFA approval, thereby terminating the RFI/CMS process for a specific SWMU. The permit modification request will include information demonstrating that at

least one of the five NFA criteria presented below has been met. The NMED will review the documentation provided by DOE/UC and other information gathered, including public comments received during the sixty (60)-day public comment period required for Class 3 permit modifications, and determine if one or more of the NFA criteria has been met. The NMED will provide this determination in writing to the DOE/UC within one-hundred eighty (180) days after the public comment period has closed. At the time of concurrence, the NMED will approve the requested permit modification, remove the SWMU(s) from the permit, and update the SWMU list in Chapter 3 of the renewed permit.

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The five NFA criteria are:

1. The SWMU cannot be located, does not exist, is a duplicate SWMU, or is located within and therefore investigated as part of another SWMU;
2. The SWMU has never been used for management (i.e., generation, treatment, storage, or disposal) of RCRA solid or hazardous wastes and/or constituents;
3. No release from the SWMU to the environment has occurred, nor is likely to occur in the future;
4. There was a release from the SWMU, but the site was characterized and/or remediated under another authority that adequately addresses corrective action, and documentation, such as a closure letter, exists;
5. The SWMU has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use.

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When site-specific circumstances indicate that a release of hazardous wastes or hazardous constituents is likely to occur, a determination of NFA will not preclude the NMED from requiring DOE/UC to conduct monitoring of environmental media (soil, groundwater, surface water,

or air), if necessary, to protect human health and the environment. Additionally, if new information or subsequent analyses indicate a release or likelihood of a release from a SWMU is likely to pose a threat to human health or the environment, a prior determination of NFA will not preclude the NMED from requiring further investigations studies, or remediation at a later date. In such a case, the NMED may initiate a permit modification in accordance with 20 NMAC 4.1, Subpart IX, 270.41 [1-1-97], to reinsert the SWMU into the permit, thereby rescinding the determination of NFA.

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### **2.10 Presumptive and Conditional Remedies**

Presumptive remedies are preferred remedial technologies for common categories of sites. These remedies are typically based on historic patterns of remedy selection and on scientific and engineering evaluation of performance data on technology implementation. Presumptive remedies also strive for greater consistency among cleanu programs, especially in the process of selecting corrective measures for facilities like LANL. Presumptive remedies should be used, where applicable, to focus RFIs, simplify evaluation of remedial alternatives in the CMS or focused CMS, and influence remedy selection in the CMI. Because presumptive remedies will streamline site investigation and accelerate the remedy selection process, they are expected to ensur the consistent selection of remedial actions and reduce the cost and tim required to clean up similar sites.

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In cases where the EPA has identified a presumptive remedy, DOE/UC will use the CMS to confirm that the presumptive remedy is appropriat to facility-specific conditions. The presumptive remedy process will, to the extent possible, rely on existing data; utilize a streamlined risk assessment approach; and incorporate a focused feasibility study that analyzes the appropriate components of the presumptive remedy and th no action alternative only.

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DOE/UC will apply practical considerations when selecting an

appropriate presumptive remedy. Site-specific conditions may limit or prohibit the use of certain presumptive remedies if, for example, a high water table, wetland, or other sensitive environment is present, or if existing habitats might be destroyed or altered as a result of a particular remedial action. Reasonably anticipated future land use will also receive important consideration at all potential presumptive remedy sites.

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Conditional remedies may be possible for some sites. The NMED may select or DOE/UC may propose a conditional remedy that protects human health and the environment under plausible exposure condition during the term of the permit if the remedy:

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- protects human health and the environment based on current exposure scenarios,
- achieves applicable media cleanup standards or levels beyond the facility boundary,
- prevents further significant degradation of the environmental media through treatment and/or engineering methods (stabilization),
- includes institutional or other controls necessary to prevent significant exposures (including deed restrictions),
- includes continued monitoring to determine whether further significant degradation occurs, and
- complies with state and federal waste management standards.

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Conditional remedies are not final remedies because they do not necessarily meet all standards for remedies included in proposed Subpart S [proposed Code of Federal Regulations, Title 40, Section 264.525(a), [General Standards for Remedies]]<sup>1</sup>. Conditional remedie may be appropriate for facilities that contain a mix of active and inactive units where it is difficult or impossible to distinguish influences. The ER Project will evaluate the use of presumptive and conditional remedies, where appropriate.

<sup>1</sup> EPA originally proposed the Subpart S standards for conditional remedies to be promulgated at 40 CFR 264.525. EPA subsequently promulgated only portions of Subpart S for corrective action management units and temporary units in 40 CFR 264.552 and 264.553.

## **2.11 Corrective Measures Study**

The purpose of a CMS is to identify, develop, and evaluate potential remedial alternatives that might be implemented if characterization conducted during the RFI indicates that corrective measures are needed. These corrective measures are evaluated based on their projected effectiveness in reducing risks to human health and the environment in a cost-effective manner. A CMS can be focused if a remedy exists and the NMED agrees on the focused approach, such as for presumptive remedies. Elements of the CMS are detailed in Appendix D.

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### **2.11.1 CMS Plan**

If the NMED determines that a CMS or focused CMS is necessary and requests in writing that a CMS or focused CMS be conducted for a SWMU or group of SWMUs, DOE/UC will prepare and submit a CM Plan to the NMED within one-hundred eighty (180) calendar days of the request. The CMS Plan will include a description of the general approach to the CMS or focused CMS, a definition of the overall objectives of the study, and specific plans for remedy evaluation to ensure compliance with remedy standards. The CMS Plan will also contain schedules for conducting the study, the proposed format for presentation of information, and any pilot or bench-scale studies necessary.

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In accordance with 20 NMAC 4.2, "Hazardous Waste Fees," the NMED will then review and approve or disapprove the CMS Plan within one-hundred eighty (180) days after the plan is accepted for review and the applicable fee has been assessed and paid. The Secretary may allow an additional sixty (60) calendar days for review upon determination that good cause exists for additional review time and shall notify DOE/UC in writing before the one-hundred eighty (180) days have passed.

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### **2.11.2 CMS Implementation**

DOE/UC will implement the CMS or focused CMS in accordance with

the annual work schedule in the IWP.

### **2.11.3 CMS Report**

DOE/UC will submit a CMS Report to the NMED in accordance with the annual work schedule in the IWP. The CMS Report will summarize the results of the investigations for each remedy studied and for any bench-scale or pilot tests conducted. The report will also include an evaluation of each corrective measures alternative. All information gathered under the approved CMS Plan will be presented. The report will contain sufficient information to enable the NMED to make an informed decision or remedy selection. Based on preliminary results and the CMS Report, the NMED may require DOE/UC to evaluate additional remedies or specific elements of one or more proposed remedies.

In accordance with 20 NMAC 4.2, [Hazardous Waste Fees], the NMED will then review and approve or not approve the CMS Report within one-hundred eighty (180) days after the report is accepted for review and the applicable fee has been assessed and paid. The Secretary may allow an additional sixty (60) calendar days for review upon determination that good cause exists for additional review time and shall notify DOE/UC in writing before the one-hundred eighty (180) days have passed.

### **2.11.4 Remedy Approvals**

The NMED will select a remedy from the corrective measures alternatives evaluated in the CMS Report. The selected remedy will be based on protection of human health and the environment and may include any interim measures implemented to date. The NMED will then initiate a permit modification incorporating the final remedy into the permit. In accordance with 20 NMAC 4.1, Subpart V, 264.140(a) [1-1-97], LANL, as a federal facility, is exempt from the requirements to provide financial assurance mechanisms for completing the approved remedy.

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## 2.12 Risk-Based Decision Making

DOE/UC conducts human health and ecological risk assessments, as necessary, to determine risks to human health and the environment. All stages of a risk assessment work in parallel with levels of response (e.g. ACA, stabilization activities, CMS) to ensure that clear and obvious or immediate contamination problems are addressed in a manner that is protective of human health and the environment; responses may, but do not always, include cleanup.

DOE/UC will use risk assessments to make decisions regarding the corrective action process, including determinations for NFA, in conjunction with remediation strategies. Risk assessments may be used to develop risk-based response levels, which may then be used in conjunction with engineered remediation, restricted access, monitored natural attenuation by an environmental medium, or *in situ* treatment. They may be used to provide a common denominator to compare sites and, thus, prioritize the sites for cleanup.

Risk assessments at LANL begin with site screening and increase in complexity to site-specific risk assessments. The complexity of assessments may be modified to accommodate different decisions. The continuum nominally involves a tiered approach and emphasizes that if there is no exposure, there is no risk. The initial human health risk screening assessment is a conservative screening tool, whereby SALs are compared to contaminant maximum values. For sites where sufficient characterization data exist, upper confidence limits may be used. If one or more of the SALs are exceeded, the risk-based decision making can result in a corrective action response, an evaluation of the extent to which the SAL is exceeded, and the site-specific consequence of no action, or may result in additional work to enhance the specificity of the risk assessment. The next level is the site-specific risk assessment. This approach is more complex through incorporating all potential pathways (e.g., surface water, soil, air, sediments, and groundwater) and exposure scenarios, and may involve probabilistic analysis for heterogeneous contaminant source terms and transport

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processes. These assessments are intended to demonstrate that all remedial actions are protective of human health and the environment, or it might identify pathways that need to be addressed by levels of response.

### **2.13 Activities That May Impact SWMUs**

All major projects at LANL are reviewed to identify environmental, safety, and health (ES&H) issues and concerns; potential hazards; physical security considerations; regulatory requirements; and required actions. DOE/UC will review activities through the ES&H Identification (ESH-ID) process to ensure that applicable ES&H compliance requirements are identified correctly and applied consistently. A relational database has been developed to provide a high degree of automation to the review process. Available data include a category on the location of the project and if it is located within a SWMU. The appropriate line manager is then responsible for resolving any ES&H issues and/or concerns, including any potential impacts on SWMUs identified through the ESH-ID process prior to start or restart of a project or process (e.g., as part of the readiness review for field work). DOE/UC will work with the NMED, Los Alamos County, and involved stakeholders to identify activities that may impact SWMUs beyond LANL boundaries.

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### **2.14 Reporting Requirements**

DOE/UC will submit to the NMED signed quarterly progress reports on all RFI and CMS activities conducted pursuant to the provisions in Chapter 3 of the renewed permit. The progress reports will contain a description of the work completed and an estimate of the percentage of work completed; summaries of all findings, including summaries of validated laboratory data; and summaries of all problems or potential problems encountered during the reporting period and the actions taken to rectify the problems. Additionally, quarterly progress reports will contain information on the projected work for the next reporting period summaries of contacts pertaining to corrective action or environmental matters with representatives of the local community, public interest

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groups, or state government during the reporting period; and changes in key project personnel during the reporting period. Changes in funding (actual or anticipated) that may impact the completion date of the activity and summaries of all changes made in implementation during the reporting period will also be included in these progress reports.

Copies of other reports relating to or having bearing upon the corrective actions specified herein will be made available to the NMED upon request. Examples include inspection reports, drilling logs, and laboratory data.

### **2.15 Information Submittals**

DOE/UC will ensure that the IWP, RFI Work Plans (and Sampling and Analysis Plans), RFI Reports, Stabilization Plans, CMS Plans, and CMS Reports submitted to the NMED are signed and certified, if required, in accordance with 20 NMAC 4.1, Subpart IX, 270.11 [1-1-97].

### **2.16 Data Retention**

UC will retain all raw data gathered or generated during the corrective action process. These data include, but will not be limited to, laboratory reports, drilling logs, bench-scale or pilot-scale data, and other supporting information. The data will be maintained at LANL during the effective term of Chapter 3 of the renewed permit.

### **2.17 Information Repository**

DOE/UC will provide public access to information related to the corrective action program at LANL. An information repository has been established in the LANL Reading Room at the Los Alamos National Laboratory Community Relations Office in Los Alamos, which provides the public an opportunity to review and comment on E Project documents and the corrective action activities being conducted at LANL. The repository is easily accessible to the public.

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**Table 2-1**

**RFI<sup>a</sup> Work Plans for Operable Units (OU) and Canyons at Los Alamos National Laboratory**

Work Plan	Date to AA <sup>b</sup>
RFI Work Plan for OU 1106	5/23/91 (A) <sup>c</sup>
RFI Work Plan for OU 1079	5/1/92 (A)
RFI Work Plan for OU 1129	5/20/92 (A)
RFI Work Plan for OU 1144	5/20/92 (A)
RFI Work Plan for OU 1147	5/20/92 (A)
RFI Work Plan for OU 1078	5/20/92 (A)
RFI Work Plan for OU 1122	5/20/92 (A)
RFI Work Plan for OU 1071	10/16/92 (A)
RFI Work Plan for OU 1093	5/14/93 (A)
RFI Work Plan for OU 1148	5/23/93 (A)
RFI Work Plan for OU 1098	6/4/93 (A)
RFI Work Plan for OU 1130	6/9/93 (A)
RFI Work Plan for OU 1132	6/18/93 (A)
RFI Work Plan for OU 1111	6/30/93 (A)
RFI Work Plan for OU 1086	7/1/93 (A)
RFI Work Plan for OU 1114	7/7/93 (A)
RFI Work Plan for OU 1082	7/15/93 (A)
RFI Work Plan for OU 1157	7/23/93 (A)
RFI Work Plan for OU 1140	8/19/93 (A)
RFI Work Plan for OU 1154	5/23/94 (A)
RFI Work Plan for OU 1136	5/23/94 (A)
RFI Work Plan for OU 1085	5/23/94 (A)
RFI Work Plan for OU 1100	5/25/94 (A)
RFI Work Plan for Los Alamos and Pueblo Canyons (Group 1)	11/28/95 (A)
RFI Work Plan Core Document for Canyons Investigation	4/2/97 (A)
Mortandad Canyon Work Plan (OU 1049) (Group 2)	9/25/97 (A)
Hydrogeologic Workplan	5/98 (A)
RFI Work Plan for TA-53 Surface Impoundments	6/18/98 (A)
Work Plan for Pajarito Canyon (Group 3)	9/29/98 (A)
Group 4 Canyons Work Plan	9/99 (S) <sup>d</sup>
Group 6 Canyons Work Plan	3/00 (S)
Group 7 Canyons Work Plan	9/00 (S)
Group 8 Canyons Work Plan	3/01 (S)
Group 5 Canyons Work Plan	6/01 (S)

<sup>a</sup> Resource Conservation and Recovery Act Facility Investigation.

<sup>b</sup> Administrative Authority (i.e., the U.S. Environmental Protection Agency or the New Mexico Environment Department).

<sup>c</sup> Actual date of submittal.

<sup>d</sup> Schedule date for submittal, per the "Hydrogeologic Workplan," LANL, 1998b.

### **3.0 References**

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**APPENDIX A  
PROPOSED CORRECTIVE ACTION  
SCHEDULE OF COMPLIANCE**

**Proposed Corrective Action Schedule of Compliance**

Task	Schedule
The Department of Energy (DOE)/University of California (UC) will provide written notification on newly-identified solid waste management units (SWMU) to the New Mexico Environment Department (NMED).	<ul style="list-style-type: none"> <li>• Within fifteen (15) calendar days after discovery and confirmation</li> </ul>
DOE/UC will provide verbal notification of newly-discovered releases to the NMED.	<ul style="list-style-type: none"> <li>• Within twenty-four (24) hours after discovery and confirmation</li> </ul>
DOE/UC will provide written notification of newly-discovered releases to the NMED.	<ul style="list-style-type: none"> <li>• Within fifteen (15) calendar days after discovery</li> </ul>
DOE/UC will submit an annual update for the Installation Work Plan (IWP).	<ul style="list-style-type: none"> <li>• By March 15 each year</li> </ul>
DOE/UC will prepare and submit Resource Conservation and Recovery Act Facility Investigation (RFI) and Canyon Systems Work Plans.	<ul style="list-style-type: none"> <li>• According to the schedule in the IWP</li> </ul>
NMED will declare RFI and Canyon Systems Work Plans administratively complete.	<ul style="list-style-type: none"> <li>• Within sixty (60) days of receipt</li> </ul>
NMED will declare RFI and Canyon Systems Work Plans technically adequate.	<ul style="list-style-type: none"> <li>• Within one-hundred eighty (180) days of declaring the plan to be administratively complete, with an additional sixty (60)-day extension allowed</li> </ul>
DOE/UC will respond to comments and revise or modify RFI and Canyon Systems Work Plans.	<ul style="list-style-type: none"> <li>• Within thirty (30) days of receiving written notification from the NMED</li> <li>• Requests for extensions will be made in writing prior to the due date</li> </ul>
DOE/UC will implement approved RFI and Canyon Systems Work Plans.	<ul style="list-style-type: none"> <li>• Within one-hundred eighty (180) days of receiving written notification of approval for an RFI or Canyon Systems Work Plan from the NMED</li> </ul>
DOE/UC will prepare RFI Reports.	<ul style="list-style-type: none"> <li>• According to schedule in the IWP</li> </ul>
NMED will declare RFI Reports administratively complete.	<ul style="list-style-type: none"> <li>• Within sixty (60) days of receipt</li> </ul>
NMED will declare RFI Reports technically adequate.	<ul style="list-style-type: none"> <li>• Within one-hundred eighty (180) days of declaring the report to be administratively complete, with an additional sixty (60)-day extension allowed</li> </ul>
DOE/UC will respond to comments and revise or modify RFI Reports.	<ul style="list-style-type: none"> <li>• Within thirty (30) days of receiving written notification from the NMED</li> <li>• Requests for extensions will be made in writing prior to the due date</li> </ul>
DOE/UC may implement, at risk, Accelerated	<ul style="list-style-type: none"> <li>• After submitting the VCA Plan to the NMED</li> </ul>

Corrective Actions in accordance with a Voluntary Corrective Action (VCA) Plan.	for informational purposes
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**Proposed Corrective Action Schedule of Compliance (Continued)**

Task	Schedule
DOE/UC may implement, at risk, Accelerated Corrective Actions in accordance with a Voluntary Corrective Measure (VCM) Plan.	<ul style="list-style-type: none"> <li>Forty-five (45) days after submitting the VCM Plan to the NMED for review and approval</li> </ul>
DOE/UC will prepare VCA/VCM Reports.	<ul style="list-style-type: none"> <li>Within one-hundred eighty (180) days of completion of the VCA/VCM</li> </ul>
DOE/UC will prepare and submit Stabilization Work Plans.	<ul style="list-style-type: none"> <li>Within one-hundred eighty (180) days after DOE/UC determines the need for an Interim Action or the NMED determines and notifies DOE/UC in writing of the need for an Interim Measure</li> </ul>
DOE/UC will respond to comments and revise or modify Stabilization Work Plans.	<ul style="list-style-type: none"> <li>Within thirty (30) days of receiving written notification from the NMED</li> <li>Requests for extensions will be made in writing prior to the due date</li> </ul>
DOE/UC will implement the Stabilization Work Plan.	<ul style="list-style-type: none"> <li>As negotiated with the NMED</li> </ul>
DOE/UC will prepare a Stabilization Report.	<ul style="list-style-type: none"> <li>Within one-hundred eighty (180) days of completing implementation of the Stabilization Work Plan</li> </ul>
DOE/UC will prepare and submit a Corrective Measures Study (CMS) Plan or focused CMS Plan.	<ul style="list-style-type: none"> <li>Within one-hundred eighty (180) days of receiving written notification from the NMED</li> </ul>
NMED will declare CMS Plans or focused CMS Plans administratively complete.	<ul style="list-style-type: none"> <li>Within sixty (60) days of receipt</li> </ul>
The NMED will review and approve or disapprove CMS Plans or focused CMS Plans.	<ul style="list-style-type: none"> <li>Within one-hundred eighty (180) days after the plan is accepted, and the fee is assessed and paid, with an additional sixty (60)-day extension allowed</li> </ul>
DOE/UC will respond to comments and revise or modify CMS Plans or focused CMS Plans.	<ul style="list-style-type: none"> <li>Within thirty (30) days of receiving written notification from the NMED</li> <li>Requests for extensions will be made in writing prior to the due date</li> </ul>
DOE/UC will implement the CMS or focused CMS.	<ul style="list-style-type: none"> <li>According to the schedule in the IWP</li> </ul>
DOE/UC will prepare a CMS or focused CMS Report.	<ul style="list-style-type: none"> <li>According to the schedule in the IWP</li> </ul>
NMED will review and approve or disapprove CMS or focused CMS Reports.	<ul style="list-style-type: none"> <li>Within one-hundred eighty (180) days of receipt</li> </ul>
DOE/UC will respond to comments and revise or	<ul style="list-style-type: none"> <li>Within thirty (30) days of receiving written</li> </ul>

modify CMS or focused CMS Reports.	notification from the NMED <ul style="list-style-type: none"> <li>• Requests for extensions will be made in writing prior to the due date</li> </ul>
NMED will initiate a permit modification incorporating a final remedy into the permit.	<ul style="list-style-type: none"> <li>• Within thirty (30) days after approving a remedy recommendation</li> </ul>

**Proposed Corrective Action Schedule of Compliance (Continued)**

Task	Schedule
DOE/UC will prepare and submit a Corrective Measures Implementation (CMI) Plan.	<ul style="list-style-type: none"> <li>• Within one-hundred eighty (180) days of the effective date of the permit modification</li> </ul>
NMED will declare CMI Plans administratively complete.	<ul style="list-style-type: none"> <li>• Within sixty (60) days of receipt</li> </ul>
NMED will review and approve or disapprove CMI Plans.	<ul style="list-style-type: none"> <li>• Within one-hundred eighty (180) days after the plan is accepted, and the fee is assessed and paid, with an additional sixty (60)-day extension allowed</li> </ul>
DOE/UC will respond to comments and revise or modify the CMI Plans.	<ul style="list-style-type: none"> <li>• Within thirty (30) days of receiving written notification from the NMED</li> </ul>
DOE/UC will implement the CMI.	<ul style="list-style-type: none"> <li>• After NMED approval of the CMI Plan and according to the schedule in the CMI Plan</li> </ul>
DOE/UC will prepare a CMI Report.	<ul style="list-style-type: none"> <li>• Within one-hundred eighty (180) days of completion of the CMI or according to the schedule in the approved CMI Plan</li> </ul>
NMED will review and approve or disapprove CMI Reports.	<ul style="list-style-type: none"> <li>• Within one-hundred eighty (180) days of receipt</li> </ul>
DOE/UC will respond to comments and revise or modify CMI Reports.	<ul style="list-style-type: none"> <li>• Within thirty (30) days of receiving written notification from the NMED</li> </ul>

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**APPENDIX B**  
**SOLID WASTE MANAGEMENT UNITS (SWMU)**  
**AT LOS ALAMOS NATIONAL LABORATORY**

The proposed tables in this appendix were developed using existing tables within Module VIII of the Laboratory's Hazardous Waste Facility Permit (Permit), the recently completed Annual Unit Audit, and the outcome of ongoing discussions between the U.S. Department of Energy (DOE)/University of California (UC) and the New Mexico Environment Department (NMED) on consolidation of units. The draft tables are:

1. Table I – a list of Hazardous and Solid Waste Amendments-regulated solid waste management units (SWMU) cross-referenced with operable units, consolidated units, and watersheds;
2. Table II – a list of SWMUs removed from Module VIII of the Permit via permit modification requests submitted to the NMED or the U.S. Environmental Protection Agency; and
3. Table III – a list of consolidated SWMUs and areas of concern cross-referenced with Tables A and B of Module VIII of the Permit.

These tables are included in this document for the sole purpose of proposing a format for the information. The final tables or lists of SWMUs, which are expected to be incorporated into the permit to be drafted and renewed for the Laboratory, will be developed and available at the conclusion of discussions between the NMED Hazardous and Radioactive Materials Bureau and DOE/UC regarding renewal of the Laboratory's Permit.

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**APPENDIX C**  
**ELEMENTS OF THE RESOURCE CONSERVATION AND  
RECOVERY ACT (RCRA) FACILITY INVESTIGATION (RFI)**

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## **List of Abbreviations/Acronyms**

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ACA	Accelerated Corrective Actions
CMI	Corrective Measures Implementation
CMS	Corrective Measure Study
DOE	U.S. Department of Energy
DQO	data quality objectives
EPA	U. S. Environmental Protection Agency
ER	Environmental Restoration
FIMAD	Facility for Information Management, Analysis, and Display
HASP	Health and Safety Plan
HSWA	Hazardous and Solid Waste Amendments
IWP	Installation Work Plan
LANL	Los Alamos National Laboratory
NFA	No Further Action
NMED	New Mexico Environment Department
OU	operable unit
PIP	Public Involvement Plan
PIPP	Public Involvement Project Plan
PMP	Project Management Plan
QAPjP	Quality Assurance Project Plan in Annex II of the RFI work plan
QAPP	Quality Assurance Project Plan
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RMP	Records Management Plan
RMPP	Records Management Project Plan
RPF	Records Processing Facility
SAP	sampling and analysis plan
SSHASP	site-specific health and safety plan
SWMU	solid waste management unit
UC	University of California
WMP	Waste Management Plan

## **APPENDIX C**

### **ELEMENTS OF THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) FACILITY INVESTIGATION (RFI)**

#### **C.1 Purpose**

The purpose of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) is to determine whether a release has occurred from a solid waste management unit (SWMU) and then, if a release has occurred, to determine the nature and extent of contamination at a SWMU. The U.S. Department of Energy (DOE)/University of California (UC) will furnish all personnel, materials, and services necessary for, or incidental to, performing RFIs at Los Alamos National Laboratory (LANL). Required information for each RFI includes, but is not limited to, the items described in Sections C.3 through C.6 below.

#### **C.2 Scope of the RFI**

The scope of the RFI at LANL consists of an Installation Work Plan (IWP), RFI Work Plans, facility investigations, and RFI Reports. Specific requirements contained in the scope of the RFI may not always be applicable; DOE/UC will identify any inapplicable requirements and provide the rationale for why they are not applicable.

#### **C.3 Installation Work Plan**

The IWP describes how each step in the corrective action process is being and will continue to be implemented at LANL. Only those sections or appendices that require modification, such as the Annual Work Schedule in Appendix D of the IWP, will be revised annually to reflect the current status of the Environmental Restoration (ER) Project at LANL and submitted to the New Mexico Environment Department (NMED). The IWP may need to be modified in Fiscal Year 2000 to reflect the watershed-based approach, the Integrated Technical Strategy, and the role of sampling and analysis plans. The elements of the IWP are outlined below.

##### **C.3.1 Project Management Plan**

The Project Management Plan (PMP) in the IWP describes the background for ER work at LANL and the purpose, scope, and structure of the ER Project. The background description includes a brief overview of the DOE Office of Environmental Restoration and Waste Management role in the ER Project, defines the primary mission, and shows the IWP's organization, chapter by chapter. The ER Project purpose and its scope, which includes the RFI, the Corrective Measures Study (CMS),

and the Corrective Measures Implementation (CMI), are also summarized in the PMP. The summary presents information on the statutory and regulatory framework under which the ER Project operates, and discusses the project management, technical, and quality assurance objectives of the ER Project. In addition, the PMP provides a description of the current structure of the ER Project, including the organization of the project office, the project's planning and control system, and reporting requirements.

### **C.3.2 Facility Description**

The IWP presents a description of and the environmental setting for the LANL facility. The description includes a summary of the operational history, regional location, and geography. Additionally, information on surrounding land use and population distribution is presented in this description. The environmental setting addresses geology, hydrology, ecology, and meteorology. Numerous figures are included in the facility description.

### **C.3.3 Quality Assurance Project Plan**

The Quality Assurance Project Plan (QAPP) describes the ER Project's technical approach to environmental restoration, including the requirements of the corrective action process, the project's assessment strategy, field sampling, and site management and recordkeeping. The technical approach incorporates elements of data quality objectives (DQO), risk assessment, and the U.S. Environmental Protection Agency (EPA) Superfund Accelerated Cleanup Model (EPA, 1993) to facilitate the rapid cleanup of SWMUs.

The three (3) main phases of the RCRA corrective action process are the RFI, the CMS, and the CMI. The ER Project also utilizes Accelerated Corrective Actions (ACA), when appropriate. The requirements for RFIs, ACAs, CMSs, and CMIs are detailed in the QAPP, along with guidance for special situations in the corrective action process (e.g., interim measures, coordination of corrective actions with RCRA closures). Site prioritization criteria are also presented in the QAPP.

An assessment strategy for the ER Project is also described in the QAPP. This assessment strategy incorporates a decision-oriented approach based on the EPA DQO process (EPA, 1994) to implement the RCRA corrective action process. The strategy also incorporates future land-use planning. The approach to data collection and evaluation utilizes site-screening decisions, further action decisions, and risk-based decisions.

The QAPP provides information on field sampling activities, including the objectives of field sampling, the field quality assurance (QA)/quality control (QC) program, sampling equipment and procedures, and sample handling and analysis procedures. A summary of site management and recordkeeping is also presented in the QAPP.

#### **C.3.4 Records Management Plan**

The Records Management Plan (RMP) in the IWP establishes general guidelines for records management, including technical data. Records management procedures and their implementation are presented, and descriptions of the ER Project's Records Processing Facility (RPF) and Facility for Information Management, Analysis, and Display (FIMAD) are provided. The RMP also describes how records management is coordinated with the quality program, project management, and public involvement activities.

#### **C.3.5 Health and Safety Plan**

The Health and Safety Plan (HASP) in the IWP is based on a health and safety plan developed by the ER Project. That plan establishes generic health and safety information and requirements applicable to ER field operations project wide. Responsibilities of project team, health and safety, health physics, and project support personnel are detailed in the HASP, as are training requirements, medical surveillance requirements, and health and safety-related recordkeeping requirements. The IWP HASP indicates that a site-specific health and safety plan (SSHASP) will be prepared for each field project (e.g., an investigation or cleanup of a SWMU or group of SWMUs). As presented in the IWP HASP, SSHASPs discuss background information specific to the project, include a hazard assessment, indicate personal protective equipment requirements, specify procedures for decontamination, and contain site-specific emergency and contingency plan information.

#### **C.3.6 Waste Management Plan**

A Waste Management Plan (WMP) is included in the IWP and describes how wastes generated during the corrective action process are managed. The WMP addresses waste characterization and classification strategies, waste management operations for various waste types, control measures for waste storage, and documentation. Waste minimization and pollution prevention techniques applicable to the ER Project are also discussed in the WMP.

#### **C.3.7 Public Involvement Plan**

The final chapter in the IWP is the Public Involvement Plan (PIP), which outlines the ER Project's current approach to public involvement. The plan also describes the involvement process, which includes information preparation, information dissemination, and public input.

### **C.3.8 Appendices**

The IWP contains four (4) appendices. These appendices provide descriptions of the technical areas at LANL, list the SWMUs at LANL, present the methodology for calculating human health screening action levels in mesa-top soils and sediments, and establish the annual work schedule for the ER Project at LANL.

## **C.4 RFI Work Plans**

At LANL, SWMUs were originally organized into twenty-four (24) operable units (OU) to be taken through the RFI process, with one RFI work plan to be submitted for each OU. In keeping with this strategy for executing the corrective action process at LANL, all 24 OU work plans have been developed and submitted to the NMED. In addition, canyon systems work plans have been and will continue to be developed and submitted to the NMED to evaluate the nineteen (19) major drainages that are, or may have been, affected by operations. To effectively and efficiently plan and conduct the investigations of the canyons systems, the 19 canyons were consolidated into eight (8) groups, with one work plan to be submitted for each canyons group. The elements of these work plans are described below.

### **C.4.1 Executive Summary**

The Executive Summary for each work plan concisely presents the purpose of the plan, illustrates the relationship of the plan to the IWP, briefly describes the background for the site (i.e., the OU or the canyons group), and presents the technical approach for the investigation. Schedule and cost estimates, various planned reports, and mandates for public involvement are also provided in the Executive Summary.

### **C.4.2 Introduction**

An introduction to each work plan typically discusses the statutory and regulatory background, which explains the driver for the work plan. Additional detail on the relationship to the IWP is also provided in the introduction, along with a more complete description of the OU or canyons group. The introduction also presents the organization of the work plan to quickly familiarize the reader with the document structure.

### **C.4.3 Background Information**

A detailed description of the OU or canyons group is provided in the Background Information section. This description typically includes the geographic setting, and may include additional OU- or canyons group-specific information pertinent to the work plan. A discussion of the operational history and current conditions is also provided in this section. In addition, past and current waste management practices are presented, as applicable.

### **C.4.4 Environmental Setting**

The Environmental Setting section for each OU or canyons group focuses on the site-specific information required to evaluate potential migration pathways and conceptual exposure models. When relevant to a work plan, information contained in the IWP is cited.

The site-specific information includes a physical description of the OU or canyons group, a discussion on climate, and a summary of cultural and biological resources. Specific information on the geology of the OU or canyons group is also presented, and includes descriptions of bedrock stratigraphy, structure, and surficial deposits. Discussions of surficial deposits include alluvium and colluvium, soil, and erosional processes. Site hydrology and a conceptual hydrologic model are also typically addressed in the Environmental Setting section. In addition, information on surface-water hydrology (including runoff and infiltration) and hydrogeology (addressing the vadose zone, alluvial aquifer, perched aquifer, regional aquifer, and water quality) is contained in this section. Finally, a conceptual three-dimensional geologic/hydrologic model of the OU or canyons group is presented. The primary release mechanisms and migration pathways of concern addressed in these models typically include surface water runoff and sediment transport, erosion and surface exposure, infiltration and transport in the vadose and/or saturated zone, and atmospheric dispersal of particulates.

#### **C.4.5 Technical Approach**

Each work plan contains a section that describes the technical approach for evaluating SWMUs or groups/aggregates of SWMUs during the RFI. Because each work plan addresses a specific OU or canyons group, the technical approaches vary somewhat. Generally, the technical approach in each work plan adopts the phased approach. This approach may lead to the decision of no further action (NFA), deferred action, ACA, Phase I sampling, or Phase II sampling. The methodology adopts the philosophy of the observational approach and incorporates the DQO process, which bases decisions for actions on definitions for acceptable uncertainties that depend on the current phase of the investigation. The ER Project has also adopted a risk-based approach to making corrective action decisions during the RFI process.

#### **C.4.6 Evaluation of SWMUs**

This section of the work plans typically presents descriptions of and sampling plans for the SWMUs or groups/aggregates of SWMUs that require evaluation. A conceptual exposure model is presented, discussing contamination and potential pathways and exposure routes. In addition, remediation decisions and investigation objectives are provided, and data needs and DQOs are addressed. The sampling strategy and objectives and a sampling and analysis plan (SAP) are also presented in this section. The SAP may include information on field screening, surveys, sampling rationale and techniques, laboratory analysis, and sample QA.

#### **C.4.7 No Further Action**

The NFA section of work plans presents information on SWMUs that meet one or more of the NFA criteria; thus, these SWMUS are immediately proposed for NFA and do not require an RFI. A description and history for each SWMU recommended for NFA are provided, along with the basis or rationale for the NFA recommendation.

#### **C.4.8 Project Management Plan**

A PMP is presented as Annex I of the work plans. This plan is an extension of the PMP included as Annex I of the IWP; deviations from the IWP, if any, are documented in the work plan PMP. The work plan PMP also discusses the technical approach, proposed schedule, and anticipated budget for implementing the work plan. In addition, the work plan PMP clearly documents the overall management approach by providing details of the management organization for the RFI and the responsibilities of key personnel directing and/or performing the RFI.

#### **C.4.9 Quality Assurance Project Plan**

Annex II of the work plans is a Quality Assurance Project Plan (QAPjP). The QAPjP addresses data collection strategy, sampling and field measurements, and sample analyses performed during site investigation and characterization activities. The purpose of the QAPjP is to ensure that these site investigation and characterization activities are technically sound, statistically valid, and properly documented. Often, to meet the objectives of the QAPjP, other sections in the work plan or the QAPP in Chapter 3 of the IWP are referenced, or the QAPjP is written as a matrix report based on the IWP QAPP.

The data collection strategy is discussed in the QAPjP (or referenced appropriately); this strategy describes the intended uses for the data and the necessary levels of precision and accuracy for the intended uses. In addition, the methods and procedures used to assess the precision, accuracy, and completeness of the data are presented.

Sampling and field measurements information is also presented in the QAPjP or is referenced to other sections in the work plan or the IWP QAPP. The information presented or referenced addresses how appropriate sampling and field measurement locations and depths were selected, indicates the number of samples to be collected, and identifies selected parameters and the rationale for these parameters. Additionally, the information describes the frequency and duration of sampling, sample types (e.g., composite, grab), and equipment decontamination procedures. Field documentation activities, appropriate sample container selection, sample preservation methods, and chain-of-custody controls are also presented in the QAPjP or referenced to other sections in the work plan or the IWP QAPP.

Sample analyses information that is addressed in the QAPjP or referenced to other sections in the work plan, the IWP QAPP, or other ER Project documents includes chain-of-custody and sample storage procedures, holding times, sample preparation methods, and analytical procedures. Calibration procedures and frequency; data reduction, validation, and reporting; internal QC checks; and laboratory performance and systems audits and frequency are also addressed in the QAPjP or referenced appropriately.

#### **C.4.10 Health and Safety Plan**

A HASP is included as Annex III of the work plans. The purpose of the HASP is to recognize potential health and safety hazards, describe techniques for hazards evaluations, and identify control

methods. The goal is to eliminate injuries and illness, minimize exposure to various agents during ER activities, and provide contingencies for events that may occur during these activities. Detailed SSHASPs are prepared for each field project involving investigation or cleanup of a SWMU or group of SWMUs.

The HASP describes the general and individual key personnel responsibilities for overall health and safety, provide or reference a facility description of the investigation site, and present information on hazards identification and assessment. Task-by-task risk analyses are developed and documented in the SSHASPs. Site access control procedures and work zone are also addressed in the HASP; specific work zone information is included in each SSHASP. In addition, information on levels of personal protective equipment to be worn and on hazards control and site monitoring, including personal monitoring to protect workers from weather-related problems, is contained in the HASP. Emergency treatment, decontamination procedures for personnel and equipment, site emergency procedures, and routine and special training requirements are also addressed in the HASP. Regulations and guidance used in developing the HASP are summarized in each annex.

#### **C.4.11 Records Management Project Plan**

Annex IV of each work plan is a Records Management Project Plan (RMPP). The RMPP typically refers back to Chapter 4, the RMP, of the IWP. The IWP RMP supports environmental cleanup work by establishing general guidelines for records management, including technical data. The plan describes records management procedures and their implementation. The RMP also describes the ER Project's records facilities' (the RPF and FIMAD) capabilities and presents information on the coordination of records management with the quality program, project management, and public involvement activities.

#### **C.4.12 Public Involvement Project Plan**

A Public Involvement Project Plan (PIPP) is included as Annex V of each work plan. The PIPP typically refers back to Chapter 7, the PIP, of the IWP. The IWP PIP emphasizes early public participation in developing recommendations for ER Project activities. Information regarding ER Project activities that is prepared for the public includes progress reports, news releases, informal handouts for tours, and information or fact sheets. Communication with the public is maintained through community meetings, tours, and related programs; notifications of these events are provided through mailings from the LANL facility mailing list, public service announcements on local radio stations, publications in local newspapers, and information on the world wide web site. A repository

for documents about activities at LANL, including ER Project documents, is located in the Reading Room at the Los Alamos National Laboratory Community Relations Office in Los Alamos. Some ER Project technical reports and other key documents are also provided to the Mesa Public Library in Los Alamos, the public libraries in Española and Santa Fe, and the Office of the Governor of the San Ildefonso Pueblo. In addition, in the event of a newly-discovered off-site release, affected parties and impacted surrounding communities (e.g., San Ildefonso Pueblo) are notified as soon as possible.

### **C.5 Facility Investigation**

The RFI activities at LANL will generally follow the work plans. It may be necessary during the RFI to revise a work plan to increase or decrease the amount of information to be collected. Sampling and analysis associated with the facility investigations will be conducted in accordance with each work plan QAPP.

Facility investigations of SWMUs or groups of SWMUs will be conducted to characterize the site, define the source, define the degree and extent of contamination, and identify actual or potential receptors. The investigations will result in data of adequate technical quality to support the development and evaluation of the corrective measures alternative(s) during the CMS, when necessary.

For each facility investigation, DOE/UC will prepare and submit to the NMED a technical progress report for the previous quarter. This quarterly progress report will summarize the work performed and provide results of sampling and analysis conducted in the previous quarter.

### **C.6 RFI Report**

After completion of a facility investigation, DOE/UC will analyze the data collected during the RFI to ensure that the data are sufficient in quality and quantity to describe the contamination and any potential threat to human health or the environment, to conduct a risk assessment if needed, and to support the CMS if one is required. DOE/UC will prepare a detailed RFI Report in accordance with the annual work schedule in the IWP. The RFI Report will describe the contamination at a site, including sources and migration pathways. The report will also include information on actual or potential receptors. All information generated during the investigation will be presented and analyzed, and all evidence and procedures used for making any determinations will be well

documented. In addition, all relevant and applicable requirements for the protection of human health and the environment will be identified.

### **C.7      *References***

EPA, see U.S. Environmental Protection Agency

LANL, see Los Alamos National Laboratory

Los Alamos National Laboratory (LANL), 1990, [Solid Waste Management Units Report,] Volumes I through IV, LAUR 90-3400, Los Alamos National Laboratory, Los Alamos, New Mexico.

U.S. Environmental Protection Agency (EPA), 1994, [Guidance for the Data Quality Objectives Process,] EPA QA/G-4, Final, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 1993, [Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA,] EPA/540-R-93-057, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency, (EPA), 1990, [Module VIII: Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments to RCRA for Los Alamos National Laboratory, EPA I.D. NM0890010515,] EPA Hazardous Waste Management Division, Dallas, Texas.

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**APPENDIX D**  
**ELEMENTS OF THE RESOURCE CONSERVATION AND**  
**RECOVERY ACT (RCRA)**  
**CORRECTIVE MEASURE STUDY (CMS)**

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## **List of Abbreviations/Acronyms** \_\_\_\_\_

CMI	Corrective Measures Implementation
CMS	Corrective Measures Study
DOE	U.S. Department of Energy
EPA	U. S. Environmental Protection Agency
NMED	New Mexico Environment Department
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SWMU	solid waste management unit
UC	University of California

## **APPENDIX D**

### **ELEMENTS OF THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) CORRECTIVE MEASURE STUDY (CMS)**

#### **D.1 Purpose**

The purpose of the Resource Conservation and Recovery Act (RCRA) Corrective Measures Study (CMS) is to develop and evaluate the corrective measures alternative(s) and to recommend the corrective measures to be taken when a presumptive remedy is not available. The U.S. Department of Energy (DOE)/University of California (UC) will furnish the personnel, materials, and services necessary to prepare the CMS at Los Alamos National Laboratory, except where noted.

#### **D.2 Scope of Work**

The CMS Scope of Work consists of the CMS Plan, the CMS, and the CMS Report. Specific requirements contained in this Scope of Work may not always be applicable (e.g., a focused CMS is determined to be more appropriate); DOE/UC will identify any inapplicable requirements and provide the rationale for why they are not applicable. The final Scope of Work will contain only that information necessary to complete the RCRA CMS.

#### **D.3 CMS Plan**

If the New Mexico Environment Department (NMED) determines that a CMS or focused CMS should be conducted at a particular site, they will notify DOE/UC in writing. DOE/UC will then prepare a CMS Plan, which will describe the current situation at the site, establish corrective action objectives, describe the approach to the CMS or focused CMS, and include a schedule for the CMS.

##### **D.3.1 Current Situation Description**

To update information provided in the RCRA Facility Investigation (RFI) Report, the CMS Plan will include a description of the current conditions at the facility. This updated information will also address previous remedial activities and any interim measures that have been or are being implemented at the site. The purpose of the CMS Plan, based on the results of the RFI, will also be presented and will identify the actual or potential exposure pathways that will be addressed by corrective measures according to the current and future land use for the area being studied.

### **D.3.2 Corrective Measures Objectives**

DOE/UC, in conjunction with the NMED, will establish site-specific objectives for the corrective measures. These objectives will be based on public health and environmental criteria, information gathered during the RFI, U.S. Environmental Protection Agency (EPA) guidance, and the requirements of any applicable state and federal statutes and regulations.

### **D.3.3 CMS General Approach**

The CMS Plan will describe the general approach to the CMS or focused CMS. The approach will include identification, development, screening, and evaluation of the corrective measures alternative(s). Specific plans for laboratory and bench-scale studies, or field studies, if needed, will also be described in the CMS Plan. In addition, specific plans for evaluating corrective measures effectiveness will be developed and included in the plan.

### **D.3.4 CMS Schedule**

DOE/UC will develop a schedule for implementing the CMS or focused CMS. This schedule will be included in the CMS Plan.

## **D.4 Corrective Measures Study**

The CMS or focused CMS consists of identification, screening, development, evaluation, and recommendation of the corrective measures alternative(s).

### **D.4.1 Identification of Preliminary Corrective Measures Alternative(s)**

Based on the results of the RFI and the CMS Plan objectives, DOE/UC will identify all possible alternatives for removal, containment, treatment, and/or other remediation of contamination. A CMS can be focused if a remedy exists and the NMED agrees on the focused approach.

### **D.4.2 Screening of Preliminary Corrective Measures Alternative(s)**

DOE/UC will screen the identified preliminary corrective measures alternative(s) to eliminate those that may not prove feasible to implement, that rely on technologies unlikely to perform satisfactorily or reliably, or that will not achieve the corrective measures objective within a reasonable time period. The screening process will focus on eliminating those technologies that have severe limitations for a given set of waste and site-specific conditions. The screening step may also eliminate technologies based on inherent technological limitations.

Identification of waste characteristics that limit the effectiveness or feasibility of technologies is an important part of the screening process. Technologies clearly limited by waste characteristics will be eliminated from consideration.

Site-specific data will be reviewed to identify conditions that may limit or promote the use of certain technologies. Technologies whose use is clearly precluded by site characteristics will be eliminated from further consideration.

The level of technology development, record of performance, and operation and maintenance problems will be identified for each technology considered. Technologies that are unreliable, perform poorly, or are not fully demonstrated may be eliminated during the screening process.

#### ***D.4.3 Development of Corrective Measures Alternative(s)***

DOE/UC will develop corrective measures alternative(s) based on corrective measures objectives and on identification and screening of preliminary alternatives. DOE/UC will rely on standard engineering practice to determine which of the previously identified and screened technologies appear most suitable for the site. Each alternative may consist of an individual technology or a combination of technologies. The alternatives developed will be able to provide a workable number of options that individually or in combination adequately address all site problems and corrective measures objectives. DOE/UC will document reasons for excluding technologies.

When a new technology is proposed or similar waste streams have not routinely been treated or disposed of using the technology, DOE/UC will conduct laboratory and/or bench-scale studies to determine the applicability to facility conditions. DOE/UC will analyze the technologies based on literature review, vendor contracts, and past experience to determine the testing requirements. DOE/UC will develop a testing plan identifying the types and goals of studies, the level of effort needed, and the procedures to be used for data management and interpretation. When testing is completed, DOE/UC will evaluate the results to assess the technology or technologies and will prepare a report summarizing the testing program and its results, both positive and negative.

#### ***D.4.4 Evaluation of Corrective Measures Alternative(s)***

DOE/UC will describe and evaluate each corrective measures alternative developed in Section D.4.3. The evaluation will be based on technical, environmental, human health, and institutional concerns. Detailed cost estimates for each corrective measures alternative will also be developed. A

description of each corrective measures alternative will include, but not be limited to, preliminary process flow sheets, preliminary sizing and type of construction for buildings and structures, and rough quantities of utilities required. An evaluation of each alternative will address the concerns presented below.

#### ***D.4.4.1 Technical Concerns***

DOE/UC will conduct a technical evaluation based on performance reliability, implementability, and safety. The performance evaluation will be based on the effectiveness and useful life of the corrective measure. Effectiveness will be evaluated in terms of the ability to perform intended functions such as containment, diversion, removal, destruction, or treatment. Design specifications or performance evaluation will be used to determine the effectiveness of each corrective measures alternative. Specific waste or site characteristics that could impede effectiveness will also be considered. The evaluation will consider the effectiveness of combinations of technologies. Useful life is the length of time the level of effectiveness of the technology can be maintained. Each corrective measure will be evaluated in terms of the projected service life of its component technologies. Resource availability in the future life of the technology and appropriateness of technologies will be considered in evaluating the useful life.

The reliability of each corrective measures alternative will be evaluated and will include the operation and maintenance requirements and demonstrated reliability. Frequent or complex operation and maintenance requirements may cause a technology to be regarded as less reliable than technologies requiring little or straightforward operation and maintenance. Availability of labor and materials will also be considered in evaluating reliability. Risk and effect of failure are measured by determining demonstrated and expected reliability. DOE/UC will evaluate whether technologies have been used effectively under the same conditions, whether the same combinations of technologies have been used together effectively, whether failure of any one technology has an immediate impact on receptors, and whether the corrective measure has the flexibility to deal with uncontrollable changes at the site.

Implementability of each corrective measures alternative will be evaluated based on constructability of the alternative and the time required for the alternative to be considered effective. Constructability is determined by conditions both internal and external to facility conditions and includes such items as location of underground utilities, depth to water table, heterogeneity of subsurface materials, and facility location (e.g., remote vs. urban). External factors that affect

implementation include the need for special permits or agreement, equipment availability, and the location of suitable off-site treatment or disposal facilities. Time requirements to be considered include the time to implement a corrective measures alternative and the time it takes for beneficial results to be achieved. Reducing contaminant concentration to levels established in the corrective measures objectives is considered beneficial.

Safety of each corrective measures alternative will be evaluated based on worker safety, safety of nearby communities, and the environment. Fire, explosion, and potential exposure will be factors considered in this evaluation.

#### ***D.4.4.2 Environmental Concerns***

DOE/UC will perform an environmental assessment for each alternative. The assessment will focus on facility conditions and pathways of contamination addressed by each alternative. The environmental assessment will evaluate the short-term and long-term beneficial and adverse effects of the response alternative, any adverse effects on environmentally sensitive areas, and analysis of measures to mitigate adverse impacts.

#### ***D.4.4.3 Human Health Concerns***

DOE/UC will assess how potential short-term and long-term exposure to residual contamination are mitigated by each alternative. Protection of human health both during and after implementation of the corrective measures alternative will be evaluated. In accordance with the current and future land uses determined for the site, the assessment will describe the levels and characterizations of on-site contaminants, potential routes of exposure, and potentially affected populations. Each alternative will be evaluated to determine the level of exposure to contaminants and the reduction of exposure over time. For management of mitigation measures, the relative reduction of impact will be determined by comparing residual levels of each alternative with existing criteria, standards, or regulations.

#### ***D.4.4.4 Institutional Concerns***

DOE/UC will assess the relevant institutional needs for each alternative according to the current and future land uses determined for the site. The institutional needs may include, but are not limited to, the effects of federal, state, and local environmental and public health standards, regulations, guidance, advisories, ordinances, or community relations on design, operation, and timing of each alternative.

#### **D.4.5 Cost Estimate**

DOE/UC will develop a cost estimate for each corrective measures alternative and for each phase or segment of the alternative. The cost estimate will include capital costs and operation and maintenance costs.

Capital costs consist of direct and indirect costs. Direct capital costs include the cost of construction, equipment, land and site development, and building and services. Construction costs are the costs of materials, labor (including fringe benefits and worker's compensation), and equipment required to install the corrective measures alternative. Costs of treatment, containment, disposal, and/or servicing of equipment used to implement the corrective measures alternative comprise equipment costs. Land and site development costs include expenses associated with land purchase and existing property development. Costs of process and nonprocess buildings, utility connections, purchased services, and disposal costs are included in building and services costs.

Indirect capital costs include engineering expenses, legal fees and license or permit costs, start up and shakedown costs, and contingency allowances. Engineering expenses include the costs of administration, design, construction, supervision, drafting, and testing of corrective measures alternatives. Administrative and technical costs necessary to obtain licenses and permits for installation and operation comprise legal fees and license or permit costs. Start up and shakedown costs are the costs incurred during start up of the corrective measures alternative. Contingency allowances include funds to cover costs resulting from unforeseen circumstances, such as adverse weather conditions, strikes, and inadequate facility characterization.

Operation and maintenance costs are post-construction costs necessary to ensure continued effectiveness of a corrective measures alternative. When estimating the operation and maintenance costs, DOE/UC will consider costs for operating labor, maintenance materials and labor, auxiliary materials and energy, purchased services, and disposal and treatment. In addition, DOE/UC will consider administrative costs; insurance, taxes, and licensing costs; maintenance reserve and contingency funds; and any other costs that could be incurred. Operating labor costs include wages, salaries, training, overhead, and fringe benefits associated with the labor needed for post-construction operation; costs for labor, parts, and other resources required for routine maintenance of facilities and equipment comprise maintenance materials and labor costs. Auxiliary materials and energy costs include such items as chemicals and electricity for treatment plant operations, water and

sewer service, and fuel. Predicted sampling costs, laboratory fees, and professional fees make up the costs for purchased services. Disposal and treatment costs include the costs of transporting, treating, and disposing of waste materials (e.g., treatment plant residues) generated during operation of the corrective measures alternative. Administrative operation and maintenance costs are those associated with administration of the corrective measures operation and maintenance that is not addressed in other cost-estimating categories. Liability and accident insurance, real estate taxes on purchased land or rights-of-way, licensing fees for certain technologies, and permit renewal and reporting costs comprise the costs for insurance, taxes, and licensing. Maintenance reserve and contingency fund costs include annual payments into escrow funds to cover costs of anticipated replacement or rebuilding of equipment, and any large unanticipated operation and maintenance costs.

**D.5 Recommendation of Corrective Measures Alternative(s)**

DOE/UC will recommend corrective measures alternative(s) based on technical, human health, and environmental criteria. At a minimum, the following criteria will be used to recommend the final corrective measures alternative(s).

**D.5.1 Technical Criteria**

The technical criteria that will be used to recommend the preferred corrective measures alternative(s) are performance, reliability, implementability, and safety. Preferred corrective measures alternative(s) are those that are most effective at performing their intended functions and maintaining performance over extended periods of time, and that do not require frequent or complex operation and maintenance activities and have proven effective and reliable under conditions similar to those anticipated. Additionally, preferred corrective measures alternative(s) are those that can be constructed and operated to reduce levels of contamination to attain or exceed applicable standards in the shortest period of time, and those that pose the least threat to the safety of nearby residents and environments as well as workers during implementation.

**D.5.2 Human Health Criteria**

The corrective measures alternative(s) will comply with existing EPA criteria, standards, or regulations for the protection of human health. Preferred corrective measures alternative(s) will provide the minimum level of exposure to contaminants and the maximum reduction in exposure with time.

### **D.5.3 Environmental Criteria**

The preferred corrective measures alternative(s) will pose the least adverse impact or the greatest improvement on the environment over the shortest period of time.

### **D.6 CMS Reports**

DOE/UC will prepare a CMS Report presenting the results of the CMS or focused CMS and recommending corrective measures. At a minimum, the report will address the information summarized below.

The report will include a summary of all the corrective measures alternative(s) originally identified, and the screening rationale employed. The results of development of each alternative will be described, and the evaluation of those developed will be presented in detail. The report will describe the rationale for recommendation of a corrective measures alternative, including performance expectations, preliminary design criteria and rationale, general operation and maintenance requirements, and long-term monitoring requirements. In addition, the report will include summary tables that allow the alternative(s) to be easily understood. Trade-offs among health risks, environmental effects, and other pertinent factors will be emphasized.

A proposed corrective measure that will attain compliance with concentration level objectives and control sources of releases will also be included in the CMS Report. In addition, the proposed corrective measure described in the report will meet acceptable waste management requirements and protect human health and the environment.

The CMS Report will also describe design and implementation precautions, including special technical problems, additional engineering data required, and permits and regulatory requirements. Information on access, easements, right-of-way, health and safety requirements, and community relations activities will also be described in the report. The report will also include cost estimates and schedules, including capital cost estimate, operation and maintenance cost estimate, project schedule, and a corrective measures implementation schedule.

### **D.7 Corrective Measures Implementation**

Upon completion of the CMS or focused CMS and after the NMED has approved the CMS Report, DOE/UC will proceed with the Corrective Measures Implementation (CMI). During the CMI step of the corrective action process, the selected remedy is implemented, its effectiveness is verified, and

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ongoing control and monitoring requirements are established, if needed. When the CMI is completed, the NMED will remove the remediated solid waste management unit (SWMU) from the permit, and update the SWMU list in Chapter 3 of the renewed permit.

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## **APPENDIX E OTHER REGULATORY REQUIREMENTS**

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## ***List of Abbreviations/Acronyms*** ---

DOE	U.S. Department of Energy
ER	Environmental Restoration
LANL	Los Alamos National Laboratory
NPDES	National Pollutant Discharge Elimination System
SWMU	solid waste management unit
SWPP	Storm Water Pollution Prevention
UC	University of California

## **APPENDIX E**

### **OTHER REGULATORY REQUIREMENTS**

The topics presented in this appendix are for informational purposes only. Sections E.1 and E.2 discuss waste minimization and waste ban requirements, which are or will be addressed in the [Los Alamos National Laboratory General Part B Permit Application.] Hence, there is no need for either of these topics to be included in the Hazardous and Solid Waste Amendments portion (Chapter 3) of the renewed Hazardous Waste Facility Permit. A discussion of the Watershed Management Program at Los Alamos National Laboratory (LANL) is provided in Section E.3 for informational purposes only, and is not intended for inclusion in Chapter 3 of the renewed permit. Sections E.4 and E.5 present information on the Storm Water Program and the Environmental Surveillance Program at LANL, respectively. The Storm Water Program is addressed under a different authority; therefore, it is inappropriate to include this information in Chapter 3 of the renewed permit. The discussion on the Environmental Surveillance Program at LANL is provided for informational purposes only. Section E.6 presents information on storm water/surface water pollution prevention at LANL. These issues are addressed under a different authority; therefore, it is inappropriate to include this information in Chapter 3 of the renewed permit.

#### **E.1 Waste Minimization Requirements**

Waste minimization requirements will be addressed in the [Los Alamos National Laboratory General Part B Permit Application," Revision 2.0. Revision 2.0 of the General Part B will provide information on the program to reduce the volume and toxicity of hazardous wastes generated by operations at LANL.

#### **E.2 Waste Ban Requirements**

Land disposal restrictions requirements and waste analysis requirements are addressed in the waste analysis plan in the [Los Alamos National Laboratory General Part B Permit Application," Revision 1.0 (LANL, 1998a). Authorized wastes at LANL are included in the [Los Alamos National Laboratory General Part A Permit Application," Revision 0.0 (LANL, 1998b).

#### **E.3 Watershed Management Program**

The U.S. Department of Energy (DOE)/University of California (UC) has developed a Watershed Management Program. The mission of this program is to protect the quality of surface water within the LANL boundaries by providing an enhanced surface water monitoring network and focusing management efforts on elements of the watershed system that may transport contaminants and potentially impact surface water quality. The objectives of the program are to coordinate activities of various LANL groups to ensure a unified approach to watershed protection and prevent duplication of effort; to establish an information system in which all watershed protection data will be stored; and to provide additional surface water monitoring and documentation to support and enhance current watershed protection efforts, measure program performance, and provide a long-term monitoring network.

The Watershed Management Program represents a coordinated effort that will utilize data collected by existing environmental programs and provide for additional data collection where insufficient surface water data exist. The program may also coordinate with the Natural Resource Trustee Board responsibilities, the Environmental Restoration (ER) Project, the Environmental Surveillance Program, and the National Pollutant Discharge Elimination System (NPDES) Storm Water Program.

LANL has also developed a Watershed Management Plan to implement the objectives of the Watershed Management Program (LANL, 1999 [draft]). The plan outlines the watershed protection strategy and watershed management approach DOE/UC will use to protect and manage surface water within LANL boundaries and to complement the protection efforts of neighboring landowners. The Watershed Management Plan focuses on elements of the watershed system that may affect contaminant transport and potentially impact surface water quality. It identifies the existing data collection activities that will support surface water quality protection and management efforts and proposes additional data collection activities through enhancement of the current surface water and sediment monitoring network.

#### ***E.4 Storm Water Program***

The NPDES Storm Water Program is responsible for acquiring NPDES permits for storm water discharges associated with "industrial activity" at LANL. Currently, DOE/UC is permitted under the NPDES Multi-Sector General Permit. Industrial activities identified as requiring permitting under the U.S. Environmental Protection Agency's NPDES Storm Water Program include, among other industrial activities, hazardous waste treatment, storage, or disposal facilities and solid waste management units (SWMU). The general permit requires the development and implementation of

a Storm Water Pollution Prevention (SWPP) Plan for all covered operations or facilities and storm water runoff monitoring. An SWPP Plan specific to SWMUs has been developed and is being implemented. The Watershed Management Plan provides the mechanism to effectively monitor the industrial activities that occur at LANL.

### ***E.5 Environmental Surveillance Program***

The Environmental Surveillance Program at LANL is responsible for annual environmental surveillance and compliance monitoring, and includes surface water and sediment monitoring. The Watershed Management Program provides an enhanced surface water monitoring network and a mechanism to implement LANL-wide program cooperation and management actions when sample analyses suggest contaminant migration is occurring in the surface water and sediments.

### ***E.6 Storm Water/Surface Water Pollution Prevention***

A Surface Water Site Assessments standard operating procedure (SOP 2.01) was developed by the Water Quality and Hydrology Group at LANL, in coordination with the ER Project, the DOE Oversight Bureau, and the New Mexico Environment Department Surface Water Quality Bureau to provide a systematic approach to identifying SWMUs that have the potential to adversely impact surface water quality through surface water runoff or erosional processes. A Surface Water Assessment Team was implemented to provide recommendations for Best Management Practices that may be needed to address erosion at SWMUs. These recommendations are provided to the ER Project and facility management for evaluation and implementation, as necessary.

### ***E.7 References***

Los Alamos National Laboratory (LANL), 1999, [Draft Watershed Management Plan,] Los Alamos National Laboratory, Los Alamos, New Mexico.

Los Alamos National Laboratory (LANL), 1998a, [Los Alamos National Laboratory General Part B Permit Application, Revision 1.0,] Los Alamos National Laboratory, Los Alamos, New Mexico.

Los Alamos National Laboratory (LANL), 1998b, [Los Alamos National Laboratory General Part A Permit Application, Revision 0.0,] Los Alamos National Laboratory, Los Alamos, New Mexico.

***Crosswalk Between Los Alamos National Laboratory's (LANL's) Existing Hazardous and Solid Waste Amendments (HSWA) Permit (Module VIII) and the LANL HSWA Information Package***

<b>Existing Module VIII Location</b>	<b>Existing Module VIII Title or Topic</b>	<b>HSWA Information Package Location</b>	<b>Comments</b>
A	Definitions	Definitions	
B	Specific Conditions	Section 1.0	
B.1	Waste Minimization	Appendix E	
B.2	Dust Suppression		Not addressed in this package.
B.3	Compliance with Permit	Section 1.1.1	
B.4	Specific Waste Ban	Appendix E	
B.5	Closure		Not addressed in this package. There are no permitted surface impoundments at LANL.
B.6	Operation of Land Disposal		Not addressed in this package. There are no permitted surface impoundments at LANL.
B.7	Additional Waste Ban Requirements	Appendix E	
C	Special Permit Conditions	Section 1.2	
C.1	Perched Zone Monitoring	Section 1.2.2	
C.2	Monitoring of Surface and Ground Water	Sections 1.2.4 and 1.2.5	
C.3	Sediment Traps Mortandad Canyon	Section 1.2.7	
C.4	Protection of the Main Aquifer	Section 1.2.6	
C.5	Unsaturated Zone Monitoring	Section 1.2.1	
C.6	Vertical Extent of Saturation	Section 1.2.3	

***Crosswalk Between Los Alamos National Laboratory's (LANL's) Existing Hazardous and Solid Waste Amendments (HSWA) Permit (Module VIII) and the LANL HSWA Information Package***

<b>Existing Module VIII Location</b>	<b>Existing Module VIII Title or Topic</b>	<b>HSWA Information Package Location</b>	<b>Comments</b>
C.7	QA/QC Evaluation	Section 1.2.8	
C.8	Identification and Summary of Previous Studies	Section 1.2.9	
D	Corrective Action for Continuing Releases	Section 2.0	
E	Dispute Resolution	Section 1.1.5	
F	Reporting Requirements	Section 2.14	
G	Notification Requirements for and Assessments of Newly-Identified Solid Waste Management Unit(s)	Section 2.3	
H	Notification Requirements for Newly-Discovered Releases at SWMU(s)	Section 2.4	
I	RCRA Facility Investigation (RFI) or Equivalent Thereof	Section 2.5	Information presented in Section I of Module VIII was revised in Section 2.5 of this HSWA Information Package to reflect the current status of the RFI process in the Environmental Restoration (ER) Project.
I.1	Preliminary Report (LANL Installation RFI Work Plan)	Section 2.5.1	
I.2	RFI Work Plan (LANL Installation RFI Work Plan)	Section 2.5.2	
I.3	RFI Work Plan (Schedule of Submittals)	Section 2.5.5	

***Crosswalk Between Los Alamos National Laboratory's (LANL's) Existing Hazardous and Solid Waste Amendments (HSWA) Permit (Module VIII) and the LANL HSWA Information Package***

<b>Existing Module VIII Location</b>	<b>Existing Module VIII Title or Topic</b>	<b>HSWA Information Package Location</b>	<b>Comments</b>
I.4	RFI Work Plan and Reports (Submittal and Preparation)	Section 2.5.6	
I.5	RFI Work Plan, Canyon Systems	Section 2.5.3	
J	Interim Measures	Section 2.6	
K	Determination of No Further Action	Section 2.9	
L	Corrective Measures Study Plan	Section 2.11.1	
M	Corrective Measures Study Implementation	Section 2.11.2	
N	Corrective Measures Study Final Report	Section 2.11.3	
O	Modification of this Permit	Section 1.1.2	
P	Facility Submission Summary	Appendix A	Titled "Proposed Corrective Action Schedule of Compliance" in this HSWA Information Package.
Q	Scope of Work for a RCRA Facility Investigation (RFI) at Los Alamos National Laboratory	Appendix C	Information presented in Section Q of Module VIII was revised in Appendix C of this HSWA Information Package to reflect the current status of the RFI process in the ER Project.
R	Scope of Work for a RCRA Corrective Measure Study (CMS) at Los Alamos National Laboratory	Appendix D	

***Crosswalk Between Los Alamos National Laboratory's (LANL's) Existing Hazardous and Solid Waste Amendments (HSWA) Permit (Module VIII) and the LANL HSWA Information Package***

<b>Existing Module VIII Location</b>	<b>Existing Module VIII Title or Topic</b>	<b>HSWA Information Package Location</b>	<b>Comments</b>
Table A	SWMUs Requiring an RFI Workplan submitted by May 23, 1994	Appendix B	SWMUs listed in Appendix B are presented in three separate tables.
Table B	Priority SWMUs		
Table C	RFI Work Plans Due in July 1994 and July 1995		Work Plans submitted to date are listed in Table 2-1 of Section 2.0 in this HSWA Information Package.
Table D	Staggered Schedule for Group 3 RFI Workplans		