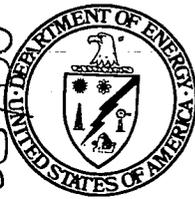


REID SNL TA-03/00



**Department of Energy**  
Field Office, Albuquerque  
Kirtland Area Office  
P.O. Box 5400  
Albuquerque New Mexico 87185-5400

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FEB 04 2000

CERTIFIED MAIL - RETURN RECEIPT REQUESTED



Mr. James P. Bearzi, Bureau Chief  
Hazardous and Radioactive Materials Bureau  
New Mexico Environment Department  
2044 Galisteo St.  
Santa Fe, NM 87502

Dear Mr. Bearzi:

On behalf of the Department of Energy (DOE) and Sandia Corporation (Sandia), enclosed is the Resource Conservation and Recovery Act (RCRA) closure plan entitled "RCRA Closure Plan for the Sandia National Laboratories, New Mexico (SNL/NM) Interim Storage Site (ISS)", December 1999. This current RCRA closure plan supersedes the previous closure plan for the ISS submitted in the "RCRA Part A and Part B Permit Applications, Hazardous Waste Management Units", November 1996.

The closure plan presents closure activities for the ISS located within Technical Area III. The ISS is a compacted-soil area, approximately 200 feet by 215 feet, surrounded by a 4-foot high fence. It was previously used as a storage site for containerized RCRA-regulated hazardous waste stored in transportainers.

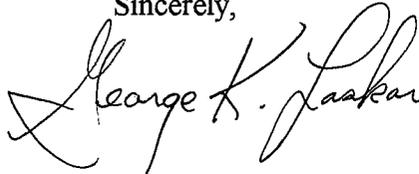
It is the intent of Sandia to initiate closure of this site following approval of the enclosed closure plan. Sandia expects to demonstrate conformance with RCRA closure performance standards provided in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), Subpart VI, Title 40 of the Code of Federal Regulations (40 CFR) Part 265, as applicable for the ISS.

Mr. James Bearzi

-2-

If you have any questions regarding this revised closure plan, please contact Ron Dobbs of my staff at 845-4428.

Sincerely,

A handwritten signature in cursive script that reads "George K. Jaskar".

for Michael J. Zamorski  
Area Manager

Enclosure

cc w/enclosure:

W. Moats, NMED HRMB (via certified mail)

J. Parker, NMED/DOE-OB

R. Kennett, NMED/DOE-OB

cc w/o enclosure:

K. Griffith, DOE/KAO

J. Cormier, DOE/KAO/AIP

J. Gould, DOE/KAO

E. Krauss, MS 0141, 11300

W. Cox, MS 1089, 6132

D. Moore, MS 1151, 7135

E. Conway, MS 1151, 7135

# **RCRA Closure Plan for the SNL/NM Interim Storage Site**

**Sandia National Laboratories/New Mexico**

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## **1.0 Introduction—20 NMAC 4.1, Subpart VI/40 CFR §§265.111 and 265.112**

This closure plan identifies the steps necessary to close the Interim Storage Site (ISS) and was prepared in accordance with the applicable requirements of the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20 NMAC 4.1), revised January 1, 1997, Subpart VI/ Title 40 of the Code of Federal Regulations (40 CFR) Part 265, Subpart G, Closure and Postclosure.

The ISS will be clean closed to meet the Resource Conservation and Recovery Act (RCRA) closure performance standards in 20 NMAC 4.1, Subpart VI/40 CFR §265.111. This closure plan only applies to the RCRA-regulated hazardous waste management areas at the ISS.

This closure plan will be amended if, during closure, unexpected events require the plan to be modified. Additionally, the plan will be amended if there are changes in technical considerations such as availability of new technology, changes in requirements, or operating contingencies.

If this closure plan requires amending, Sandia National Laboratories/New Mexico (SNL/NM) and the U.S. Department of Energy (DOE) will request authorization from the New Mexico Environment Department (NMED) in writing in accordance with 20 NMAC 4.1, Subpart VI/ 40 CFR §§265.112.

This closure plan is designed to meet the following performance standards in 20 NMAC 4.1, Subpart VI/40 CFR §265.111:

- To protect human health and the environment
- To control, minimize, or eliminate the postclosure release of RCRA-regulated hazardous waste (i.e., Federal and State regulated hazardous waste), RCRA-regulated hazardous waste constituents, leachate, contaminated runoff, or RCRA-regulated hazardous waste decomposition products to the ground, surface waters, or atmosphere
- To minimize the need for further maintenance.

## **2.0 Facility Description**

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### **2.1 Description of SNL/NM**

SNL/NM (Environmental Protection Agency [EPA] No. NM5890110518) is a multidisciplinary laboratory engaged in the research and development of weapons and alternative energy sources. SNL/NM is managed by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin, for the DOE, with work also performed for the U.S. Department of Defense and the Nuclear Regulatory Commission. Generation and management of mixed waste occurs at SNL/NM as part of these activities. SNL/NM is located south of Albuquerque, New Mexico, within the boundaries of Kirtland Air Force Base (KAFB) (Figure 1) in Bernalillo County.

### **2.2 Unit Description**

The ISS is a compacted-soil area surrounded by a 4-foot- (1.2-meter-) high fence within Technical Area III (Figures 1 and 2). The ISS was used for storage of containerized RCRA-regulated hazardous waste from 1990 until 1996. The ISS is approximately 200 feet (61 meters) by 215 feet (66 meters).

## **3.0 Waste Description and Maximum Volume Stored— 20 NMAC 4.1, Subpart VI/40 CFR §265.112(b)(3)**

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RCRA-regulated hazardous waste types and quantity that may have been stored at the ISS are highly variable in composition and may include, but are not limited to: excess chemical waste; process waste; explosive waste; used batteries; elemental lead; contaminated soil; contaminated debris; contaminated equipment; scintillation cocktails; and treatment residues. The maximum RCRA-regulated hazardous waste storage capacity at the ISS was approximately 18,000 cubic feet (510,000 liters).

## **4.0 Closure Method—20 NMAC 4.1, Subpart VI/40 CFR §§265.112(b), 265.114, and 265.115**

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SNL/NM expects to demonstrate conformance with RCRA closure performance standards in 20 NMAC 4.1, Subpart VI/40 CFR §§265.111 through 265.116, as applicable, for the ISS.

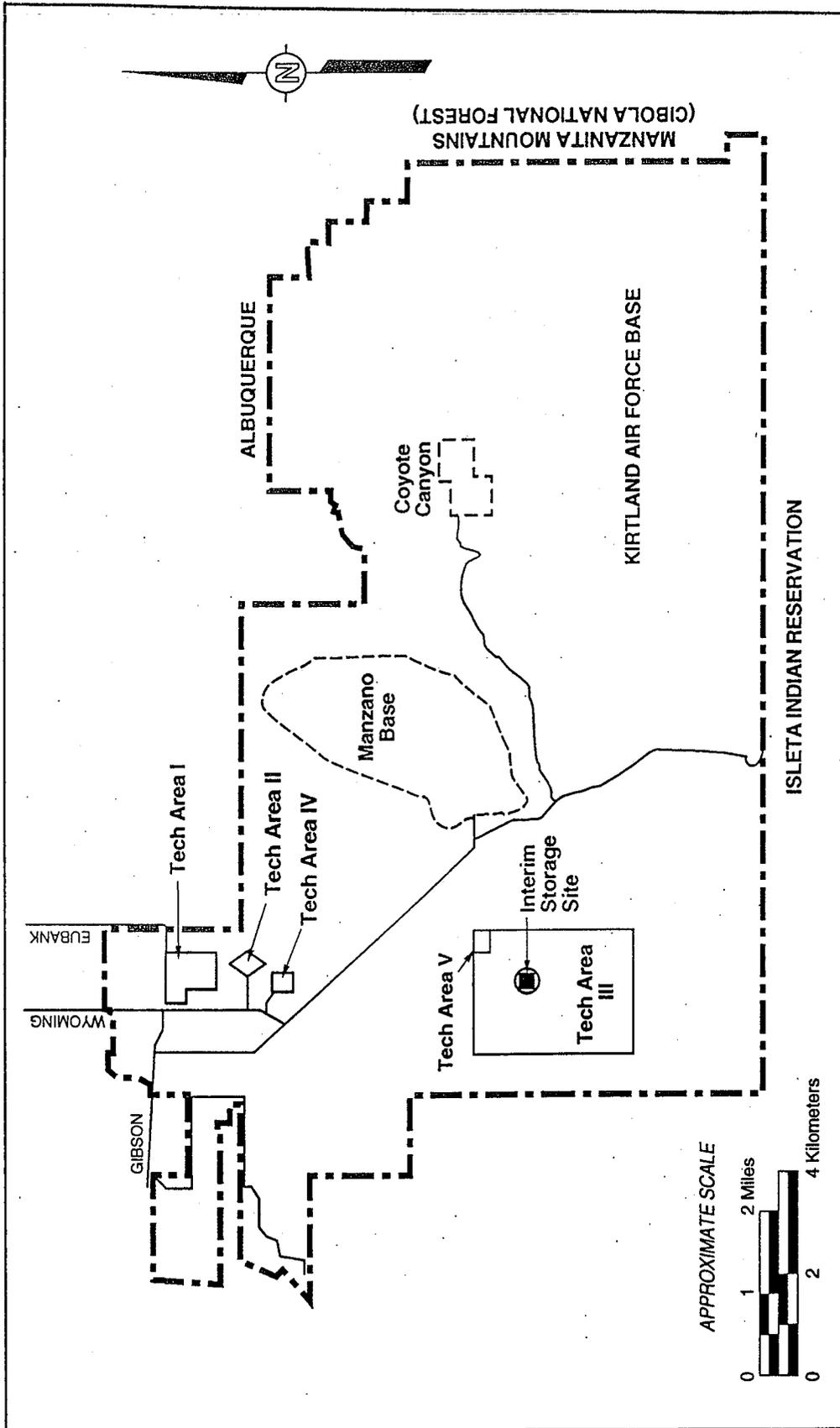
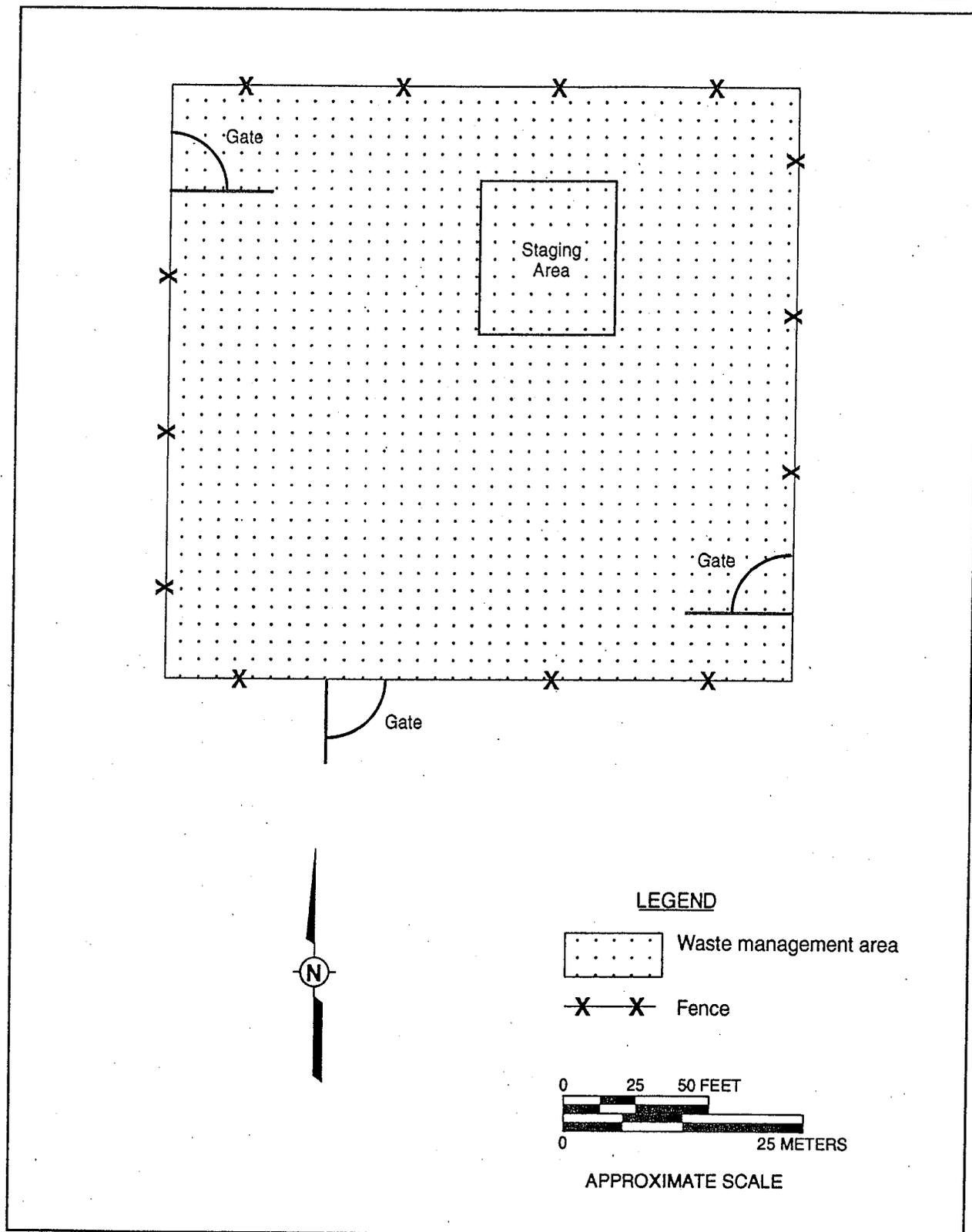


Figure 1  
Sandia National Laboratories/New Mexico  
Technical Areas and Interim Storage Site in Relation to KAFB



**Figure 2**  
**Interim Storage Site Layout**

Closure methods proposed in this plan are based on the following assumptions about conditions during the operational life of the ISS:

- RCRA-regulated hazardous waste at the ISS was stored in containers (e.g., drums placed inside transportainers). Containers were not reopened after wastes were initially placed in them.
- Containers used to store RCRA-regulated hazardous waste at the ISS retained their integrity.
- Scintillation cocktails were the only liquid wastes stored at the ISS. The liquid was contained in vials (primary containers) and stored in larger secondary containers (e.g., 55-gallon drums).
- No incident occurred that might have contaminated equipment (e.g., waste handling machinery, transportainers) during waste handling activities.
- Releases of RCRA-regulated hazardous waste constituents to the environment did not occur.

These assumptions are derived from historical knowledge of waste management practices and policies as well as written records (e.g., inspection logs, survey results, waste inventory reports, operating procedures, facility/activity descriptions). Based on these assumptions, SNL/NM does not believe that any hazardous constituent contamination has occurred in the ISS. In order to demonstrate achievement of RCRA closure performance standards, SNL/NM proposes to perform the following activities:

- Phase I: Application of the data quality objective (DQO) process
- Phase II: Performance of hazard surveys, if necessary
  - A hazardous waste contamination survey will be conducted in areas used for RCRA-regulated waste management at the ISS.
- Phase III: Removal, if necessary
  - If any hazardous waste contamination is found, contaminated soil will be removed.
  - Verification of “clean closure” will be conducted.

- Phase IV: Certification of closure
  - The ISS will be certified as closed by an independent, registered professional engineer.

#### **4.1 Phase I: Data Quality Objective Process**

DQOs are qualitative and quantitative statements derived from a series of seven planning steps based on the scientific method. The DQO process is designed to ensure that the type, quantity, and quality of environmental data used in decision making are appropriate for the intended application. DQO statements applied to RCRA closure of the ISS are summarized below.

**Define the Problem.** The ISS is not needed for RCRA-regulated waste management activities and should be closed under applicable RCRA interim status regulations for container storage units. Regulatory closure must meet the performance standards found in 20 NMAC 4.1, Subpart VI/40 CFR 265.111(a) and (b) (see Chapter 1.0).

**Identify the Decision.** Does the ISS meet the closure performance standards for container storage unit without further remediation? If so, closure certification will be submitted to the Secretary of the NMED. If not, contaminated soil will be removed to meet the stated performance standards before closure certification.

**Identify Inputs to the Decision.** Archival records on ISS waste management activities will be reviewed. The records (e.g., inspection logs, survey results, waste inventory reports, operating procedures, facility/activity descriptions) will be reviewed for evidence of any incidents or activities that may have resulted in surface-soil contamination at the ISS. Visual observations of the ISS surface soils will be performed to identify stains or discoloration that may indicate surface-soil contamination at the ISS.

**Define the Study Boundaries.** The records review is limited to hazardous waste management records generated during the operating life of the ISS as a RCRA-regulated hazardous waste management unit. Visual observations at the ISS are limited to surface soils in areas used for RCRA-regulated hazardous waste management activities. If surface-soil sampling is necessary, based on the records review or visual observations at the site, samples will be collected from

within the fenced area used for RCRA-regulated hazardous waste management activities at the ISS.

**Develop the Decision Rule.** If, based on the records review and visual observations at the site, there are no indications of potential soil contamination due to ISS RCRA-regulated hazardous waste management activities, the ISS will be considered "clean." Phase II and III activities will not be conducted. Closure activities will advance to Phase IV. If there is, based on the records review and/or visual observations at the site, a potential for soil contamination, Phase II activities will commence.

**Specify Limits on Decision Errors.** Because measurement data from sampling and analysis can only estimate true values, there is always a possibility that decisions made based on measurement data will be in error. Decision errors can be attributed to either sampling error, when incorrect sampling fails to adequately represent the true environment, and measurement errors, when the combination of random and systematic errors in the measurement process inaccurately represent the true values. Precautions taken to minimize either type of decision error when performing regulatory closure of the ISS are discussed in the sampling and analysis plan (SAP) included as Chapter 5.0 of this closure plan.

**Analytical Data Assessment.** Chemical analysis data, if any are generated, used to document attainment of the closure performance criteria for the ISS will be assessed using SNL/NM data verification and validation procedures. These procedures are described in Section 10.0 of the "Sampling and Analysis Plan for Characterization of Low-Level Radioactive and Mixed Waste," (February 1999 or amendment, as applicable; see Attachment 1).

Quality controls (QC) for sampling and analysis will be implemented to ensure that measurement data collected meets the information objectives for this investigation. QC will be implemented by strictly adhering to the sampling procedures described in the approved sampling and analysis plan; documenting sampling activities and sample custody; using controlled and standard equipment and materials; and collecting, analyzing, and evaluating field and laboratory QC samples.

#### **4.2 Phase II: Hazard Surveys**

A survey will be conducted to identify any surface-soil contamination by hazardous waste or hazardous constituents. Chapter 5.0 describes the sampling and analysis procedures that will be used to conduct the chemical hazard survey.

#### **4.3 Phase III: Removal Procedure**

Removal of surface soils will be performed if contamination requiring remediation is found during the surveys. Otherwise, Phase III will not be conducted. The method of decontamination will be as follows.

If the ISS operating log identifies spills or releases, the area will be visually inspected for stains and discolorations. If visible contamination is detected on the surface soils, biased sampling will be performed. Surface soil samples will be collected at 6 inch- (15 centimeter)-depths until the lateral extent of surface-soil contamination is defined.

Soil samples will be collected, stored, and preserved in accordance with established procedures (e.g., EPA, American Society for Testing and Materials). Soil samples will be analyzed for hazardous constituents potentially released during the operational life of the unit.

Should analysis of the soil or chemistry data indicate the presence of contamination by RCRA-regulated hazardous constituents, SNL/NM will further investigate the horizontal extent of contamination. Appropriate remedial actions will be determined and undertaken after contamination investigations have been conducted. Because the ISS is located above an Environmental Restoration Project site (i.e., the Mixed Waste Landfill), appropriate actions may include soil removal, treatment, or corrective action undertaken for the Mixed Waste Landfill by the SNL/NM Environmental Restoration Project. Removed contaminated soil will be shipped to an appropriate treatment, storage, or disposal facility.

Most personal protective equipment, plastic sheeting, and sampling equipment used by personnel performing closure activities will be disposable. These materials will be placed in containers and managed as mixed, hazardous, radioactive, or solid waste, whichever is appropriate, based on detected contaminants. The containerized cleanup materials and equipment will be moved to appropriate waste storage facilities at SNL/NM.

Any nondisposable tools and equipment used during decontamination will be cleaned with detergent and water and scraped or brushed as necessary to remove any residue. Decontamination will be ascertained using sampling and analysis of the wash water. Equipment that cannot be successfully decontaminated will be disposed of as radioactive, hazardous, or mixed waste, as appropriate. All wash water will be containerized.

Used wash water may be discharged into the City of Albuquerque sewer treatment system provided that the results of wash water sampling and analysis confirm that the water meets all discharge permit criteria. If the wash water cannot be discharged, it will be appropriately managed at SNL/NM.

All hazardous waste generated during closure of the ISS, including portable berms and used wash water, will be characterized and containerized, and the containers will be labeled. Containers of RCRA-regulated hazardous waste will be managed in accordance with 20 NMAC 4.1, Subpart IV/40 CFR 262.34, pending arrangements for on-site transfer to a storage facility at SNL/NM or an off-site permitted treatment, storage, or disposal facility.

#### **4.4 Phase IV: Closure Certification**

An independent, registered professional engineer will verify that closure activities followed the approved plan. Upon completion of closure, a letter certifying that the ISS was closed according to the approved plan will be prepared. The letter will be dated and signed by the engineer and will be stamped by the engineer with his or her professional seal. The original copy will be submitted by the DOE to the Secretary of the NMED. Copies shall be maintained at the DOE offices and at SNL/NM.

Upon completion of the closure activities, the owner/operator will submit closure information to the Secretary of the NMED. This information shall include:

- Certification of closure
- Location and custodian of all closure documentation.

Additional information will be available, upon request, in the documentation supporting the independent registered professional engineer's certification in accordance with 20 NMAC 4.1, Subpart VI/40 CFR 265.115. The supporting documentation will include:

- Discussion of closure activities
- Laboratory analyses/results summaries
- Original laboratory data package(s)
- QA/QC documentation for contract laboratory analyses.

## **5.0 Sampling and Analysis Plan—20 NMAC 4.1, Subpart VI/40 CFR §265.112(b)**

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Sampling and analysis activities, if any, performed to verify decontamination will be strictly controlled. Sample collection will be performed in accordance with established sampling procedures (e.g., EPA, American Society for Testing and Materials) so that samples are representative of the site conditions at closure. Sample collection equipment and techniques are specified in this closure plan (Table 1).

### **5.1 Sample Locations, Collection, and Handling**

Surface-soil samples will be collected from any visibly stained or discolored spots. Clean and used decontamination wash water samples will be collected using appropriate equipment. A representative sample will be taken of the clean wash water and final wash water from each decontamination session. Samples will be properly handled to maintain sample integrity from collection through analysis.

#### **5.1.1 Sample Collection Documentation**

Sample collection will be documented in the field for each sample following quality assurance/quality control (QA/QC) information established by EPA guidelines.

#### **5.1.2 Sample Identification**

Each sample container will be labeled or marked with appropriate QA/QC information and laboratory analysis established by EPA guidelines.

#### **5.1.3 Sample Preservation, Handling, and Shipment Preparation**

Sample preservation and handling will be in accordance with applicable QA requirements. Proper container, preservative, and holding time requirements for each parameter will follow EPA guidelines. Sample shipment will be in accordance with U.S. Department of Transportation and International Air Transport Association Shipping requirements, as applicable.

**Table 1**  
**Sampling and Analysis Plan for**  
**Closure of the Interim Storage Site**

Activity	Sampling Method/Type	Parameters of Interest <sup>a</sup>	Sample Number/ Frequency
Operations and site reviews	1) Visual observation 2) Review of ISS waste management documentation/records	1) Staining, discoloration 2) Known hazardous constituents present during the operational life of the unit	1) Not applicable 2) Not applicable
Surface soil sampling	Grab with scoop or trowel	1) Physical state 2) TCLP metals 3) TCLP organics 4) Appropriate hazardous constituents or characteristics	1 per area of discrete soil staining at the center
Characterization of decontamination equipment <sup>b</sup> (e.g., personal protective equipment, plastic sheeting, dry wipes, and tools)	None	1) Physical state 2) TCLP metals 3) TCLP organics 4) Appropriate hazardous constituents or characteristics 5) Free liquid	None

<sup>a</sup>The parameters of interest will be determined by a review of the unit operating records to determine hazardous constituents and characteristics of Resource Conservation and Recovery Act-regulated hazardous wastes managed at the unit.

<sup>b</sup>Decontamination equipment waste will be characterized using the results of decontamination sampling and analysis (i.e., used wash water or soil sampling, as appropriate).

TCLP = Toxicity characteristic leaching procedure.

#### **5.1.4 Quality Control Field Sampling**

The quality of data from field sampling efforts will be controlled by using blank and duplicate samples. Blanks and duplicate samples will be collected so that the extent of any contamination introduced during sample collection and handling and the precision of the total sample collection and laboratory analysis system can be determined. Sampling equipment rinsate blanks will be collected at a frequency of one per day for each piece of sampling equipment to determine if samples have been contaminated by sampling equipment. One trip blank will accompany each sample shipment submitted for analysis to determine if volatile contaminants are introduced during shipment. One in every ten clean and used wash water samples collected will be submitted in duplicate for analysis and determination of precision. The blanks and duplicate samples will be treated as separate samples. Objectives for acceptable QC sample analytical results will follow available EPA guidance.

#### **5.1.5 Analysis Request and Chain-of-Custody Form**

In order to document the integrity of samples from collection to analysis, sample possession will be recorded on an analysis request and chain-of-custody form, which will be prepared for samples collected for laboratory analyses. This form is to be initiated at the point of sample collection and it will be kept with the samples during transfer to the laboratory. The form will be completed upon receipt in the laboratory.

#### **5.1.6 Sampling Equipment Decontamination Procedures**

To minimize the potential for cross contamination between samples, sampling devices will be decontaminated after each use. Decontamination will be verified by collection and analysis of the final rinsate blank as discussed above.

### **5.2 Laboratory Analysis**

Chemical constituents to be analyzed during closure will be determined based on the RCRA-regulated hazardous constituents released during the operational life of the unit. Typical analyses may include the following:

- Toxicity characteristic leaching procedure metals (20 NMAC 4.1, Subpart II/ 40 CFR Part 261, Appendix II)

- Any hazardous constituent(s) listed in 20 NMAC 4.1, Subpart V/40 CFR Part 264, Appendix IX, that are known to have been released during the operational life of the unit.

Analytical procedures will conform to EPA-approved methods (EPA, 1992) or other appropriate established methods.

### **6.0 Closure Schedule—20 NMAC 4.1, Subpart VI/40 CFR §§265.112(d), 265.113, and 265.115**

The schedule for completion of the closure activities is shown in Table 2. Closure is expected to take 180 days. If unforeseen circumstances that impact this schedule arise during closure, a closure plan modification will be requested in accordance with 20 NMAC 4.1, Subpart VI/40 CFR §265.113(b)(1)(i).

**Table 2  
Closure Schedule for the  
Interim Storage Site**

Activity <sup>a</sup>	Schedule <sup>b</sup>
Notify the New Mexico Environment Department (NMED) of closure	Day -45
Begin closure activities	Day 0
Begin records review and site observations	Day 1
Conduct hazard surveys, if necessary	Day 90
Conduct decontamination activities, if necessary	Day 120
Verify decontamination, if necessary	Day 140
Complete final closure	Day 180
Submit closure certification to NMED	60 days from final closure

<sup>a</sup>Some activities may be accomplished concurrently with others.

<sup>b</sup>This schedule represents estimated completion time; some activities may be completed earlier than scheduled.

## **7.0 Postclosure Care Plan—20 NMAC 4.1, Subpart VI/40 CFR §265.118**

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SNL/NM intends to perform a clean closure of the ISS. Therefore, a postclosure care plan is not required. Because the ISS will be clean closed, ground-water monitoring, leachate collection, and runoff control are not necessary.

## **8.0 References**

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EPA, see U.S. Environmental Protection Agency

SNL/NM, see Sandia National Laboratories/New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), 1999 or amendment, "Sampling and Analysis Plan for Characterization of Low-Level Radioactive and Mixed Waste," Sandia National Laboratories, Albuquerque, New Mexico.

U.S. Environmental Protection Agency (EPA), 1992, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA-SW-846, Third Edition and Codified Amendments, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

**ATTACHMENT 1**  
**CHAPTER 10, SAMPLING AND ANALYSIS PLAN FOR**  
**CHARACTERIZATION OF**  
**LOW-LEVEL RADIOACTIVE AND MIXED WASTE,**  
**SANDIA NATIONAL LABORATORIES,**  
**ALBUQUERQUE, NEW MEXICO (1999)**

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## 10. DATA REDUCTION, VERIFICATION AND VALIDATION, AND REPORTING

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### 10.1 Field Technical Data Reduction

Field technical data collected during monitoring and investigations can generally be characterized as either objective or subjective. Objective data include all direct measurements (e.g., field analytical data, water-level measurements). Subjective data include descriptions and observations, such as a preliminary site description. Some activities (e.g., test boring and well logging) include both types of data in that the data recorded in the field are descriptive but can be characterized and subsequently reduced using standardized lithologic coding systems.

Field personnel shall record all field data on standardized forms or in logbooks. At the completion of daily activities, all field data forms and logbooks should be checked for completeness by field personnel. For field measurement data that require reduction using calculations to obtain final concentrations/values, all reduction activities shall be conducted in accordance with applicable Field Operating Procedures (FOPs). The required equations, calculations, documentation, checking, and reporting shall be specified in the FOPs. Field technical data should be reduced to tabular form wherever possible, by entering into electronic data management programs (e.g., data bases, spreadsheets). Input data shall be verified against the original data source to minimize transcription errors. Subjective data should be filed in the SNL/NM ES&H Records Center (ES&H RC) as hard copies for incorporation into technical reports as appropriate.

Occasionally, a field measurement may result in an outlier with a value significantly outside the expected range for most field conditions. When identified, an outlier should be recorded as would any other field measurement, and whenever possible at least two additional measurements should be made and recorded to verify or invalidate the suspected outlier. When appropriate, field instrumentation and calibration should be checked following the appropriate FOP(s) and the parameter remeasured. If after this check, the value remains the same, it is considered a valid measurement. However, if instrument malfunction is suspected as the source of anomalous data, appropriate steps shall be taken to verify instrument performance. Equipment failure shall be documented by a Nonconformance Corrective Action Report (NCAR), as described in AOP 94-18.

## 10.2 Laboratory Data Reduction

At the completion of a set of laboratory analyses, all calculations are completed and reviewed by the analyst. Calculations using raw data to obtain final concentrations are performed according to the procedures described in the specified analytical method and the laboratory's QA manual. Data reduction calculations may be performed manually or electronically if the analytical instrument is interfaced with a microprocessor.

The associated QC check data (e.g., laboratory duplicates and replicates, surrogate and matrix spike, and QC reference sample data) is used to verify that data are within the control limits specified for the analytical method. If QC results are not within the control limits, corrective actions shall be taken, as per the specified analytical method and the laboratory's QA Program. Typically, if all data are acceptable, the data are entered into the analytical laboratory computer system, and data summaries (including raw data) are submitted to the analytical laboratory QC reviewer for laboratory validation. Following the QC review, a hard-copy data summary shall be reviewed and signed by supervisory or management person at the laboratory.

## 10.3 Data Verification and Validation

Data verification is a systematic process of reviewing a body of data for documentation completeness and attainment of contractual and SAP requirements. Data validation is a systematic process of reviewing a body of data against a set of criteria to provide assurance that the data are adequate for their intended use. The validation criteria should be developed during the DQO process and depend upon the type(s) of data involved and the purpose for which data are collected. The sampling event Project Leader is responsible for ensuring that the resulting data are properly verified and validated. The verification/validation process shall document that, as applicable

- The appropriate FOPs were used during sample collection;
- Samples were preserved and handled in accordance with applicable field and laboratory OPs;
- The appropriate number and type of field and laboratory QC check samples were collected;
- Data packages were complete, as per the analytical laboratory SOW;
- Analyses were performed by the methods specified in the work plan, and any deviations from specified analytical methods are documented (case narrative); and
- Field and laboratory QC checks met the established acceptance criteria.

The data validation process will result in qualifiers of the data as to whether it is acceptable, conditional, or unacceptable. Data verification and validation requirements are specified below in the following subsections. Detailed procedures for performing data verification and validation are provided in the TOP 94-03, *Verification and Validation of Chemical and Radiochemical Data* (SNL/NM 1994g).

## 10.4 Laboratory Data Verification and Validation

The initial responsibility for monitoring the quality of analytical data lies with the analytical laboratory analyst. In this pursuit, the analyst shall verify that all QC procedures specified for each analytical method are followed and that the results of QC check sample analyses are within the acceptance criteria established for the method. Laboratory data validation/verification criteria shall be included in the laboratory QAP.

When the SMO receives the analytical data packages from the laboratory, the SMO performs verification/validation of the package to ensure that contractual requirements have been met (DV-1). While the SMO also performs verification/validation for data quality requirements (DV-2) on a statistically valid number of data packages, the sampling and analysis Project Leader is responsible for any further validation requirements noted in the SSSP/SAP. SNL/NM data validation procedures are specified in TOP 94-03 (SNL/NM 1994f). This TOP describes the levels of data verification and validation (DV-1, DV-2, DV-3) used for assessing chemical and radiochemical data. The level(s) of verification/validation to be used and the required frequency of verification and validation should be determined during the DQO process and specified in the SSSP or project SAP.

## 10.5 Data Reporting

Detailed laboratory data reporting requirements are specified in AOP 95-15, Administrative Operating Procedure for Contract Laboratory Management (SNL/NM 1995k) and in the laboratory's contractual SOW. Data reporting requirements are summarized below.

Analytical laboratory data may be reported on magnetic media and in hard copy data reports. All analytical laboratory data report packages for each type of analysis shall contain a case narrative that, on the given set of samples, summarizes as applicable:

- The date of issue;
- The contents of the laboratory report with page count;
- The project name and number;
- The laboratory analysis performed;
- A reference to the analytical method;
- Any deviations from the stated analytical method;
- The laboratory batch number;
- Unique sample identification;
- The number of samples and sample matrix;
- The condition of the samples received (e.g., whether preserved and packaged properly);
- The date of sample receipt, preparation, and analysis;
- Whether sample holding times were met, and identification of those that were not;
- Any observations that may have had an impact on the analyses;

- Any technical problems or nonconformances affecting the analysis and corrective actions taken;
- Laboratory QC checks that did not meet the project/method criteria and/or laboratory criteria (include any corrective actions taken and any known possible reasons for the results);
- Analytical laboratory supervisor or management's signature approving the issuance of the data package.

Complete data packages including raw sample and calibration data may be required, based on the use of the data. Analytical data results associated with waste intended to meet NTSWAC criteria shall be reported using the Standardized Data Reporting Forms, in accordance with the NTSWAC LRD. The following subsections identifies minimum routine reporting requirements for analytical data packages.

### **10.5.1 Chemical Analytical Data**

The standard analytical laboratory data reports for chemical analysis data shall consist of a transmittal letter and, as applicable:

- Case narrative that summarizes the information discussed above (Section 10.3)
- Copies of the analysis request and chain-of-custody forms with appropriate signatures
- Sample analytical results and QC summaries
- All laboratory QC data including reagent blank, LCS, matrix spike, laboratory duplicate or spike duplicate, and surrogate recovery data and associated control limits
- Method quantitation limits for all parameters and dilutions

Organic analytical results (VOCs, SVOCs, pesticides/PCBs, and herbicides) shall be reported in micrograms per liter ( $\mu\text{g/L}$ ) for aqueous samples and in micrograms per kilogram ( $\mu\text{g/kg}$ ) for soil/sediment samples.

Inorganic (metals) analytical results shall be reported in  $\text{mg/L}$  for aqueous samples and in milligrams per kilogram ( $\text{mg/kg}$ ) for soil/sediment samples. Miscellaneous analyte parameters should be reported in milligrams per liter ( $\text{mg/L}$ ) for aqueous samples and in  $\text{mg/kg}$  for soil/sediment samples.

All laboratory analytical reports shall be archived by the SNL/NM ES&H RC.

### **10.5.2 Radiochemical Analytical Data**

Analytical laboratory data packages for radiochemical analyses shall consist of a transmittal letter and, as applicable:

- Case narrative that summarizes the information discussed above (Section 10.3);
- Copies of the analysis request and chain-of-custody forms with appropriate signatures;
- Actual sample results including the critical level, determination level, and quantitation level as defined by (Currie 1968) and associated 2-sigma error;

- Instrument calibration information (including date, time, technician).
- All laboratory radiochemical QC data including reagent blank, laboratory duplicate, spiked samples (matrix spikes), LCS and spike duplicate, and corresponding laboratory control limits.

Radiochemical analytical results shall be reported in picocuries per liter (pCi/L) for aqueous samples and in picocuries per gram (pCi/g) for soil/sediment samples. Total uranium shall be reported in mg/L for aqueous samples and micrograms per grams (mg/g) for soil/sediment samples. Tritium shall be reported in pCi/L for both aqueous and solid samples. All laboratory analytical reports shall be archived by the SNL/NM ES&HRC.

### **10.5.3 Physico-chemical and Geochemical Data Reporting**

Data packages for physicochemical and geochemical results of tests performed on soil, sediment, or waste samples should include a case narrative that contains all applicable components, as discussed above (Section 10.3). The results of each test shall be reported in the units consistent with the method.

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