September 2006

Los Alamos National Laboratory

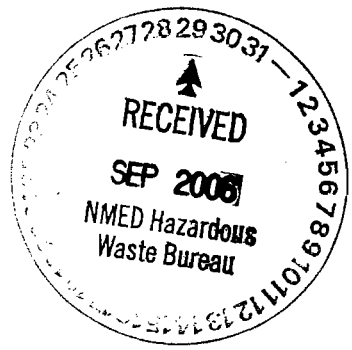
Closure Plans

Technical Areas 16, 50, 54, and 55

Revisions 0.0

DEPARTMENT OF ENERGY
National Nuclear Security Administration
Los Alamos Site Office
Los Alamos, New Mexico 87544

SEP 2 8 2006



John E. Kieling, Program Manager
Permits Management Program
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Bldg. 1
Santa Fe, New Mexico 87505-6303

Dear Mr. Kieling,

Subject: Transmittal of Closure Plans, Los Alamos National Laboratory (LANL) Environmental Protection Agency (EPA) Hazardous Waste Identification Number NM 0890010515

The purpose of this letter is to submit the attached closure plans for the Resource Conservation and Recovery Act (RCRA) waste management units at LANL Technical Areas (TAs) -16, -50, -54, and -55. This submittal is in response to the letter from your office of March 15, 2006 titled "Transfer of Permit Request and Request for Class Determination to the Los Alamos National Laboratory (LANL) Hazardous Waste Facility Permit (EPA ID No. NM0890010515)." The letter required that LANL submit a permit modification to include detailed closure plans and closure cost estimates with financial assurance mechanisms for the waste management units that LANL is seeking to permit.

A letter was recently submitted under separate cover stating the National Nuclear Security Administration (NNSA)'s position regarding the applicability of the closure requirements of 20.4.1.500 NMAC, Part 264, Subpart H, to provide a cost estimate, financial assurance mechanisms, and liability insurance for closure actions at LANL as a federal facility. It should be noted that the permit applications currently before the New Mexico Environment Department (NMED) supporting the upcoming LANL hazardous waste facility permit renewal include closure plans that are superseded by these new revisions. The new closure plans being submitted incorporate recent suggestions from your permitting staff regarding format, technical details, and a new approach for integration with the permit for a mix of permitted and interim status units. For these reasons, the closure plans are being submitted as replacements for those in the Part B permit applications submitted in 2003 for these TAs rather than as a permit modification.

The closure plans include the general closure procedures for each TA with attachments for specific decontamination and verification testing associated with each waste management unit type. As separate documents, they can directly replace the closure plans included within the TA-specific permit applications. As a result of this format, Appendix F, "General Closure Plan," in the "Los Alamos National Laboratory General Part B Permit Renewal Application," Revision 2.0 is no longer needed and should be removed.

SEP 2 8 2000

This submittal includes three copies of the closure plans and an electronic copy on an enclosed compact disk. Should you have any questions regarding this subject, please call Gene Turner of my staff at (505) 667-5794 or Jack Ellvinger of LANS, at (505) 667-0633.

Sincerely,

Edwin L. Wilmot
Manager

EO: 2GT-021

cc:
James Bearzi, Chief
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LA-UR-06-6913
September 2006

Los Alamos National Laboratory
Technical Area 16
Closure Plan

Revision 0.0

Prepared by:

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Los Alamos National Laboratory

Technical Area 16
Closure Plan

Revision 0.0
LA-UR-06-6913

Facility ID No.:	**NM0890010515**
Facility Name:	**Los Alamos National Laboratory**
Facility Address:	**Los Alamos National Laboratory** **P.O. Box 1663** **Los Alamos, New Mexico 87545**
Legal Owner:	**U.S. Department of Energy**
Legal Operators:	**U.S. Department of Energy** **Los Alamos Site Office** **528 35th Street** **Los Alamos, New Mexico 87544** **Los Alamos National Security, LLC.** **4200 West Jemez Road, Suite 4000** **Los Alamos, New Mexico 87544**
Contact Person:	**Gene E. Turner** **Environmental Permitting Manager** **Los Alamos Site Office** **National Nuclear Security Administration** **U.S. Department of Energy** **Owner/Operator**
Date:	**September 2006**

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LIST OF ACRONYMS AND ABBREVIATIONS

20.4.1 NMAC	New Mexico Administrative Code, Title 20, Chapter 4, Part 1
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ESL	Ecological Screening Levels
ft	feet
HE	High Explosives
HWB	Hazardous Waste Bureau
in.	inch/inches
LANL	Los Alamos National Laboratory
lbs.	pounds
NIOSH	National Institute of Occupational Safety and Health
NMED	New Mexico Environment Department
OB	open burning
PPE	personal protective equipment
P&T	Packaging and Transportation
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
R&D	research and development
SSL	Soil Screening Levels
SW-846	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods
TA	Technical Area

LOS ALAMOS NATIONAL LABORATORY TECHNICAL AREA 16 CLOSURE PLAN

1 INTRODUCTION

The information provided in this closure plan is submitted to address the closure requirements specified in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart V (20.4.1.500 NMAC), incorporating the Code of Federal Regulations (CFR), Title 40, Part 264, Subparts G and X, as revised October 1, 2003 [10-1-03], for waste management units operated at the Los Alamos National Laboratory (LANL) under the Resource Conservation and Recovery Act (RCRA) and the New Mexico Hazardous Waste Act. This closure plan describes the activities necessary to close the hazardous waste open burning (OB) treatment units at the LANL Technical Area (TA) 16 Burn Ground. General information for the closure activities at the TA-16 OB units is presented in this closure plan. Specific information on closure decontamination, sampling strategies, and analytical requirements for the units at TA-16 is included in Attachment A.

Until closure is complete and has been certified in accordance with 20.4.1.500 NMAC, §264.115 [10-1-03], a copy of the approved closure plan, any approved revisions, and closure activity documentation associated with the closure will be on file at the LANL Environmental Protection Division Water Quality and RCRA Group Office and at the U.S. Department of Energy (DOE) Los Alamos Site Office.

2 GENERAL CLOSURE INFORMATION

2.1 Closure Performance Standard

As required by 20.4.1.500 NMAC, §264.111 [10-1-03], the TA-16 OB units will be closed to meet the following performance standards:

- Minimize the need for further maintenance;
- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground, or surface waters, or to the atmosphere; and
- Comply with the closure requirements of 20.4.1.500 NMAC, Part 264, Subparts G and X [10-1-03], including, but not limited, to the requirements of 20.4.1.500 NMAC, §264.603 [10-1-03].

This will be accomplished by removal of hazardous waste from the units; decontamination/decommissioning, if necessary, of the surfaces and equipment that may have come into contact with the wastes; and/or disposal of contaminated unit structures or equipment. Verification sampling may be performed after the removal of site structures to assess the potential for residual contamination at the closure site if any evidence is found that indicates there may have been a potential release of hazardous constituents from the unit. If sampling indicates contamination, the level of such

contamination will be evaluated for further decontamination activities or management of all remaining unit structures as contaminated waste using appropriate LANL waste management procedures. Decontamination activities will ensure the removal of hazardous waste residues from the TA-16 OB units to established cleanup levels as agreed upon with the New Mexico Environment Department (NMED) or as outlined in Section 5.5 of this closure plan.

2.2 Partial and Final Closure Activities

This closure plan has been written for partial closure rather than final closure of the entire LANL facility. Partial closure will consist of closing an individual OB unit, while leaving the other regulated hazardous/mixed waste management units at LANL in service. Partial closure of each OB unit (hereinafter referred to simply as "closure") will be deemed complete when 1) all surfaces and equipment have been decontaminated, or otherwise properly dispositioned, if necessary; 2) closure has been certified by an independent, professional engineer licensed in the State of New Mexico; and 3) closure certification has been submitted to and approved by the NMED. Final closure of the LANL facility will occur when the remaining hazardous/mixed waste management units at LANL are closed. Final closure will consist of assembling documentation on the closure status of each unit, including all previous partial closures as well as land-based units that have been or are being addressed via coordination with corrective action projects. Final closure will be deemed complete when the information has been submitted to the NMED and approved.

3 DESCRIPTION OF UNITS TO BE CLOSED

LANL is located in Los Alamos County, an incorporated county, in north-central New Mexico, approximately 60 miles north of Albuquerque and 25 miles northwest of Santa Fe. LANL is divided into TAs. TA-16 is located in the southwestern portion of LANL. It is situated on a broad mesa that is bound on the north by Cañon de Valle, on the south by State Road 4 and Bandelier National Monument, and on the west by West Jemez Road (State Road 501) and the Santa Fe National Forest. Elevation ranges from approximately 7,700 feet (ft) at the west end of the TA to approximately 6,800 ft at the east end. Topography is varied, ranging from steep precipitous canyon walls to sloping mesa tops. The remainder of this section provides a listing of the waste management units at TA-16 to which this closure plan applies, followed by brief descriptions of the specific units.

3.1 TA-16 Waste Management Units

The TA-16 OB units addressed in this closure plan are:

- TA-16-388 Flash Pad, and
- TA-16-399 High Explosives (HE) Burn Tray.

Information on the hazardous component(s) of the wastes treated at the TA-16 OB units and pictures and figures of the units are provided in the "Los Alamos National Laboratory General Part A Permit

Application," Revision 5.0 (LANL, 2006) and the "Los Alamos National Laboratory Technical Area 16 Part B Permit Renewal Application," Revision 4.0 (LANL, 2003b).

3.1.1 TA-16-388 Flash Pad

In 1998, the NMED granted LANL Temporary Authorization to upgrade the TA-16-388 HE Burn Tray to a propane-fueled flash pad and burn tray. The upgrade began shortly thereafter. The new designation for TA-16-388 was reflected in the "Los Alamos National Laboratory General Part A Permit Application," Revision 0.0 (LANL, 1998), submitted to the NMED in April 1998. The TA-16-388 conversion was subsequently approved by the NMED on May 12, 1999, as a Change During Interim Status, pursuant to 20.4.1.900 NMAC §270.72 [10-1-03].

The TA-16-388 Flash Pad consists of a 22-ft by 22-ft concrete pad set on a secondary containment area. The base of the flash pad is 12 inches (in.) thick. The entire flash pad is contained in a 45-mil Hypalon® liner, which is 6 in. below the bottom of the pad and curved up to ground level on all 4 sides, extending out 2 ft from the pad perimeter. Inset one ft from the edge of the concrete pad along the two sides and back is a 3-ft-high, 8-in.-thick, integrally-poured concrete wall. The pad is slanted down toward the back concrete wall, thus providing secondary containment for any spills or run-on/runoff of stormwater. Between operations, the unit can be covered with a retractable steel roof, tarps, or other types of covers.

3.1.2 TA-16-399 HE Burn Tray

The TA-16-399 HE Burn Tray is a 4-ft-wide, 16-ft-long steel tray, supported on 1.5-ft-high legs, and lined with firebricks. The tray is equipped with a cover that is removed during a burn. The cover is kept in place between operations.

3.2 Estimate of Maximum Waste Treated

Waste is not stored prior to treatment at the TA-16 OB units. The maximum total capacity of hazardous waste that may be flashed at the TA-16-388 Flash Pad at any time is 40,000 pounds (lbs.) per burn; this capacity consists mainly of non-combustible materials. The maximum total capacity of liquid hazardous waste that may be treated at the TA-16-388 Flash Pad is 100 gallons per burn, and the maximum total capacity of wet HE that may be treated is 1,000 lbs. per burn. The maximum total capacity of hazardous waste that may be treated at the TA-16-399 HE Burn Tray is 1,000 lbs.

Approximate estimates of the total maximum inventory of hazardous wastes treated over the active life (1980 to present) of each OB unit are:

- TA-16-388 Flash Pad ≈ 200,000 lbs. of solids and 666 gallons of liquids
- TA-16-399 HE Burn Tray ≈ 155,500 lbs.

3.3 Description of Waste Managed

The following paragraphs describe waste that is treated at the TA-16 OB Units.

Pure HE: Pure HE waste is generated primarily from excess or reject parts (dry), or is wet HE from machining activities. The types and amounts of bulk wet and dry HE treated at the TA-16 Burn Ground vary depending primarily on research and development (R&D) and stockpile stewardship activities. In 2005, the primary type of HE treated was cyclotetramethylenetetranitramine (HMX) and much smaller amounts of 1,3,5-triamino-2,4,6-trinitrobenzene (TATB), trinitrotoluene (TNT), and cyclonite (RDX). Most dry HE is treated at the TA-16-399 HE Burn Tray. Wet HE is treated at the TA-16-388 Flash Pad because external heat from the propane burners is needed to dry the HE before it can burn. Usually less than 100 lbs. are burned to provide sufficient surface area for drying.

Combustible Solids: Combustible solids treated at the TA-16 Burn Ground consist primarily of HE filter socks, paper, rags, and plastics that are contaminated with detonable quantities of HE. These originate from operational facilities (e.g., machining, pressing) and R&D laboratories. They are treated at the TA-16-388 Flash Pad using external heat from the propane burners to improve burning. Usually, less than 100 lbs. are treated per burn.

Non-Combustible Solids: Non-combustible solids contaminated with HE consist primarily of metal piping, equipment, concrete, or soil generated during decommissioning and environmental restoration activities. They are flashed if detonable quantities of HE exist in cracks or crevices. The amount of non-combustible material, usually metal, can be quite large; however, the amount of HE present that is burned is quite small. These are flashed at the TA-16-388 Flash Pad using external heat from the propane burners to heat the non-combustible material to temperatures that will degrade the HE.

Liquids: This waste stream historically consisted of oils and solvents contaminated with HE. Oils contained in equipment occasionally become contaminated with explosives during cleaning or oil leaks. Solvents are generated primarily from R&D operations.

Specific hazardous waste constituents that are managed are described by U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers. These are reflected in past Part A permit applications, and most recently in Section XIV, “Technical Area 16”, of the “Los Alamos National Laboratory General Part A Permit Application,” Revision 5.0 (LANL, 2006). Additional information about wastes treated at the units is available in the Waste Analysis Plan in Appendix B of the “Los Alamos National Laboratory General Part B Permit Renewal Application,” Revision 2.0 (LANL, 2003a). At the time of closure, the history of each of the OB units will be reviewed to determine the specific waste constituents that apply for each unit.

4 CLOSURE SCHEDULE

Closure of the TA-16 OB units will be initiated on an individual unit basis; however, both units will be closed by 2100. This closure plan is intended to address closure requirements for the units within the

authorized timeframe of the current Hazardous Waste Facility Permit. Written notification will be provided to the NMED before the start of closure activities for each of the TA-16 OB units. However, pursuant to 20.4.1.500 NMAC, §264.112(e)[10-1-03], removing hazardous wastes and decontaminating or dismantling equipment in accordance with an approved closure plan may be conducted at any time before or after notification of closure. Closure activities will begin according to the requirements of 20.4.1.500 NMAC §264.112(d)(2) [10-1-03]. Treatment, removal, or disposal of hazardous wastes will begin in accordance with the approved closure plan, as required by 20.4.1.500 NMAC §264.113(a) [10-1-03], within 90 days after the final receipt of waste at each of the TA-16 OB units. In the event that closure activities cannot begin within 90 days, LANL will notify the Secretary of the NMED in accordance with the extension requirements in 20.4.1.500 NMAC, §264.113(a) [10-1-03]. In addition, the demonstrations in 20.4.1.500 NMAC, §264.113(a)(1) and (b)(1) [10-1-03], will be made in accordance with 20.4.1.500 NMAC, §264.113(c) [10-1-03]. Closure activities and reporting requirements will be completed within 180 days of the final treatment of waste at each of the treatment units. Closure will be conducted in accordance with the schedule presented in Table 1. In the event that closure of the TA-16 OB units cannot proceed according to schedule, LANL will notify the Secretary of the NMED in accordance with extension request requirements in 20.4.1.500 NMAC, §264.113(b) [10-1-03].

5 GENERAL CLOSURE PROCEDURES

Closure activities at the TA-16 OB units will involve treatment or removal of untreated hazardous wastes; proper management and disposition of hazardous waste residues, contaminated structures, and contaminated equipment associated with the OB units and subsequent appropriate disposition; and verification that the closure performance standards have been achieved. The following sections describe general closure procedures applicable to the TA-16 OB units closure activities.

5.1 Security

Because of the ongoing HE operations at TA-16, security and administrative controls for TA-16 (and, therefore, the TA-16 Burn Ground) will be maintained by the DOE for as long as necessary to prohibit public access. Details on security and access control to TA-16 are available in Section G.2.6 of the ”Los Alamos National Laboratory Technical Area 16 Part B Permit Renewal Application,” Revision 4.0 (LANL, 2003b).

5.2 Removal of Waste

After hazardous wastes are treated at each OB unit, non-combustible debris and ash are removed promptly, characterized, and dispositioned properly. Therefore, removal of hazardous waste from each unit prior to initiation of closure activities is not anticipated. All waste material will be controlled, handled, characterized, and dispositioned in accordance with LANL waste management procedures. Appropriate shipping papers will accompany the treated debris and ash during transport to a waste management

facility. Table 2 provides a list of the potential waste materials that may be generated during closure, possible waste type(s), and disposal options.

5.3 Preliminary Closure Procedures

5.3.1 Safety Precautions

In accordance with LANL safety procedures, job hazards associated with closure activities will be identified, controls developed, and workers briefed before closure activities are conducted. Personnel involved in closure activities will wear appropriate personal protective equipment (PPE) specified by LANL industrial hygiene personnel, and will follow good hygiene practices to protect themselves from exposure to hazardous waste. The level of PPE required will depend upon the physical hazards present and the levels of chemical contamination detected, if any. If surveys conducted by LANL industrial hygiene personnel indicate no detectable contamination levels, minimum PPE requirements will consist of coveralls, booties, gloves, steel-toed/composite-toed shoes, and safety glasses or face shields. Additional PPE will be required (e.g., hard hats, ear plugs) if other safety issues are identified. Contaminated PPE will be decontaminated or managed in accordance with applicable waste management regulations.

All workers involved in closure activities will be required to have appropriate training as required by site-specific work procedures. Workers who will manage hazardous waste or waste constituents during closure activities will follow the training requirements in the appropriate LANL RCRA Training Plan.

5.3.2 Pre-Closure and Structural Assessment

Before starting closure decontamination and sampling activities, the operating and inspection records for the OB units will be reviewed to determine any previous finding(s) or action(s) that may influence closure activities or potential sampling locations. Goals of this review will be to determine the specific hazardous waste constituents of concern; determine potential sampling locations for the OB unit by identifying any spills or chronic conditions in the operating record that would indicate the type and location of released constituents; and differentiate equipment or other materials that will undergo decontamination from those to be recycled or reused, or managed as waste. Tables A-1 and A-2 in Attachment A list potential constituents of concern for the TA-16-388 Flash Pad and TA-16-399 HE Burn Tray, respectively. The pre-closure and structural assessment of each OB unit will include a thorough visual inspection for unburned materials. Paths forward for equipment at each unit, locations for potential soil sampling, and locations and types of decontamination verification sampling (if determined to be necessary) will also be identified during this assessment. In addition, background samples or data derived from LANL studies developed under the LANL corrective action program or other programs will be reviewed to determine levels or concentration thresholds applicable for the purposes of closure.

At least weekly, preventive maintenance inspections are conducted at the TA-16 OB units. HEs are handled very carefully and spills are unlikely; however, any spill would be documented. Staging is done on the concrete pad, which would contain any spills. Therefore, contamination would not be expected unless there was a recorded release. If any defects, deterioration, damage, or hazards affecting containment developed, appropriate remedial actions (including sampling, repairs, maintenance, or replacement) are completed and noted in the inspection record. This information will be reviewed to determine whether these activities have resulted in conditions affecting the closure or determination of sampling needs. Prior to beginning any decontamination activities at the TA-16 OB units, the base or secondary containment will be inspected for any existing cracks or conditions that indicate a potential for release of contaminants or that could lead to loss of decontamination and/or verification water during closure. This inspection will be documented with photographs and drawings, as necessary. If a crack or gap is present, the operating record will be reviewed to determine the possible presence or release of contamination. If contamination could be present, a wipe sample or a representative sample of the media (e.g., concrete, metal) will be taken and analyzed for the potential hazardous constituents identified during the assessment, following procedures outlined in Section 6.4.3 and in Attachment A of this closure plan. If contamination is present above baseline/background levels, the surface flaw will be decontaminated to meet, as necessary, the applicable requirements for disposition (e.g., leaving in place, reuse, or disposal). Material may be partially or completely removed until contamination is no longer detected, or it is established that contamination present is not due to treatment activities at the TA-16 OB units, but is part of historical contamination.

5.4 General Decontamination Procedures

To the extent necessary, all contaminated equipment present at closure, surfaces, and structures will be decontaminated. Discarded materials and equipment that cannot or will not be decontaminated will be managed as waste or otherwise dispositioned in compliance with applicable regulations. Decontamination procedures specific for the TA-16 OB units are further described in Attachment A of this closure plan.

If decontamination is necessary, all sampling during closure and decontamination will be conducted in accordance with quality assurance (QA)/quality control (QC) procedures defined by the latest revision of the U.S. Environmental Protection Agency (EPA) “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods” (SW-846) (EPA, 1986). Monitoring for contamination will occur throughout closure activities, as appropriate.

5.4.1 Equipment Located at the TA-16 OB Units

Equipment associated with the TA-16 OB units is essentially comprised of steel trays and plates, firebrick, sand, burners, mounts, steel pallets, and thermocouples. Most equipment will be decontaminated by treatment (i.e., flashing or burning) to remove any HE residuals. If the equipment requires other

decontamination, it will be wiped down with a solution consisting of Alconox®, or equivalent cleaner, and water, or steam cleaned. To minimize the quantity of wash solution used if washing (rather than steam cleaning), the wash solution will be dispensed from buckets, spray bottles, or other types of containers. Cheesecloth, rags, or other absorbent materials will be used to wipe down the equipment after being wetted with the wash solution or after spraying solution onto the equipment. If necessary, portable berms or other devices (e.g., absorbent socks, plastic sheeting, wading pools, or existing secondary containment) designed to collect and provide containment will collect excess wash water or steam condensate and provide containment during the decontamination process.

5.4.2 Decontamination of Surfaces

Contaminated OB unit surfaces, structures, and liners will be decontaminated and/or removed and managed in accordance with appropriate waste management regulations. Decontamination of the concrete pads and/or walls of the TA-16 OB units (if required) will consist of pressure washing or washing with mops, cloths, and/or other absorbent materials to remove any hazardous constituents. When mops, cloths, and/or other absorbent materials are used, the materials will be wetted in a wash solution consisting of Alconox®, or an equivalent cleaner, and water. A portable berm or other device (e.g., absorbent socks, plastic sheeting, wading pools, or existing secondary containment) designed to collect and provide containment for excess wash water or steam condensate will be used, as necessary. If any contaminated portion of an OB unit cannot or will not be decontaminated to acceptable levels as described in Section 5.5, the contaminated portion will be disposed of in accordance with appropriate waste management regulations. Concrete pads and other equipment that are successfully decontaminated may be left in place or reused if a potential use is identified.

The concrete may be transported to and stored at other hazardous waste management locations to facilitate the closure process. If the concrete is totally removed, or a crack that penetrated through the concrete and liner is identified during the pre-closure and structural assessment, soil samples will be collected from the area underlying the original concrete. Soil sampling procedures are presented in Section 6.4.1. If the crack did not extend to the soil or the concrete is not removed, the underlying soil will be presumed to be uncontaminated and soil sampling will not be required. If determined to be contaminated, the Hypalon® liner associated with the concrete pad at the TA-16-388 Flash Pad will be decontaminated or removed and managed appropriately.

When decontamination of the OB unit is complete, verification will be conducted as described in Section 5.5. If verification analyses indicate that hazardous constituents are present above acceptable levels, as described in Section 5.5, the decontamination activities and verification analyses will continue until the surfaces, structures, equipment, and/or media have been decontaminated or the decision is made to proceed with an alternative demonstration of closure, as described in Section 5.6. Upon determination

that a surface, structure, or other media is waste, it may be removed, transported, and stored at other hazardous waste storage units to facilitate the closure process.

5.4.3 Decontamination Waste Management

After any decontamination wash down process needed for the closing unit, the excess wash water will be collected, transferred to containers, sampled, and analyzed for the hazardous constituents listed in Tables A-1 or A-2 of Attachment A. The results of this analysis will determine if the excess wash water should be managed as hazardous or non-hazardous wastewater. The wastewater, PPE, and any other waste generated as a result of closure will be managed as outlined in Table 2. All decontamination activities involving wash water will be conducted within the existing secondary containment for the OB unit, if present, or on secondary containment pallets in order to prevent migration to surface soils or waters. In addition, all waste management operations will be subject to LANL Hazardous Waste Facility Contingency Plan conditions to further prevent potential contamination if spills occur. Subsequent disposition options for the decontaminated structures and equipment include reuse, recycling, or disposal.

5.4.4 Equipment Used During Closure

Reusable protective clothing, tools, and equipment used during decontamination activities will be cleaned with a wash water solution. Residue, disposable equipment, and reusable equipment that cannot be decontaminated will be containerized and managed as waste in accordance with LANL waste management procedures, depending on the regulated constituents present.

5.5 Verification of Decontamination

LANL proposes analysis of water and/or wipe samples for decontamination verification at the TA-16 OB units using the following methods:

- When liquid sampling, the verification solution will be limited to an amount that is sufficient to wipe down the surface to be verified and collect the required number of samples. This will minimize dilution of hazardous constituents present at the location.
- For wipe sampling, guidance from the analytical laboratory must be obtained prior to wipe verification sampling to confirm that the solution chosen for each analysis is appropriate for the analysis to be conducted and that wipe sampling is a proper technique for the analysis.
- Sample area will be limited to a specific discrete location (e.g., a wall or portion thereof, depending on the size of the unit/equipment).
- Decontamination will be verified by comparing the discrete analytical results for liquid sampling to a baseline result (blank) obtained from the verification solution prior to its use for the verification wipe down. Comparison of wipe sample analytical results to an unused wipe media sample (blank) will be used to determine the presence or absence of contamination.

- If the result is at or below that of the blank, decontamination is verified for the discrete area sampled.
- If the result is above the blank, decontamination and verification will be repeated for the discrete location in accordance with Sections 5.4 and 5.5 of this closure plan; closure will be verified as described below; or the decision will be made to proceed with an alternative demonstration of closure, as described in Section 5.6.

This proposed method minimizes dilution and establishes criteria by which successful decontamination is verified. Analytical procedures will conform to the methods found in Section 7.

5.5.1 Verification Criteria

Successful decontamination of the TA-16 OB units will meet a minimum of one of the following criteria:

- No detectable RCRA-regulated constituent residues from the management of treated authorized RCRA-regulated wastes are identified in samples collected during closure activities.
- Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline/background data.
- Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health and the environment, based on the results of risk assessment methods.
  - Comparison of the analytical results to the appropriate NMED Soil Screening Levels (SSLs) (NMED, 2006) and/or the LANL Ecological Screening Levels (ESLs) (LANL, 1999), or most current applicable document(s). If the result is below the SSL/ESL, the equipment/soil/surface will be considered free of contamination.
- Detectable concentrations of RCRA-regulated constituents that cannot be removed or decontaminated to acceptable levels, as described above, will remain provided that these RCRA-regulated constituents do not pose an unacceptable risk when combined with technical or administrative control measures agreed upon with the NMED.
  - Assessment of residual (i.e., above the SSL, ESL) contamination levels using an occupational risk scenario.

5.6 Alternative Demonstration of Closure

An alternative demonstration of closure may be justified at the TA-16 OB units addressed in this plan if verification methods described in the previous section are not feasible. LANL proposes the following alternative demonstrations:

- All equipment/materials/surfaces of the treatment unit have been recycled or disposed of in accordance with applicable regulatory requirements.

- Pursuant to 20.4.1.200 NMAC §261.3(f)(2), LANL has requested and the NMED has approved a determination that the debris is no longer contaminated with hazardous waste.
- Due diligence has been conducted to establish that contamination at the site is historical contamination (the difference between operating unit and historical operations cannot be distinguished) that should be addressed under corrective actions and not as part of the operating unit closure.

6 SAMPLE MANAGEMENT PROCEDURES

The following information presents general sample management and sampling equipment cleaning procedures shared in common for closure of the waste management units described in this closure plan. Specific sampling strategies to be used for this closure to demonstrate decontamination, if necessary, are included in Attachment A of this closure plan.

Samples will be collected and transported using documented chain-of-custody and sample management procedures to ensure the integrity of the sample and provide an accurate and defensible written record of the possession and handling of a sample from the time of collection through laboratory analysis. Sample collection equipment will include labels, chain-of-custody forms, EPA-certified clean containers, coolers, preservatives, and custody seals. The following provides a description of sample documentation; sample handling, preservation, and storage; and sample packaging and transportation requirements that will be followed during the sampling activities associated with the closure.

6.1 Sample Documentation

Sampling personnel will complete and maintain records to document sampling and analysis activities. Sample documentation will include sample identification numbers, chain-of-custody forms, analysis requested, sample logbooks detailing sample collection activities, and shipping forms (if necessary).

6.1.1 Chain-of-Custody

Chain-of-custody forms will be maintained by sampling personnel until the samples are relinquished to the analytical laboratory. One chain-of-custody form may be used to document all of the samples collected from a single sampling event. The sample collector will be responsible for the integrity of the samples collected until properly transferred to another person. The EPA considers a sample to be in a person's custody if it is:

- In a person's physical possession,
- In view of the person in possession, or
- Secured by that person in a restricted access area to prevent tampering.

The sample collector will document all pertinent sample collection data. Individuals relinquishing or receiving custody of the samples will sign, date, and note the time on the analysis request/chain-of-custody form. A chain-of-custody form must accompany all samples from collection through laboratory analysis. The completed original chain-of-custody form will be returned by the analytical laboratory and will become a part of the permanent record documenting the sampling effort.

6.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- A unique sample identification number;
- Name of the sample collector;
- Date and time of collection;
- Type of preservatives used, if any; and
- Location from which the sample was collected.

A custody seal will be placed on each sample container to detect unauthorized tampering with the samples. These labels must be initialed, dated, and affixed by the sample collector in such a manner that it is necessary to break the seal to open the container.

6.1.3 Sample Logbook

All pertinent information on the sampling effort must be recorded in a bound logbook. Information must be recorded in ink and any cross outs must be made with a single line and the change initialed and dated by the author. The sample logbook will include the following information:

- The sample location.
- Suspected composition.
- Sample identification number.
- Volume/mass of sample taken.
- Purpose of sampling.
- Description of sample point and sampling methodology.
- Date and time of collection.
- Name of the sample collector.
- Sample destination and how it will be transported.
- Observations, and
- Names of personnel responsible for the observations.

6.2 Sample Handling, Preservation, and Storage

Samples will be collected and containerized in appropriate pre-cleaned sample containers. Table 3 presents the requirements in SW-846 (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE Orders, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate LANL documents establish these requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, wastes, and defense program materials.

Off-site transportation of samples will occur via private, contract, or common motor carrier; air carrier; or freight. All off-site transportation will be processed through the LANL Packaging & Transportation (P&T) Organization, unless the shipper is specifically authorized through formal documentation by the P&T Organization to independently tender shipments to common motor or air carriers.

6.4 Sample Collection Procedures

Samples will be collected in accordance with the most recent and appropriate LANL sampling plan incorporating guidance from the EPA (EPA, 2002) and DOE (DOE, 1995), or other approved procedures.

6.4.1 Soil and Sediment Sampling

If necessary, soil will be sampled using a spade, scoop, auger, or trowel. Samples will be kept at their at-depth temperature or lower, protected from ultraviolet light, sealed tightly in the recommended container, and analyzed within the specific holding times listed in Table 3.

6.4.2 Liquid Sampling

For verification sampling, each discrete sample location will be wiped down with clean water. A mop, cloth, and/or other absorbent material will be submerged into the container and squeezed out prior to wiping down the discrete surface to be verified. Excess solution will collect in a bermed area, if necessary. To minimize dilution of the samples, the solution used for the wipe down will be limited to a quantity sufficient to collect the appropriate number of samples. Liquid sampling will be conducted using glass or plastic tubes, a composite liquid waste sampler, a bacon bomb, a bailer, or by pouring liquid into sample containers.

6.4.3 Wipe Sampling

When surface wipe samples are used to determine if residual hazardous constituents remain within the TA-16-388 Flash Pad or the TA-16-399 HE Burn Tray, the samples will be taken in accordance with the National Institute of Occupational Safety and Health (NIOSH) *Manual of Analytical Methods*, Method 9100 (NIOSH, 1994), or other approved methodology. The appropriate use of wipe sample methods will consider the type of surface being sampled, the type of contaminant, the solution used, and the desired contaminant concentration detection limits. The NIOSH method includes wiping a 100 square centimeter area at each discrete location with a gauze wipe wetted with a liquid solution appropriate for the desired analysis (e.g., deionized water for lead). The solution used depends on the analysis; therefore, the analytical laboratory will be consulted prior to sampling activities to ensure that the correct solution is employed for each analysis and that wipe sampling is a proper technique for the analysis.

6.5 Cleaning of Sampling Equipment

Reusable sampling equipment will be cleaned and rinsed prior to use. Sampling equipment rinsate blanks will be collected and analyzed only if reusable sampling equipment is used. Reusable decontamination equipment, including protective clothing and tools, used during closure activities will be scraped as necessary to remove residue and cleaned with a wash water solution. Sampling equipment will be cleaned prior to each use with a wash solution, rinsed several times with tap water, and air-dried or wiped dry to prevent cross-contamination of samples. A disposable sampler is considered clean if still in a factory-sealed wrapper. Residue, disposable decontamination equipment, and reusable decontamination equipment that cannot be decontaminated will be containerized and managed appropriately at an approved on-site facility.

7 ANALYSIS REQUIREMENTS

The following information presents general analysis procedures shared in common for closure of the waste management units described in this closure plan. Specific analytical requirements for this closure to demonstrate decontamination, if necessary, are included in Attachment A of this closure plan.

7.1 Analytical Laboratory Requirements

The analytical laboratory will perform the detailed qualitative and quantitative chemical analyses specified in Attachment A of this closure plan. This analytical laboratory will have:

- A documented comprehensive QA/QC program,
- Technical analytical expertise,
- A document control/records management plan, and
- The capability to perform data reduction, validation, and reporting.

The selection of the analytical testing methods identified in Attachment A was based on the following considerations:

- The physical form of the waste,
- Constituents of interest,
- Required detection limits (e.g., regulatory thresholds), and
- Information requirements (e.g., waste classification).

7.2 Quality Assurance/Quality Control

Field sampling procedures and laboratory analyses will be evaluated through the use of QA/QC samples to assess the overall quality of the data produced. QC samples evaluate precision, accuracy, and potential sample contamination associated with the sampling/analysis process, and are described in the following sections, along with information on calculations necessary to evaluate the QC results. QA/QC samples will be collected in accordance with the most recent and appropriate LANL sampling plan incorporating guidance from the EPA (EPA, 2002) and DOE (DOE, 1995), or other approved procedures. Analysis will be conducted in accordance with procedures given in SW-846 (EPA, 1986), or other approved procedures or methods.

7.2.1 Field Quality Control

The field QC samples that may be collected include trip blanks, field blanks, field duplicates, and equipment rinsate blanks. Table 4 presents a summary of QC sample types, applicable analyses, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample.

7.2.2 Analytical Laboratory QC Samples

QA/QC considerations are an integral part of analytical laboratory operations. Laboratory QA ensures that analytical methods generate data that are technically sound, statistically valid, and that can be documented. QC procedures are the tools employed to measure the degree to which these QA objectives are met.

7.3 Data Reduction, Verification, Validation, and Reporting

Analytical data generated by the activities described in this closure plan will be verified and validated. Data reduction is the conversion of raw data to reportable units; transfer of data between recording media; and computation of summary statistics, standard errors, confidence intervals, and statistical tests.

7.4 Data Reporting Requirements

Analytical results will include all pertinent information about the condition and appearance of the sample-as-received. Analytical reports will include:

- A summary of analytical results for each sample;
- Results from QC samples such as blanks, spikes, and calibrations;
- Reference to standard methods or a detailed description of analytical procedures; and
- Raw date printouts for comparison with summaries.

The laboratory will describe off-normal sample preparations that occur during the analysis in sufficient detail so that the data user can understand how the sample was analyzed.

8 AMENDMENT OF THE CLOSURE PLAN

In accordance with 20.4.1.500 NMAC, §264.112(c) [10-1-03], LANL will submit a written change in the approved closure plan whenever:

- There are changes in operating plans or facility design that affect the closure plan, or
- There is a change in the expected date of closure, or
- Unexpected events occur during closure that require modification of the approved closure plan.

LANL will submit a written request for a permit modification with a copy of the amended closure plan at least 60 days prior to the proposed change in unit design or operation or no later than 60 days after an occurrence of an unexpected event that affects the closure plan. If the unexpected event occurs during closure, the permit modification will be requested within 30 days of the occurrence. The Secretary of the NMED may request a modification of the closure plan under the conditions presented in the bulleted items above. LANL will submit the modified plan in accordance with the request within 60 days of notification, or within 30 days of notification if a change in facility condition occurs during the closure process.

9 CLOSURE COST ESTIMATE, FINANCIAL ASSURANCE, AND LIABILITY REQUIREMENTS

In accordance with 20.4.1.500 NMAC, §264.140(c) [10-1-03], LANL, as a federal facility, is exempt from the requirements of 20.4.1.500 NMAC, Part 264, Subpart H [10-1-03], to provide a cost estimate, financial assurance mechanisms, and liability insurance for closure actions.

10 CLOSURE CERTIFICATION REPORT

Upon completion of the closure activities at either of the TA-16 OB units, a closure certification report will be prepared and submitted to the Secretary of the NMED. The report will document the closure and contain the following:

- A copy of the certification described in Section 2.2 of this closure plan.
- Any significant variance from the approved activities and the reason for the variance.
- A summary of all sampling results, showing:
  - Sample identification
  - Sampling location
  - Datum reported
  - Detection limit for each datum
  - A measure of analytical precision (e.g., uncertainty, range, variance)
  - Identification of analytical procedure
  - Identification of analytical laboratory.
- A QA/QC statement on analytical data validation and decontamination verification.
- The location of the file of supporting documentation, including:
  - Field logbooks
  - Laboratory sample analysis reports
  - QA/QC documentation
  - Chain-of-custody forms.
- Storage or disposal location of regulated hazardous waste resulting from closure activities.
- A certification of accuracy of the report.

11 NEW MEXICO ENVIRONMENT DEPARTMENT CLOSURE ASSESSMENT

LANL will notify the NMED Hazardous Waste Bureau (HWB) prior to the pre-closure and structural assessment of the waste management unit, described in Section 5.3.2, to provide an opportunity to participate in the unit's physical condition review. LANL may also arrange for other on-site reviews of closure activities at reasonable times upon request by NMED representatives. Upon submittal of the closure certification report described in Section 10 of this closure plan, LANL will arrange an on-site closure review with representatives of the HWB or equivalent NMED representatives to assess the completion of the closure activities for each OB unit. LANL may also arrange for other on-site reviews of prior closure activities during the closure period at reasonable times upon request by NMED representatives.

12 REFERENCES

DOE, 1995. "DOE Methods for Evaluating Environmental and Waste Management Samples," DOE/EM-0089T, Rev. 2. Prepared for the U.S. Department of Energy by Pacific Northwest Laboratory, Richland, Washington.

EPA, 1986 and all approved updates. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA-*SW-846*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C.

EPA, 2002. "RCRA Waste Sampling Draft Technical Guidance Planning, Implementation, and Assessment," EPA530-D-02-002, August 2002, Office of Solid Waste, U.S. Environmental Protection Agency, Washington, DC.

LANL, 1998. “Los Alamos National Laboratory General Part A Permit Application,” Revision 0.0, Los Alamos National Laboratory, Los Alamos, New Mexico.

LANL, 1999. “Screening Level Ecological Risk Assessment Methods,” LA-UR-99-1406, Los Alamos National Laboratory, Los Alamos, New Mexico.

LANL, 2003a. “Los Alamos National Laboratory General Part B Permit Renewal Application, Revision 2,0” LA-UR-03-5923, Los Alamos National Laboratory, Los Alamos, New Mexico.

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LANL, 2006. “Los Alamos National Laboratory General Part A Permit Application, Revision 5.0,” LA-UR-06-2553, Los Alamos National Laboratory, Los Alamos, New Mexico.

NIOSH, 1994. The National Institute for Occupational Health and Safety (NIOSH) *Manual of Analytical Methods*, Method 9100, 4th ed. Issue 1. 1994.

NMED, 2006. “Technical Background Document for Development of Soil Screening Levels,” Rev. 4.0, June 2006, New Mexico Environment Department, Santa Fe, New Mexico.

Table 1

Closure Schedule for the Treatment Units at Technical Area 16

Activity	Maximum Time Required [a]
Submit amended closure plan, if necessary.	-90 Days
Notify the New Mexico Environment Department (NMED) of intent to close.	-45 Days
Conduct pre-closure and structural assessment.	-25 Days
Final receipt/treatment of waste.	Day 0
Begin closure activities.	Day 5
Decontaminate surfaces and equipment.	Day 20
Sample excess decontamination materials for disposal.	Day 20
Perform verification sampling.	Day 30
Evaluate analytical data from verification sampling.	Day 50
Perform additional decontamination, if necessary.	Day 55
Perform additional verification sampling, if necessary.	Day 60
Evaluate additional analytical data.	Day 75
Perform final cleanup and disposal (i.e., removal of decontaminated equipment and decontamination waste).	Day 140
Prepare closure certification report.	Day 150
Certify closure.	Day 175
Submit final report to NMED.	Day 180

[a] The schedule above indicates calendar days from the beginning by which activities will be completed. Some activities may be conducted simultaneously and/or may not require the maximum time listed. Extensions to this schedule may be requested, as needed.

Table 2

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Decontamination wash water	Non-regulated liquid waste	High Explosives Waste Treatment Facility (HEWTF) or sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Verification water	Non-regulated liquid waste	HEWTF or sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Firebrick	Non-regulated solid waste	Subtitle D landfill or reuse
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Metal covers/trays	Non-regulated solid waste	Recycled
	Hazardous waste	Treated if necessary to remove HE and recycled.
Soil and tuff	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Recycled, salvaged, or sent to a Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded concrete	Non-regulated solid waste	Subtitle D landfill or reuse
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.

Table 3

Recommended Sample Containers[a], Preservation Techniques, and Holding Times[b]

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP/Total Metals: Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver	Aqueous Media: 500-mL Wide Mouth-Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO_3 to pH <2 Cool to 4 °C	180 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide Mouth-Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO_3 to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Solid Media Cool to 4 °C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	
Semi-Volatile Organic Compounds			
Target Compound Semi-volatile Organic Compounds	Aqueous Media: Four 1-L Amber Glass with Teflon-Lined Lid	Aqueous Media: Cool to 4 °C	Seven days from field collection to preparative extraction. 40 days from preparative extraction to determinative analysis.
	Solid Media: 250-mL Glass	Solid Media: Cool to 4 °C	

[a] Smaller sample containers may be required due to health and safety concerns associated with potential radiation exposure, transportation requirements, and waste management considerations.

[b] Information obtained from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, U.S. Environmental Protection Agency, 1986 and all approved updates.

°C = degrees Celsius
HNO_3 = nitric acid
HCl = hydrochloric acid
L = Liter
mL = milliter
TCLP = Toxicity Characteristic Leaching Procedure

Table 4

Recommended Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis [a]	Frequency	Acceptance Criteria
Trip Blank	VOC	One set per shipping cooler containing samples to be analyzed for VOCs	Not Applicable
Field Blank	VOC/SVOC, metals	One sample daily per analysis	Not Applicable
Field Duplicate	Chemical	One for each sampling sequence	Relative percent difference less than or equal to 20 percent
Equipment Rinsate Blank[b]	VOC/SVOC, metals	One sample daily	Not Applicable

[a] For VOC and SVOC analysis, if blank shows detectable levels of any common laboratory contaminant (e.g., methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

[b] Collected only if reusable sampling equipment used.

QC = quality control
VOC = volatile organic compound
SVOC = semi-volatile organic compound

ATTACHMENT A

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES FOR CLOSURE OF THE TECHNICAL AREA 16 OPEN BURNING UNITS

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LIST OF ACRONYMS AND ABBREVIATIONS

DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
HE	high explosives
in.	inch
LANL	Los Alamos National Laboratory
OB	open burning
TA	Technical Area

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES FOR CLOSURE OF THE TECHNICAL AREA 16 OPEN BURNING UNITS

A.1. INTRODUCTION

This attachment describes specific decontamination, sampling strategies, and analytical requirements applicable to closure of the Los Alamos National Laboratory (LANL) Technical Area (TA) 16 Open Burning (OB) units. General closure procedures for the OB units are presented in the closure plan. The general procedures include appropriate disposition of treated waste prior to the beginning of closure, and a pre-closure and structural assessment of the unit, as described in Section 5.3.2 of the closure plan, for conditions that may adversely affect decontamination and verification sampling activities.

The OB units addressed in this attachment are the TA-16-388 Flash Pad and the TA-16-399 High Explosives (HE) Burn Tray. Tables A-1 and A-2 identify the category, U.S. Environmental Proection Agency (EPA) Hazardous Waste Numbers, and specific constituents of concern for the wastes treated at each unit.

Closure activities at the TA 16-OB units will include decontamination, recycling, reuse, and/or disposal of portable metal equipment, concrete (based on information in the operating record), and the liner and wall of the TA-16-388 Flash Pad (based on information in the operating record), and disposal of waste materials generated during closure activities.

Decontamination will be conducted as described in Section 5.4 of the closure plan and in Section A.2 herein. Sampling will be conducted in accordance with the most recent LANL sampling and analysis plan incorporating guidance from the EPA (EPA, 2002) and the U.S. Department of Energy (DOE) (DOE, 1995). Section A.3 in this attachment and Section 6.0 of the closure plan describe sampling activities and sample collection procedures, respectively. Analysis will be conducted in accordance with procedures given in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods” (SW-846)(EPA, 1986), or other approved procedures or methods. Analytical requirements are provided in Section A.4 herein and in Section 7.0 of the closure plan. All waste generated will be managed in accordance with applicable regulatory requirements.

A.2. SPECIFIC DECONTAMINATION PROCEDURES

To the extent necessary, all contaminated equipment, surfaces, structures, and media present at closure will be decontaminated. Sampling and analysis will be performed, as necessary, to verify that decontaminated equipment, surfaces, structures, and media meet the verification criteria specified in Section 5.5 of the closure plan. Discarded materials and equipment that cannot or will not be decontaminated will be dispositioned appropriately.

A.2.1. Equipment Decontamination

Prior to decontamination of the main surfaces at the TA-16-388 Flash Pad, any HE-contaminated equipment or other materials (e.g., sand or firebricks) will be treated to meet the DOE Explosives Safety Manual (DOE, 2006) release criteria before being recycled, reused, or disposed. Decontamination of non-HE contaminated equipment or other materials present at the OB units will be performed in accordance with the general procedures described in Section 5.4.1 of the closure plan.

A.2.2. Surfaces/Structures Decontamination

If determined to be necessary, decontamination of OB unit surfaces and structures (i.e., concrete pads, walls, liner) will involve removing any contamination through washing the surface with appropriate decontamination solutions, steam cleaning, or physically removing material until decontamination is achieved. Decontamination of OB unit surfaces and structures will be performed in accordance with the general procedures described in Section 5.4.2 of the closure plan. After the decontamination process, the excess wash water and/or steam condensate will be collected, sampled for analysis, and stored in appropriate containers at the site pending determination of appropriate disposition. Each surface or structure may undergo several wash cycles; however, the option to remove the material and manage it as waste may be exercised at any time.

A.2.3. Contaminated Soil Removal

Record reviews and visual inspection of soils along the margins of the TA-16-388 Flash Pad and the TA-16-399 HE Burn Tray will be conducted during the pre-closure and structural assessment and used to identify areas where soil contamination from waste management activities could have occurred. If records indicate that no release of hazardous waste to soils has occurred and no staining is observed, soil sampling will not be conducted. Soil sampling, if required, will be conducted following sample collection procedures in Section 6.4.1 of the closure plan in any areas that are suspected to be contaminated by hazardous waste treatment activities at the OB units. For example, soil sampling would be conducted in areas where the operating records indicate that a release of hazardous waste from the OB units to the surrounding soil has occurred and/or areas where a crack in the concrete penetrated through the concrete and liner. A statistically representative number of soil samples will be collected from the suspected contaminated area(s) to a 6-inch (in.) depth. Sampling locations to determine the extent of contamination will be chosen using a biased sampling approach, based on historical evidence of releases, visual staining, and any other information that indicates potential contamination. These samples will be compared to background/baseline concentrations. Background samples will be established using analytical results from soil samples collected from appropriate areas before closure activities begin or, if available, established baseline concentration levels for the area (e.g., using corrective action program analytical data).

If contamination resulting from waste treatment activities is discovered above acceptable levels as described in the verification criteria listed in Section 5.5 of the closure plan, the contaminated soils will be removed for proper disposal. Soil sampling results that are above the background/baseline levels will be used to identify the extent of soil contamination. Contaminated soils will be removed in layers and verification sampling will be conducted in accordance with Section A.3.1.2 following the removal of each layer. This procedure will be used to minimize the amount of soil removed. If analysis from the verification indicates it does not meet acceptable levels after each layer, more soil will be removed and verification sampling will be repeated, or the decision will be made to proceed with an alternative demonstration of closure, as described in Section 5.6 of the closure plan.

A.3. SAMPLING ACTIVITIES

All general sample management, documentation, handling, preservation, storage, packaging and transportation procedures for the closure of the TA-16 OB units are described in Section 6 of the closure plan. The following specific information applies to the sampling location strategy and approach for closure of the TA-16 OB units. Samples will be collected from discrete locations according to the methods and procedures provided in Section 6.4 of the closure plan and analyzed for the appropriate hazardous constituents identified during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan. Tables A-1 and A-2 identify potential hazardous waste constituents of concern for the TA-16-388 Flash Pad and the TA-16-399 HE Burn Tray, respectively. Samples will be analyzed by an independent laboratory for constituents included in Table A-1 or A-2, as necessary, using the methods outlined in Table A-3. Tables A-1, A-2, and A-3 will be modified, if necessary, at the time of notification of closure to incorporate changes based on the operating record review that will be conducted for each of the TA-16 OB units.

A.3.1. Sampling Strategy/Approach

Verification sampling will be conducted to verify that decontamination and potential soil removal efforts described herein and in Section 5.4 of the closure plan were effective at removing hazardous waste residues. Soil sampling may intially be conducted to establish the presence or absence of contamination.

A.3.1.1. Soil Sampling Strategy

Sampling locations to determine the extent of contamination will be chosen using a biased sampling approach, based on historical evidence of releases, physical evidence of distressed vegetation, visual staining, and any other information that indicates potential contamination. At least three and a maximum of eight samples will be collected to a 6- in. depth in the area of suspected contamination at the TA-16-388 Flash Pad. At the TA-16-399 HE Burn Tray, one sample from each side of the pad will be collected to a 6-in. depth. Individual locations and depths will be determined during the pre-closure and structural

assessment of the unit, as described in Section 5.3.2 of the closure plan. Analytical results will be compared to background samples and/or baseline concentration levels, as discussed in Section A.2.3.

A.3.1.2. Verification Sampling Strategy

Verification samples will be collected from each of the locations where decontamination activities were performed. Liquid or wipe sampling will be used for decontamination verification of surfaces, structures, and other equipment. Soil sampling will be conducted for soil verification sampling. After decontamination of the concrete pad at the TA-16-388 Flash Pad, at least two wipe or liquid samples will be collected from the base and one sample will be collected from each of the three inner-facing sides of the concrete wall, for a minimum total of five samples. At least two verification samples will be collected from the concrete pad at the TA-16-399 HE Burn Tray. To verify that contaminated soil removal was effective, at least two and a maximum of eight verification samples will be collected at the TA-16-388 Flash Pad. At the TA-16-399 HE Burn Tray, at least two and a maximum of four samples will be collected for verification purposes after soil removal.

A.4. ANALYTICAL REQUIREMENTS

All general analytical laboratory requirements, quality assurance/quality control, and data requirements procedures for closure of the TA-16 OB units are described in Section 7 of the closure plan. .

Analytical methods to be used for decontamination verification during the TA-16 OB units closure activities are summarized in Table A-3. Each sample will be analyzed for the constituents identified in Table A-1 or A-2, as appropriate. Analytes, test methods/instrumentation, target detection limits, and rationale for metals and organic analyses are also presented in Table A-3.

A.5. WASTE MANAGEMENT

Decontamination and sample collection activities will be conducted with waste minimization goals in mind. All waste generated will be controlled, handled, characterized, and disposed of in accordance with LANL waste management procedures. Closure activities may generate different types of waste materials, which are listed with potential disposal options in Table 2 of the closure plan.

A.6. REFERENCES

DOE, 1995. "DOE Methods for Evaluating Environmental and Waste Management Samples," DOE/EM-0089T, Rev. 2. Prepared for the U.S. Department of Energy by Pacific Northwest Laboratory, Richland, Washington.

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Table A-1

Hazardous Waste Constituents of Concern at the TA-16-388 Flash Pad[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
High Explosives (HE) and associated compounds	D003	HMX, RDX, TNT, PETN, Tetryl, and Other Nitrobenzenes and Nitrotoluenes
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
Semi-volatile Organic Compounds	D030, D036	2,4-Dinitrotoluene, Nitrobenzene
Volatile Organic Compounds	F002, F003, F004, F005	Acetone, Ethanol, Benzene, Nitrobenzene, MEK, Methylene Chloride, Toluene, MIBK, Xylene, Ethyl Acetate, Methanal

[a] Based on the unit operating record.
EPA = U.S. Environmental Protection Agency
HMX = cyclotetramethylenetetranitramine
RDX = cyclonite
TNT = trinitrotoluene
PETN = pentaerythrioltetranitrate (2,2-bis[(nitroxy)methyl]-1,3-propanediol dinitrate
MEK= methyl ethyl ketone
MIBK = 4-methyl-2-pentanone

Table A-2

Hazardous Waste Constituents of Concern at the TA-16-399 High Explosives (HE) Burn Tray[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
HE and associated compounds	D003	HMX, RDX, TNT, PETN, Tetryl, and Other Nitrobenzenes and Nitrotoluenes
Toxic Metals	D005	Barium
Semi-volatile Organic Compounds	D030	2,4-Dinitrotoluene

[a] Based on the unit operating record.
EPA = U.S. Environmental Protection Agency
HMX = cyclotetramethylenetetranitramine
RDX = cyclonite
TNT = trinitrotoluene
PETN = pentaerythrioltetranitrate (2,2-bis[(nitroxy)methyl]-1,3-propanediol dinitrate

Table A-3

Summary of Proposed Analytical Methods

Analyte	EPA SW-846 Analytical Method [a]	Test Methods/ Instrumentation	Target Detection Limit [b]	Rationale
Metal Analysis				
Arsenic	7060A [c], 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A [d], 7081 [c]	FLAA,GFAA	200 ug/L	
Cadmium	7130 [d], 7131A [c]	FLAA, GFAA	2 ug/L	
Chromium	7190 [d], 7191 [c]	FLAA, GFAA	10 ug/L	
Lead	7420 [d], 7421 [c]	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A [e]	CVAA	0.2 ug/L	
Selenium	7740[c], 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A[d], 7761 [c]	FLAA, GFAA	10 ug/L	
Organic Analysis				
Target compound list VOCs plus ten tentatively identified compounds (TIC)	8260B	GC/MS	10 mg/L	Determine the VOCs concentration in the samples.
Target compound list SVOCs plus 20 TICs	8270D [c]	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.

[a] U.S. Environmental Protection Agency (EPA), 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846.

[b] Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.

[c] Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.

[d] Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.

[e] Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy
FLAA = Flame atomic absorption spectroscopy
GC/MS = Gas chromatography/mass spectrometry
GFAA = Graphite furnace atomic absorption spectroscopy
mg/L = milligrams per liter
SVOC = semi volatile organic compounds
ug/L = micrograms per liter.
VOC = volatile organic compounds

LA-UR-06-6914
September 2006

Los Alamos National Laboratory
Technical Area 50
Closure Plan

Revision 0.0

Prepared by:

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Los Alamos National Laboratory

Technical Area 50
Closure Plan

Revision 0.0
LA-UR-06-6914

Facility ID No.:	**NM0890010515**
Facility Name:	**Los Alamos National Laboratory**
Facility Address:	**Los Alamos National Laboratory** **P.O. Box 1663** **Los Alamos, New Mexico 87545**
Legal Owner:	**U.S. Department of Energy**
Legal Operators:	**U.S. Department of Energy** **Los Alamos Site Office** **528 35th Street** **Los Alamos, New Mexico 87544** **Los Alamos National Security, LLC.** **4200 West Jemez Road, Suite 4000** **Los Alamos, New Mexico 87544**
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Date:	**September 2006**

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LIST OF ACRONYMS AND ABBREVIATIONS

20.4.1 NMAC	New Mexico Administrative Code, Title 20, Chapter 4, Part 1
CFR	Code of Federal Regulations
CSU	container storage unit(s)
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ESL	Ecological Screening Levels
ft	feet
HWB	Hazardous Waste Bureau
LANL	Los Alamos National Laboratory
NIOSH	National Institute of Occupational Safety and Health
NMED	New Mexico Environment Department
PPE	personal protective equipment
P&T	Packaging and Transportation
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
SSL	Soil Screening Levels
SW-846	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods
TA	Technical Area
TRU	transuranic

LOS ALAMOS NATIONAL LABORATORY TECHNICAL AREA 50 CLOSURE PLAN

1 INTRODUCTION

The information provided in this closure plan is submitted to address the closure requirements specified in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart V (20.4.1.500 NMAC), incorporating the Code of Federal Regulations (CFR), Title 40, Part 264, Subparts G and I, as revised October 1, 2003 [10-1-03], for waste management units operated at the Los Alamos National Laboratory (LANL) under the Resource Conservation and Recovery Act (RCRA) and the New Mexico Hazardous Waste Act. This closure plan describes the activities necessary to close the hazardous/mixed waste container storage units (CSUs) at LANL Technical Area (TA) 50.

General information for the closure activities at the TA-50 CSUs is presented in this closure plan. Specific information on closure decontamination, sampling strategies, and analytical requirements for the units at TA-50 is included in Attachments A and B.

Until closure is complete and has been certified in accordance with 20.4.1.500 NMAC, §264.115 [10-1-03], a copy of the approved closure plan, any approved revisions, and closure activity documentation associated with the closure will be on file at the LANL Environmental Protection Division Water Quality and RCRA Group Office and at the U.S. Department of Energy (DOE) Los Alamos Site Office.

2 GENERAL CLOSURE INFORMATION

2.1 Closure Performance Standard

As required by 20.4.1.500 NMAC, §264.111 [10-1-03], the TA-50 CSUs will be closed to meet the following performance standards:

- Minimize the need for further maintenance;
- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground, or surface waters, or to the atmosphere; and
- Comply with the closure requirements of 20.4.1.500 NMAC, Part 264, Subparts G and I [10-1-03], including, but not limited to, the requirements of 20.4.1.500 NMAC, §264.178 [10-1-03].

This will be accomplished by removal of hazardous and mixed (hazardous waste with a radioactive component) waste from the CSUs; decontamination/decommissioning, if necessary, of the surfaces and equipment that may have come into contact with the wastes; and/or disposal of contaminated structures or equipment. Verification sampling may be performed after the removal of site structures to assess the potential for residual contamination at the closure site if any evidence is found that indicates there may

have been a potential release of hazardous constituents from the unit. If sampling indicates contamination, the level of such contamination will be evaluated for further decontamination activities or management of all remaining unit structures as contaminated waste using appropriate LANL waste management procedures. Decontamination activities will ensure the removal of hazardous waste residues from the TA-50 CSUs to established cleanup levels as agreed upon with the New Mexico Environment Department (NMED) or as outlined in Section 5.5 of this closure plan.

2.2 Partial and Final Closure Activities

This closure plan has been written for partial closure rather than final closure of the entire LANL facility. Partial closure will consist of closing an individual CSU, while leaving the other regulated hazardous/mixed waste management units at LANL in service. Partial closure of each CSU (hereinafter referred to simply as "closure") will be deemed complete when 1) all surfaces and equipment have been decontaminated, or otherwise properly dispositioned, if necessary; 2) closure has been certified by an independent, professional engineer licensed in the State of New Mexico; and 3) closure certification has been submitted to and approved by the NMED. Final closure of the LANL facility will occur when the remaining hazardous/mixed waste management units at LANL are closed. Final closure will consist of assembling documentation on the closure status of each unit, including all previous partial closures as well as land-based units that have been or are being addressed via coordination with corrective action projects. Final closure will be deemed complete when the information has been submitted to the NMED and approved.

3 DESCRIPTION OF UNITS TO BE CLOSED

LANL is located in Los Alamos County, an incorporated county, in north-central New Mexico, approximately 60 miles north of Albuquerque and 25 miles northwest of Santa Fe. LANL is divided into TAs. TA-50 is located at the northeast corner of the intersection of Pajarito Road and Pecos Drive, on the finger mesa bounded by Mortandad Canyon to the north and Two Mile Canyon to the south. The remainder of this section provides a listing of the waste management units at TA-50 to which this closure plan applies, followed by brief descriptions of the specific units.

3.1 TA-50 Waste Management Units

The TA-50 CSUs addressed in this closure plan are:

- TA-50-69 Indoor CSU, and
- TA-50-69 Outdoor CSU.

Information on the hazardous component(s) of the wastes stored at the TA-50 CSUs and pictures and figures of the units are provided in the "Los Alamos National Laboratory General Part A Permit

Application," Revision 5.0 (LANL, 2006) and the "Los Alamos National Laboratory Technical Area 50 Part B Permit Renewal Application," Revision 3.0 (LANL, 2002).

The primary purpose of the TA-50 CSUs was to size reduce large metallic items (e.g., glove boxes and other process equipment) that were transuranic (TRU)-contaminated and repackage them into standard-sized containers capable for transportation and disposal at the Waste Isolation Pilot Plant. TA-50-69 was first used to size reduce mixed TRU waste in 1982. The original function of TA-50-69 has since been expanded to include other activities related to hazardous and mixed waste management, including waste characterization and experimental process demonstration support.

3.1.1 TA-50-69 Indoor CSU

The TA-50-69 Indoor CSU consists of Rooms 102 and 103. Room 102, the main process room, measures approximately 45 feet (ft) wide and 52-ft long. The long dimension is oriented northwest-southeast. Room 103, the unloading area, measures approximately 18-ft wide and 19-ft long and is located adjacent to and southeast of Room 102. A 12-ft by 20-ft roll-up vehicle access door is located at the southernmost end of Room 103, separating the unloading area (Room 103) from the vehicle airlock entrance (Room 104).

3.1.2 TA-50-69 Outdoor CSU

The TA-50-69 Outdoor CSU is located in the southwest corner of TA-50 and consists of an asphalt and concrete pad that is not lined or coated, and measures 24-ft wide and 90-ft long, with an additional asphalt strip 12-ft wide and 90-ft long added to the southwest end. The asphalt and concrete pad is approximately 4-inches thick. The long dimension of this CSU is oriented east-southeast. The pad slopes gently (approximately 1 to 5 percent) from west to east and up to 2.5 percent toward the center line. Transportainers and other weather protective structures within the TA-50-69 Outdoor CSU provide optional weather protection for containers of various sizes. Painted lines are used to visually delineate the CSU boundary.

3.2 Estimate of Maximum Waste in Storage

Assuming a six-month turn-around of an estimated average inventory, an estimate of the total maximum inventory of hazardous/mixed waste stored (from 1982 to present) at each of the TA-50 CSUs over the active life is as follows:

- TA-50-69 Indoor CSU - 52,800 gallons
- TA-50-69 Outdoor CSU - 528,000 gallons.

The maximum total inventory of waste that may be in storage at any time in the TA-50 CSUs is estimated as follows:

- TA-50-69 Indoor CSU - 1,500 gallons

- TA-50-69 Outdoor CSU - 30,000 gallons.

3.3 Description of Waste Managed

The TA-50 CSUs are used to store containers of hazardous and mixed waste. The waste is generated during research and development activities, processing and recovery operations, decontamination and decommissioning projects, and environmental remediation/restoration activities conducted at various TAs throughout LANL. Specific hazardous waste constituents that are managed are described by U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers. These are reflected in past Part A permit applications, and most recently in Section XIV, "Technical Area 50", of the "Los Alamos National Laboratory General Part A Permit Application," Revision 5.0 (LANL, 2006). A detailed description of the waste streams managed is presented in the Waste Analysis Plan in Appendix B of the "Los Alamos National Laboratory General Part B Permit Renewal Application," Revision 2.0 (LANL, 2003). At the time of closure, the history of each of the CSUs will be reviewed to determine the specific waste constituents that apply for each unit.

4 CLOSURE SCHEDULE

Closure of the TA-50 CSUs will be initiated on an individual unit basis; however, both units will be closed by 2100. This closure plan is intended to address closure requirements for the units within the authorized timeframe of the current Hazardous Waste Facility Permit.

Written notification will be provided to the NMED 45 days before the start of closure activities for each of the TA-50 CSUs. However, pursuant to 20.4.1.500 NMAC, §264.112(e) [10-1-03], removing hazardous wastes and decontaminating or dismantling equipment in accordance with an approved closure plan may be conducted at any time before or after notification of closure. Closure activities will begin according to the requirements of 20.4.1.500 NMAC, §264.112(d)(2) [10-1-03]. Treatment, removal, or disposal of hazardous wastes will begin in accordance with the approved closure plan, as required by 20.4.1.500 NMAC, §264.113(a) [10-1-03], within 90 days after final receipt of waste at each of the TA-50 CSUs. This timeframe will be met if facilities are available for storage, treatment, or disposal of these wastes. In the event that closure activities cannot begin within 90 days, LANL will notify the Secretary of the NMED in accordance with the extension requirements in 20.4.1.500 NMAC, §264.113(a) [10-1-03]. In addition, the demonstrations in 20.4.1.500 NMAC, §264.113(a)(1) and (b)(1) [10-1-03], will be made in accordance with 20.4.1.500 NMAC, §264.113(c) [10-1-03]. Closure activities and reporting requirements will be completed within 180 days of receipt of the final volume of waste at each of the CSUs. Closure will be conducted in accordance with the schedule presented in Table 1. In the event that closure of the TA-50 waste management units cannot proceed according to schedule, LANL will notify the Secretary of the NMED in accordance with extension request requirements in 20.4.1.500 NMAC, §264.113(b) [10-1-03].

5 GENERAL CLOSURE PROCEDURES

Closure activities at the TA-50 CSUs will involve removal of hazardous/mixed wastes; proper management and disposition of hazardous waste residues, contaminated structures, and contaminated equipment associated with the CSUs and subsequent appropriate disposition; and verification that the closure performance standards have been achieved. The following sections describe general closure procedures applicable to the TA-50 CSUs closure activities.

5.1 Security

Because of the ongoing operations at TA-50, site security at the TA-50 CSUs will be maintained by the DOE for as long as necessary to prohibit public access. The security fence at TA-50 will be maintained to prevent public access. Details on security and access control to TA-50 are available in Section G.2.2 of the "Los Alamos National Laboratory Technical Area 50 Part B Permit Renewal Application," Revision 3.0 (LANL, 2002).

5.2 Removal of Waste

Prior to initiation of closure activities, all containerized wastes will be removed from the CSU scheduled for closure. Containers may be removed from each location with forklifts. Small containers may be handled manually or with dollies. Containers will be placed on flatbed trucks, trailers, or other appropriate vehicles for transport. Appropriate shipping papers will accompany the wastes during transport. Containers holding hazardous or mixed wastes will be moved to an approved on-site CSU or a permitted off-site treatment, storage, or disposal facility.

At closure, all remaining hazardous/mixed waste and hazardous waste residues will be removed from the TA-50 CSUs. Unit structures, liners, bases, and equipment contaminated with hazardous/mixed waste or hazardous waste residues will be decontaminated or removed/dispositioned. All waste material will be controlled, handled, characterized, and dispositioned in accordance with LANL waste management procedures. Table 2 provides a list of the potential waste materials that may be generated during closure, possible waste type(s), and disposal options.

5.3 Preliminary Closure Procedures

5.3.1 Safety Precautions

In accordance with LANL safety procedures, job hazards associated with closure activities will be identified, controls developed, and workers briefed before closure activities are conducted. Personnel involved in closure activities will wear personal protective equipment (PPE) specified by LANL health physics and industrial hygiene personnel, and will follow good hygiene practices to protect themselves from exposure to hazardous and/or mixed waste. The level of PPE required will depend upon the physical hazards present and the levels of radiological and/or chemical contamination detected, if any.

Contaminated PPE will be decontaminated or managed in accordance with applicable waste management regulations.

All workers involved in closure activities will be required to have appropriate training as required by site-specific work procedures. Workers who will manage hazardous/mixed waste or waste constituents during closure activities will follow the training requirements in the appropriate LANL RCRA Training Plan.

5.3.2 Pre-Closure and Structural Assessment

Before starting closure decontamination and sampling activities, the operating and inspection records for the CSU will be reviewed to determine any previous finding(s) or action(s) that may influence closure activities or potential sampling locations. Goals of this review will be to determine the specific hazardous waste constituents of concern; determine potential sampling locations for the CSU by identifying any spills or chronic conditions in the operating record that would indicate the type and location of released constituents; and differentiate equipment or other materials that will undergo decontamination from those to be recycled or reused, or managed as waste. Table A-1 in Attachment A and Table B-1 in Attachment B list potential constituents of concern for the TA-50-69 Indoor and TA-50-69 Outdoor CSUs, respectively. Paths forward for equipment and surfaces at the CSU, locations for potential soil sampling, and locations and types of decontamination verification sampling (if determined to be necessary) will be identified during this assessment. In addition, background samples or data derived from LANL studies developed under the LANL corrective action program or other programs will be reviewed to determine levels or concentration thresholds applicable for the purposes of closure.

At least weekly, CSU inspections are conducted at the TA-50 CSUs while waste is in storage. If any defects, deterioration, damage, or hazards affecting containment developed, appropriate remedial actions (including sampling, repairs, maintenance, or replacement) are completed and noted in the inspection record. This information will be reviewed to determine whether these activities have resulted in conditions affecting the closure or determination of sampling needs.

Prior to beginning any decontamination activities at the TA-50 CSUs, the base or secondary containment will be inspected for any existing cracks or conditions that indicate a potential for release of contaminants. This inspection will be documented with photographs and drawings, as necessary. If a crack, gap, or stained area is present, the operating record will be reviewed to determine the possible presence or release of contamination. If contamination could be present, a wipe sample or a representative sample of the media (e.g., concrete, metal) will be taken and analyzed, for the potential hazardous constituents identified during the assessment, following procedures outlined in Section 6.4.2 and Attachments A or B of this closure plan, as appropriate. If contamination is present above baseline/background levels, the surface flaw will be decontaminated to meet, as necessary, the applicable requirements for disposition (e.g., leaving in place, reuse, or disposal). Material may be partially or completely removed until contamination is no longer detected or it is established that contamination present is not due to storage activities at the TA-50 CSUs, but is part of historical contamination.

5.4 General Decontamination Procedures

To the extent necessary, all contaminated equipment present at closure, surfaces, and structures will be decontaminated. Discarded materials and equipment that cannot or will not be decontaminated will be managed as waste or otherwise dispositioned in compliance with applicable regulations. Decontamination procedures specific for the TA-50 CSUs are further described in Attachments A and B of this closure plan.

If decontamination is necessary, all sampling during closure and decontamination will be conducted in accordance with quality assurance (QA)/quality control (QC) procedures defined by the latest revision of the U.S. Environmental Protection Agency (EPA) "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846) (EPA, 1986). Monitoring for contamination will occur throughout closure activities, as appropriate.

5.4.1 Equipment Located at the TA-50 CSUs

All portable equipment (if present) will be wiped down with a solution consisting of Alconox®, or an equivalent cleaner, and water. To minimize the quantity of wash solution used, it will be dispensed from buckets, spray bottles, or other types of containers. Cheesecloth, rags, or other absorbent materials will be used to wipe down the equipment after being wetted with the wash solution or after spraying solution onto the equipment. If necessary, portable berms or other devices (e.g., absorbent socks, plastic sheeting, wading pools, or existing secondary containment) designed to collect and provide containment will collect excess wash water and provide containment during the decontamination process.

5.4.2 Decontamination of Surfaces

Contaminated TA-50 CSU surfaces (i.e., floors, walls, structures) will be decontaminated and/or removed and managed in accordance with appropriate waste management regulations. Decontamination of surfaces will consist of pressure washing or washing with mops, cloths, and/or other absorbent materials to remove any hazardous constituents. When mops, cloths, and/or other absorbent materials are used, the materials will be wetted in a wash solution consisting of Alconox®, or an equivalent cleaner, and water. A portable berm or other device (e.g., absorbent socks, plastic sheeting, wading pools, or existing secondary containment) designed to collect and provide containment for excess wash water will be used, as necessary. If any contaminated portion of the CSU cannot or will not be decontaminated to acceptable levels as described in Section 5.5, the contaminated portion will be disposed of in accordance with appropriate waste management regulations.

Neither of the TA-50 CSUs has recessed areas (i.e., sumps); thus, temporary berms will collect excess wash water generated during decontamination. After the walls have been decontaminated, the floor and the secondary containment berms will be wiped down and any excess wash water transferred to an appropriate container for analysis and waste disposal. Specific decontamination information for each of the TA-50 CSUs is included in Attachments A and B.

The asphalt or concrete may be transported to and stored at other hazardous waste management locations to facilitate the closure process. If the asphalt or concrete is totally removed, or a crack that penetrated through the asphalt or concrete is identified during the pre-closure and structural assessment, soil samples may be collected from the area underlying the original material as indicated in Sections A.3.1.1 and B.3.1.1, as appropriate. Soil sampling procedures are presented in Section 6.4.3. If the material has successfully been decontaminated or the crack did not extend to the soil, the underlying soil will be presumed to be uncontaminated and soil sampling will not be required.

When decontamination of the CSU is complete, verification will be conducted as described in Section 5.5. If sampling and analyses indicate that hazardous constituents are present above acceptable levels, as described in Section 5.5, the wash cycles and verification analyses will continue until the surfaces, structures, or equipment have been decontaminated or the decision is made to proceed with an alternative demonstration of closure, as described in Section 5.6. Upon determination that a surface or structure is waste, it may be removed, transported, and stored at other hazardous waste storage units to facilitate the closure process.

5.4.3 Decontamination Waste Management

After any decontamination wash down process needed for the closing unit, the excess wash water will be collected, transferred to containers, sampled, and analyzed for the hazardous constituents listed in Table A-1 in Attachment A or Table B-1 of Attachment B, as appropriate. The results of this analysis will determine if the excess wash water should be managed as hazardous or non-hazardous wastewater. The wastewater, PPE, and any other waste generated as a result of closure will be managed as outlined in Table 2. All decontamination activities involving wash water will be conducted within the existing secondary containment for the CSU or on secondary containment pallets in order to prevent migration to surface soils or waters. In addition, all waste management operations will be subject to LANL Hazardous Waste Facility Permit Contingency Plan conditions to further prevent potential contamination if spills occur. Subsequent disposition options for the decontaminated structures and equipment include reuse, recycling, or disposal.

5.4.4 Equipment Used During Closure

Reusable protective clothing, tools, and equipment used during decontamination activities will be cleaned with a wash water solution. Residue, disposable equipment, and reusable equipment that cannot be decontaminated will be containerized and managed as waste in accordance with LANL waste management procedures, depending on the regulated constituents present.

5.5 Verification of Decontamination

LANL proposes analysis of water and/or wipe samples for decontamination verification at the TA-50 CSUs using the following methods:

- When liquid sampling, the verification solution will be limited to an amount that is sufficient to wipe down the surface to be verified and collect the required number of samples. This will minimize dilution of hazardous constituents present at the location.
- For wipe sampling, guidance from the analytical laboratory must be obtained prior to wipe verification sampling to confirm that the solution chosen for each analysis is appropriate for the analysis to be conducted and that wipe sampling is a proper technique for the analysis.
- Sample area will be limited to a specific discrete location (e.g., a wall or portion thereof, depending on the size of the unit/equipment).
- Decontamination will be verified by comparing the discrete analytical results for liquid sampling to a baseline result (blank) obtained from the verification solution prior to its use for the verification wipe down. Comparison of wipe sample analytical results to an unused wipe media sample (blank) will be used to determine the presence or absence of contamination.
- If the result is at or below that of the blank, decontamination is verified for the discrete area sampled.
- If the result is above the blank, decontamination and verification will be repeated for the discrete location in accordance with Sections 5.4 and 5.5 of this closure plan; closure will be verified as described below; or the decision will be made to proceed with an alternative demonstration of closure, as described in Section 5.6.

These proposed methods minimize dilution and establish criteria by which successful decontamination is verified. Analytical procedures will conform to the methods found in Section 7.

5.5.1 Verification Criteria

Successful decontamination of the TA-50 CSUs will meet a minimum of one of the following criteria:

- No detectable RCRA-regulated constituent residues from the management of stored authorized RCRA-regulated wastes are identified in samples collected during closure activities.
- Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline/background data.
- Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health and the environment, based on the results of risk assessment methods.
  - Comparison of the analytical results to the appropriate NMED Soil Screening Levels (SSLs) (NMED, 2006) and/or the LANL Ecological Screening Levels (ESLs) (LANL, 1999), or most current applicable document(s). If the result is below the SSL/ESL, the equipment/soil/surface will be considered free of contamination.

- Detectable concentrations of RCRA-regulated constituents that cannot be removed or decontaminated to acceptable levels, as described above, will be allowed to remain, provided that these RCRA-regulated constituents do not pose an unacceptable risk when combined with technical or administrative control measures agreed upon with the NMED.
  - Assessment of residual (i.e., above the SSL, ESL) contamination levels using an occupational risk scenario.

5.6 Alternative Demonstration of Closure

An alternative demonstration of closure may be justified at the TA-50 CSUs addressed in this plan if verification methods described in the previous section are not feasible. LANL proposes the following alternative demonstrations:

- All equipment/materials/surfaces of the CSU have been recycled or disposed of in accordance with applicable regulatory requirements.
- Pursuant to 20.4.1.200 NMAC §261.3(f)(2), LANL has requested and the NMED has approved a determination that the debris is no longer contaminated with hazardous waste.
- Due diligence has been conducted to establish that contamination at the site is historical contamination (the difference between operating unit and historical operations cannot be distinguished) that should be addressed under corrective actions and not as part of the operating unit closure.

6 SAMPLE MANAGEMENT PROCEDURES

The following information presents general sample management and sampling equipment cleaning procedures shared in common for closure of the waste management units described in this closure plan. Specific sampling strategies to be used for this closure to demonstrate decontamination, if necessary, are included in Attachments A and B of this closure plan.

Samples will be collected and transported using documented chain-of-custody and sample management procedures to ensure the integrity of the sample and provide an accurate and defensible written record of the possession and handling of a sample from the time of collection through laboratory analysis. Sample collection equipment will include labels, chain-of-custody forms, EPA-certified clean containers, coolers, preservatives, and custody seals. The following provides a description of sample documentation; sample handling, preservation, and storage; and sample packaging and transportation requirements that will be followed during the sampling activities associated with the closure.

6.1 Sample Documentation

Sampling personnel will complete and maintain records to document sampling and analysis activities. Sample documentation will include sample identification numbers, chain-of-custody forms, analysis requested, sample logbooks detailing sample collection activities, and shipping forms (if necessary).

6.1.1 Chain-of-Custody

Chain-of-custody forms will be maintained by sampling personnel until the samples are relinquished to the analytical laboratory. One chain-of-custody form may be used to document all of the samples collected from a single sampling event. The sample collector will be responsible for the integrity of the samples collected until properly transferred to another person. The EPA considers a sample to be in a person's custody if it is:

- In a person's physical possession,
- In view of the person in possession, or
- Secured by that person in a restricted access area to prevent tampering.

The sample collector will document all pertinent sample collection data. Individuals relinquishing or receiving custody of the samples will sign, date, and note the time on the analysis request/chain-of-custody form. A chain-of-custody form must accompany all samples from collection through laboratory analysis. The completed original chain-of-custody form will be returned by the analytical laboratory and will become a part of the permanent record documenting the sampling effort.

6.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- A unique sample identification number;
- Name of the sample collector;
- Date and time of collection;
- Type of preservatives used, if any; and
- Location from which the sample was collected.

A custody seal will be placed on each sample container to detect unauthorized tampering with the samples. These labels must be initialed, dated, and affixed by the sample collector in such a manner that it is necessary to break the seal to open the container.

6.1.3 Sample Logbook

All pertinent information on the sampling effort must be recorded in a bound logbook. Information must be recorded in ink and any cross outs must be made with a single line and the change initialed and dated by the author. The sample logbook will include the following information:

- The sample location,
- Suspected composition,
- Sample identification number,
- Volume/mass of sample taken,
- Purpose of sampling,
- Description of sample point and sampling methodology,
- Date and time of collection,
- Name of the sample collector,
- Sample destination and how it will be transported,
- Observations, and
- Names of personnel responsible for the observations.

6.2 Sample Handling, Preservation, and Storage

Samples will be collected and containerized in appropriate pre-cleaned sample containers. Table 3 presents the requirements in SW-846 (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE Orders, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate LANL documents establish these requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, wastes, and defense program materials.

Off-site transportation of samples will occur via private, contract, or common motor carrier; air carrier; or freight. All off-site transportation will be processed through the LANL Packaging & Transportation (P&T) Organization, unless the shipper is specifically authorized through formal documentation by the P&T Organization to independently tender shipments to common motor or air carriers.

6.4 Sample Collection Procedures

Samples will be collected in accordance with the most recent and appropriate LANL sampling plan incorporating guidance from the EPA (EPA, 2002) and DOE (DOE, 1995), or other approved procedures.

6.4.1 Liquid Sampling

For verification sampling, each discrete sample location will be wiped down with clean water. A mop, cloth, and/or other absorbent material will be submerged into the container and squeezed out prior to wiping down the discrete surface to be verified. Excess solution will collect in a bermed area, if necessary. To minimize dilution of the samples, the solution used for wipe down will be limited to a quantity sufficient to collect the appropriate number of samples. Liquid sampling will be conducted using glass or plastic tubes, a composite liquid waste sampler, a bacon bomb, a bailer, or by pouring liquid into sample containers.

6.4.2 Wipe Sampling

When surface wipe samples are used to determine if residual hazardous constituents remain within the TA-50 Indoor CSU, the samples will be taken in accordance with the National Institute of Occupational Safety and Health (NIOSH) *Manual of Analytical Methods*, Method 9100 (NIOSH, 1994), or other approved methodology. The appropriate use of wipe sample methods will consider the type of surface being sampled, the type of contaminant, the solution used, and the desired contaminant concentration detection limits. The NIOSH method includes wiping a 100 square centimeter area at each discrete location with a gauze wipe wetted with a liquid solution appropriate for the desired analysis (e.g., deionized water for lead). The solution used depends on the analysis; therefore, the analytical laboratory will be consulted prior to sampling activities to ensure that the correct solution is employed for each analysis and that wipe sampling is a proper technique for the analysis.

6.4.3 Soil Sampling

If necessary, soil will be sampled using a spade, scoop, auger, or trowel. Samples will be kept at their at-depth temperature or lower, protected from ultraviolet light, sealed tightly in the recommended container, and analyzed within the specific holding times listed in Table 3.

6.5 Cleaning of Sampling Equipment

Reusable sampling equipment will be cleaned and rinsed prior to use. Sampling equipment rinsate blanks will be collected and analyzed only if reusable sampling equipment is used. Reusable decontamination equipment, including protective clothing and tools, used during closure activities will be scraped as necessary to remove residue and cleaned with a wash water solution. Sampling equipment will be cleaned prior to each use with a wash solution, rinsed several times with tap water, and air-dried or

wiped dry to prevent cross contamination of samples. A disposable sampler is considered clean if still in a factory-sealed wrapper. Residue, disposable decontamination equipment, and reusable decontamination equipment that cannot be decontaminated will be containerized and managed appropriately at an approved on-site facility.

7 ANALYSIS REQUIREMENTS

The following information presents general analysis procedures shared in common for closure of the waste management units described in this closure plan. Specific analytical requirements to be used to demonstrate decontamination, if necessary, are included in Attachments A and B of this closure plan.

7.1 Analytical Laboratory Requirements

The analytical laboratory will perform the detailed qualitative and quantitative chemical analyses specified in Attachments A and Attachment B of this closure plan. This analytical laboratory will have:

- A documented comprehensive QA/QC program,
- Technical analytical expertise,
- A document control/records management plan, and
- The capability to perform data reduction, validation, and reporting.

The selection of the analytical testing methods identified in Attachments A and B was based on the following considerations:

- The physical form of the waste,
- Constituents of interest,
- Required detection limits (e.g., regulatory thresholds), and
- Information requirements (e.g., waste classification).

7.2 Quality Assurance/Quality Control

Field sampling procedures and laboratory analyses will be evaluated through the use of QA/QC samples to assess the overall quality of the data produced. QC samples evaluate precision, accuracy, and potential sample contamination associated with the sampling/analysis process, and are described in the following sections, along with information on calculations necessary to evaluate the QC results. QA/QC samples will be collected in accordance with the most recent and appropriate LANL sampling plan incorporating guidance from the EPA (EPA, 2002) and DOE (DOE, 1995), or other approved procedures. Analysis will be conducted in accordance with procedures given in SW-846 (EPA, 1986), or other approved procedures or methods.

7.2.1 Field Quality Control

The field QC samples that may be collected include trip blanks, field blanks, field duplicates, and equipment rinsate blanks. Table 4 presents a summary of QC sample types, applicable analyses, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample.

7.2.2 Analytical Laboratory QC Samples

QA/QC considerations are an integral part of analytical laboratory operations. Laboratory QA ensures that analytical methods generate data that are technically sound, statistically valid, and that can be documented. QC procedures are the tools employed to measure the degree to which these QA objectives are met.

7.3 Data Reduction, Verification, Validation, and Reporting

Analytical data generated by the activities described in this closure plan will be verified and validated. Data reduction is the conversion of raw data to reportable units; transfer of data between recording media; and computation of summary statistics, standard errors, confidence intervals, and statistical tests.

7.4 Data Reporting Requirements

Analytical results will include all pertinent information about the condition and appearance of the sample-as-received. Analytical reports will include:

- A summary of analytical results for each sample;
- Results from QC samples such as blanks, spikes, and calibrations;
- Reference to standard methods or a detailed description of analytical procedures; and
- Raw data printouts for comparison with summaries.

The laboratory will describe off-normal sample preparations that occur during the analysis in sufficient detail so that the data user can understand how the sample was analyzed.

8 AMENDMENT OF THE CLOSURE PLAN

In accordance with 20.4.1.500 NMAC, §264.112(c) [10-1-03], LANL will submit a written change in the approved closure plan whenever:

- There are changes in operating plans or facility design that affect the closure plan, or
- There is a change in the expected date of closure, or
- Unexpected events occur during closure that require modification of the approved closure plan.

LANL will submit a written request for a permit modification with a copy of the amended closure plan at least 60 days prior to the proposed change in unit design or operation or no later than 60 days after an occurrence of an unexpected event that affects the closure plan. If the unexpected event occurs during closure, the permit modification will be requested within 30 days of the occurrence. The Secretary of the NMED may request a modification of the closure plan under the conditions presented in the bulleted items above. LANL will submit the modified plan in accordance with the request within 60 days of notification, or within 30 days of notification if a change in facility condition occurs during the closure process.

9 CLOSURE COST ESTIMATE, FINANCIAL ASSURANCE, AND LIABILITY REQUIREMENTS

In accordance with 20.4.1.500 NMAC, §264.140(c) [10-1-03], LANL, as a federal facility, is exempt from the requirements of 20.4.1.500 NMAC, Part 264, Subpart H [10-1-03], to provide a cost estimate, financial assurance mechanisms, and liability insurance for closure actions.

10 CLOSURE CERTIFICATION REPORT

Upon completion of the closure activities at either of the TA-50 CSUs, a closure certification report will be prepared and submitted to the Secretary of the NMED. The report will document the closure and contain the following:

- A copy of the certification described in Section 2.2 of this closure plan.
- Any significant variance from the approved activities and the reason for the variance.
- A summary of all sampling results, showing:
  - Sample identification
  - Sampling location
  - Datum reported
  - Detection limit for each datum
  - A measure of analytical precision (e.g., uncertainty, range, variance)
  - Identification of analytical procedure
  - Identification of analytical laboratory.
- A QA/QC statement on analytical data validation and decontamination verification.
- The location of the file of supporting documentation, including:
  - Field logbooks
  - Laboratory sample analysis reports
  - QA/QC documentation
  - Chain-of-custody forms.
- Storage or disposal location of regulated hazardous/mixed waste resulting from closure activities.
- A certification of accuracy of the report.

11 NEW MEXICO ENVIRONMENT DEPARTMENT CLOSURE ASSESSMENT

LANL will notify the NMED Hazardous Waste Bureau (HWB) prior to the pre-closure and structural assessment of the waste management unit, described in Section 5.3.2, to provide an opportunity to participate in the unit's physical condition review. LANL may also arrange for other on-site reviews of closure activities at reasonable times upon request by NMED representatives. Upon submittal of the closure certification report described in Section 10 of this closure plan, LANL will arrange an on-site closure review with representatives of the HWB or equivalent NMED representatives to assess the completion of the closure activities for each CSU. LANL may also arrange for other on-site reviews of prior closure activities during the closure period at reasonable times upon request by NMED representatives.

12 REFERENCES

DOE, 1995. "DOE Methods for Evaluating Environmental and Waste Management Samples," DOE/EM-0089T, Rev. 2. Prepared for the U.S. Department of Energy by Pacific Northwest Laboratory, Richland, Washington.

EPA, 1986 and all approved updates. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA-*SW-846*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C.

EPA, 2002. "RCRA Waste Sampling Draft Technical Guidance Planning, Implementation, and Assessment," EPA530-D-02-002, August 2002, Office of Solid Waste, U.S. Environmental Protection Agency, Washington, D.C.

LANL, 1999. "Screening Level Ecological Risk Assessment Methods," LA-UR-99-1406, Los Alamos National Laboratory, Los Alamos, New Mexico.

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LANL, 2006. "Los Alamos National Laboratory General Part A Permit Application," Revision 5.0, LA-UR-06-2553, Los Alamos National Laboratory, Los Alamos, New Mexico.

NIOSH, 1994. The National Institute for Occupational Health and Safety (NIOSH) *Manual of Analytical Methods*, Method 9100, 4th ed. Issue 1. 1994.

NMED, 2006. "Technical Background Document for Development of Soil Screening Levels," Rev. 4.0, June 2006, New Mexico Environment Department, Santa Fe, New Mexico.

Table 1
Closure Schedule for the Container Storage Units at Technical Area 50

Activity	Maximum Time Required [a]
Submit amended closure plan, if necessary.	-90 Days
Notify the New Mexico Environment Department (NMED) of intent to close.	-45 Days
Conduct pre-closure and structural assessment.	-25 Days
Final receipt of waste.	Day 0
Remove stored waste.	Day 5
Decontaminate surfaces and equipment.	Day 20
Sample excess decontamination materials for disposal. Perform equipment swipes or monitoring, as necessary.	Day 20
Perform verification sampling.	Day 30
Evaluate analytical data from verification sampling.	Day 50
Perform additional decontamination, if necessary.	Day 55
Perform additional verification sampling, if necessary.	Day 60
Evaluate additional analytical data.	Day 75
Perform final cleanup and disposal (i.e., removal of decontaminated equipment and decontamination waste).	Day 140
Prepare closure certification report.	Day 150
Certify closure.	Day 175
Submit final report to NMED.	Day 180

[a] The schedule above indicates calendar days from the beginning by which activities will be completed. Some activities may be conducted simultaneously and/or may not require the maximum time listed. Extensions to this schedule may be requested, as needed.

Table 2
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Technical Area 54 (TA-54) Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Verification water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	RLWTF
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal buildings	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Discarded asphalt	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

Table 2 (continued)
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Discarded concrete	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

Table 3
Recommended Sample Containers[a], Preservation Techniques, and Holding Times[b]

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP Metals: Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver	Aqueous Media: 500-mL Wide-Mouth-Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO_3 to pH <2 Cool to 4°C	180 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4°C	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide-Mouth-Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO_3 to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4°C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Solid Media: Cool to 4°C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	
Semi-Volatile Organic Compounds			
Target Compound Semi-volatile Organic Compounds	Aqueous Media: Four 1-L Amber Glass with Teflon-Lined Lid	Aqueous Media: Cool to 4 °C	Seven days from field collection to preparative extraction. 40 days from preparative extraction to determinative analysis.
	Solid Media: 250-mL Glass	Solid Media: Cool to 4°C	

[a] Smaller sample containers may be required due to health and safety concerns associated with potential radiation exposure, transportation requirements, and waste management considerations.

[b] Information obtained from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, U.S. Environmental Protection Agency, 1986 and all approved updates.

°C = degrees Celsius
HNO_3 = nitric acid
HCl = hydrochloric acid
L = Liter
mL = milliter
TCLP = Toxicity Characteristic Leaching Procedure

Table 4
Recommended Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis [a]	Frequency	Acceptance Criteria
Trip Blank	VOC	One set per shipping cooler containing samples to be analyzed for VOCs	Not Applicable
Field Blank	VOC/SVOC, metals	One sample daily per analysis	Not Applicable
Field Duplicate	Chemical	One for each sampling sequence	Relative percent difference less than or equal to 20 percent
Equipment Rinsate Blank[b]	VOC/SVOC, metals	One sample daily	Not Applicable

[a] For VOC and SVOC analysis, if blank shows detectable levels of any common laboratory contaminant (e.g., methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

[b] Collected only if reusable sampling equipment used.

QC = quality control
VOC = volatile organic compound
SVOC = semi-volatile organic compound

ATTACHMENT A

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES FOR CLOSURE OF THE TECHNICAL AREA 50, BUILDING 69, INDOOR CONTAINER STORAGE UNIT

TABLE OF CONTENTS

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LIST OF ACRONYMS AND ABBREVIATIONS

CSU	container storage unit(s)
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ft	feet
LANL	Los Alamos National Laboratory
TA	Technical Area

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES FOR CLOSURE OF THE TECHNICAL AREA 50, BUILDING 69, INDOOR CONTAINER STORAGE UNIT

A.1. INTRODUCTION

This attachment describes specific decontamination, sampling strategies, and analytical requirements applicable to closure of the Los Alamos National Laboratory (LANL) Technical Area 50, Building 69 (TA-50-69), Indoor Container Storage Unit (CSU). General closure procedures for the TA-50-69 CSUs are presented in the closure plan. The general procedures include removal and appropriate disposition of the waste inventory in the unit prior to the beginning of closure, and a pre-closure and structural assessment of the unit, as described in Section 5.3.2 of the closure plan, for conditions that may adversely affect decontamination and verification sampling activities. The waste management unit addressed in this attachment is the TA-50-69 Indoor CSU, which consists of Rooms 102 and 103. Table A-1 identifies the category, U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers, and specific constituents of concern for the wastes stored at this unit. Closure activities at the TA-50-69 Indoor CSU will include decontamination, reuse, recycling, and/or disposal of portable equipment; decontamination of floor and/or walls of the CSU and reuse, recycling, and/or disposal of concrete (based on information in the operating record), and disposal of waste materials generated during closure activities.

Decontamination will be conducted as described in Section 5.4 of the closure plan and in Section A.2 herein. Sampling will be conducted in accordance with the most recent LANL sampling and analysis plan incorporating guidance from the EPA (EPA, 2002) and the U.S. Department of Energy (DOE) (DOE, 1995). Section A.3 in this attachment and Section 6.0 of the closure plan describe sampling activities and sample collection procedures, respectively. Analysis will be conducted in accordance with procedures given in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods” (SW-846) (EPA, 1986), or other approved procedures or methods. Analytical requirements are provided in Section A.4 herein and in Section 7.0 of the closure plan. All waste generated will be managed in accordance with applicable regulatory requirements. All wastes will be removed from the permitted unit as specified in Section 5.2 of the closure plan.

A.2. SPECIFIC DECONTAMINATION PROCEDURES

To the extent necessary, all contaminated equipment present at closure, surfaces, and structures will be decontaminated. Sampling and analysis will be performed, as necessary, to verify that decontaminated equipment, surfaces, and structures meet the verification criteria specified in Section 5.5 of the closure plan. Discarded materials and equipment that cannot or will not be decontaminated will be dispositioned appropriately.

A.2.1. Equipment Decontamination

Prior to decontamination of the main surfaces at the TA-50-69 Indoor CSU, any contaminated portable equipment (if present) to be removed from the area will be wiped down with a wash water solution in accordance with the general procedures described in Section 5.4.1 of the closure plan. The equipment may include items such as pallets and miscellaneous waste management equipment (e.g., drum dollies, gloveboxes).

A.2.2. Surface/Structures Decontamination

At the TA-50-69 Indoor CSU, only a portion of Room 102 has stored hazardous/mixed waste and Room 103 has only been used for unloading. If at the time of the pre-closure and structural assessment prior to closure, if no spills have been noted in the operating record and no staining is observed, only the floor where hazardous/mixed waste was stored and the attached walls will be decontaminated to a height of 5 feet (ft) in Room 102. Room 103 will not be decontaminated if no waste was stored there. However, if the building is slated for decommissioning and decontamination at the time of closure, Rooms 102 and 103 will not be decontaminated. Areas where a crack, gap, or spilled area is present in the floor will be managed as described in Section 5.3.2 of the closure plan. There are no recessed areas (i.e., sumps) located at the TA-50-69 Indoor CSU. There are, however, two drains connected directly to the piping that feeds to the Radioactive Liquid Waste Treatment Facility. These drains are located in Rooms 102 and 103 and will be covered prior to decontamination activities.

If determined to be necessary, decontamination of TA-50-69 Indoor CSU surfaces and structures (i.e., walls, floors) will involve removing any contamination through washing the surface with appropriate decontamination solutions until decontamination is achieved. Decontamination of surfaces and structures will be performed in accordance with the general procedures described in Section 5.4.2 of the closure plan. After the decontamination process, the excess wash water will be collected, sampled for analysis, and stored in appropriate containers at the site pending determination of appropriate disposition. Each surface or structure may undergo several wash cycles; however, the option to remove the material and manage it as waste may be exercised at any time.

A.3. SAMPLING ACTIVITIES

All general sample management, documentation, handling, preservation, storage, and packaging and transportation procedures for the closure of the TA-50-69 Indoor CSU are described in Section 6 of the closure plan. The following specific information applies to the sampling location strategy and approach for closure of the TA-50-69 Indoor CSU. Samples will be collected from discrete locations according to the methods and procedures provided in Section 6.4 of the closure plan and analyzed for the appropriate hazardous constituents identified during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan. Table A-1 identifies potential hazardous waste constituents of concern for the

TA-50-69 Indoor CSU. Samples will be analyzed by an independent laboratory for constituents included in Table A-1, as necessary, using the methods outlined in Table A-2. Tables A-1 and A-2 will be modified, if necessary, at the time of notification of closure to incorporate changes based on the operating record review that will be conducted for the CSU.

A.3.1. Sampling Strategy/Approach

Verification sampling will be conducted to verify that decontamination efforts described herein and in Section 5.4 of the closure plan were effective at removing hazardous waste residues.

A.3.1.1. Soil Sampling Strategy

The TA-50-69 structure that houses the TA-50-69 Indoor CSU provides containment and run-on protection by design. The TA-50-69 floor is a reinforced concrete slab on compacted fill and is coated with a chemical-resistant epoxy primer and paint, which effectively prevents migration of any liquids through the concrete and into the environment. Also, the pre-closure and structural assessment described in Section 5.3.2 of the closure plan will be conducted prior to closure activities to review the operating record for spills, and to ensure that defects, deterioration, damage, or hazards affecting waste containment were repaired. The assessment will assure that inspections and maintenance were effective at preventing migration of waste to the environment. Therefore, soil sampling should not be applicable for the TA-50-69 Indoor CSU closure. In the case that the pre-closure and structural assessment and the operating record indicate otherwise, LANL will notify the NMED to discuss further proposals, such as utilizing soil sampling techniques contained in Section 6 of the closure plan.

A.3.1.2. Verification Sampling Strategy

Verification samples will be collected from each of the locations where decontamination activities were performed. Liquid or wipe sampling will be conducted using the procedures in Sections 6.4.1 and 6.4.2 of the closure plan; sampling results will be used for decontamination verification of surfaces, structures, and other equipment. After decontamination, at least one sample for every 6-ft x 5-ft area will be collected, with no fewer than two samples taken from the floor area. Verification sampling will be conducted for the floor and then the walls to prevent cross contamination of the samples and allow for the identification of potentially contaminated areas.

A.4. ANALYTICAL REQUIREMENTS

All general analytical laboratory requirements, quality assurance/quality control, and data requirements procedures for the closure of the TA-50-69 Indoor CSU are described in Section 7 of the closure plan. Analytical methods to be used for decontamination verification during the TA-50-69 Indoor CSU closure activities are summarized in Table A-2. Each sample will be analyzed for the constituents identified in

Table A-1, as appropriate. Analytes, test methods/instrumentation, target detection limits, and rationale for metals and organic analyses are also presented in Table A-2.

A.5. WASTE MANAGEMENT

Decontamination and sample collection activities will be conducted with waste minimization goals in mind. All waste generated will be controlled, handled, characterized, and disposed of in accordance with LANL waste management procedures. Closure activities may generate different types of waste materials, which are listed with potential disposal options in Table 2 of the closure plan

A.6. REFERENCES

DOE, 1995. "DOE Methods for Evaluating Environmental and Waste Management Samples," DOE/EM-0089T, Rev. 2. Prepared for the U.S. Department of Energy by Pacific Northwest Laboratory, Richland, Washington.

EPA, 1986 and all approved updates. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA-*SW-846*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C.

EPA, 2002. "RCRA Waste Sampling Draft Technical Guidance Planning, Implementation, and Assessment," EPA530-D-02-002, August 2002, Office of Solid Waste, U.S. Environmental Protection Agency, Washington, D.C.

Table A-1

Hazardous Waste Constituents of Concern at the TA-50-69 Indoor Container Storage Unit[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
Organic Compounds	D018, D019, D021, D022, D035, D038, D039, D040	Benzene, Carbon tetrachloride, Chlorobenzene, Chloroform, Methyl ethyl ketone, Pyridine, Tetrachloroethylene, Trichloroethylene
	F001, F002, F003, F005	Various
	U080	Dichloromethane

[a] Based on the unit operating record.
EPA = U.S. Environmental Protection Agency

Table A-2

Summary of Proposed Analytical Methods

Analyte	EPA SW-846 Analytical Method [a]	Test Methods/ Instrumentation	Target Detection Limit [b]	Rationale
Metal Analysis				
Arsenic	7060A [c], 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A [d], 7081 [c]	FLAA,GFAA	200 ug/L	
Cadmium	7130 [d], 7131A [c]	FLAA, GFAA	2 ug/L	
Chromium	7190 [d], 7191 [c]	FLAA, GFAA	10 ug/L	
Lead	7420 [d], 7421 [c]	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A [e]	CVAA	0.2 ug/L	
Selenium	7740[c], 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A[d], 7761 [c]	FLAA, GFAA	10 ug/L	
Organic Analysis				
Target compound list VOCs	8260B	GC/MS	10 mg/L	Determine the VOC concentration in the samples.
Target compound list SVOCs	8270D [c]	GC/MS	10 mg/L	Determine the SVOC concentration in the samples.

[a] U.S. Environmental Protection Agency (EPA), 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846.
[b] Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.
[c] Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.
[d] Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.
[e] Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy
FLAA = Flame atomic absorption spectroscopy
GC/MS = Gas chromatography/mass spectrometry
GFAA = Graphite furnace atomic absorption spectroscopy
mg/L = milligrams per liter
SVOC = semi volatile organic compounds
ug/L = micrograms per liter
VOC = volatile organic compounds

ATTACHMENT B

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES FOR CLOSURE OF THE TECHNICAL AREA 50, BUILDING 69, OUTDOOR CONTAINER STORAGE UNIT

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LIST OF ACRONYMS AND ABBREVIATIONS

CSU	container storage unit(s)
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ft	feet
in.	inch/inches
LANL	Los Alamos National Laboratory
TA	Technical Area

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES FOR CLOSURE OF THE TECHNICAL AREA 50, BUILDING 69, OUTDOOR CONTAINER STORAGE AREA

B.1. INTRODUCTION

This attachment describes specific decontamination, sampling strategies, and analytical requirements applicable to closure of the Los Alamos National Laboratory (LANL) Technical Area 50, Building 69 (TA-50-69), Outdoor Container Storage Unit (CSU). General closure procedures for the TA-50-69 CSUs are presented in the closure plan. The general procedures include removal and appropriate disposition of the waste inventory in the unit prior to the beginning of closure, and a pre-closure and structural assessment of the unit, as described in Section 5.3.2 of the closure plan, for conditions that may adversely affect decontamination and verification sampling activities.

The waste management unit addressed in this attachment is the TA-50-69 Outdoor CSU, which consists of an asphalt and concrete pad that is not lined or coated, and measures 24-feet (ft) wide and 90-ft long, with an additional asphalt strip 12-ft wide and 90-ft long added to the southwest end. Transportainers and other weather protective structures within the TA-50-69 Outdoor CSU provide optional weather protection for containers of various sizes. Painted lines are used to visually delineate the CSU boundary. Table A-1 identifies the category, U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers, and specific constituents of concern for the wastes stored at this unit.

Closure activities at the TA-50-69 Outdoor CSU will include decontamination, reuse, recycling, and/or disposal of transportainers and/or portable equipment; decontamination, reuse, or removal portions of the storage pad underlying the CSU (based on information in the operating record); removal of soil if determined to be contaminated above acceptable levels (based on information in the operating record or determined through analysis); and disposal of soils and/or waste materials generated during closure activities.

Decontamination will be conducted as described in Section 5.4 of the closure plan and in Section A.2 herein. Sampling will be conducted in accordance with the most recent LANL sampling and analysis plan incorporating guidance from the EPA (EPA, 2002) and the U.S. Department of Energy (DOE) (DOE, 1995). Section A.3 in this attachment and Section 6.0 of the closure plan describe sampling activities and sample collection procedures, respectively. Analysis will be conducted in accordance with procedures given in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods” (SW-846) (EPA, 1986), or other approved procedures or methods. Analytical requirements are provided in Section A.4 herein and in Section 7.0 of the closure plan. All waste generated will be subsequently reclaimed, recycled, or disposed of in accordance with applicable regulatory requirements. All wastes will be removed from the permitted unit as specified in Section 5.2 of the closure plan.

B.2. SPECIFIC DECONTAMINATION PROCEDURES

To the extent necessary, all contaminated equipment, surfaces, structures, and media present at closure will be decontaminated. Sampling and analysis will be performed, as necessary, to verify that decontaminated equipment, surfaces, structures, and media meet the verification criteria specified in Section 5.5 of the closure plan. Discarded materials and equipment that cannot or will not be decontaminated will be dispositioned appropriately.

B.2.1. Equipment Decontamination

Prior to decontamination of the pad at the TA-50-69 Outdoor CSU, any contaminated pallets and other portable miscellaneous waste management equipment (e.g., drum dollies) will be wiped down with a wash water solution in accordance with the general procedures described in Section 5.4.1 of the closure plan.

B.2.2. Transportainer Decontamination

Normal operations at the TA-50-69 Outdoor CSU do not expose outer surfaces of transportainers to waste. Therefore, if there is no evidence of outer surface contamination by a spill or leakage from interior spills, the outer surfaces will not be decontaminated. If the pre-closure and structural assessment indicates outer surfaces of a transportainer(s) may be contaminated, those surfaces will be decontaminated in accordance with the procedures described below.

If determined to be necessary, decontamination of internal surfaces of transportainers will involve removing any contamination through washing the surfaces with appropriate decontamination solutions until decontamination is achieved. Decontamination of internal surfaces will be performed in accordance with the general procedures described in Section 5.4.2 of the closure plan. The walls of the transportainer will be decontaminated to a height of 7 ft, because drums were stacked two-high within the CSU. The floor will also be decontaminated. After the decontamination process, the excess wash water will be collected, sampled for analysis, and stored in appropriate containers at the site pending determination of appropriate disposition.

B.2.3. Storage Pad Decontamination

Review of operating records, analytical results, and visual inspection will be relied on to determine if the asphalt pad at the TA-50-69 Outdoor CSU is potentially contaminated by hazardous constituents resulting from waste management operations. If records indicate that no release of hazardous waste to soils has occurred, decontamination will not be conducted. Suspected areas of contamination will be removed from the pad or washed with a wash water solution. Removal, containerization, and disposal of contaminated asphalt is likely to be the option of choice. If decontamination of the pad is chosen, decontamination will

be conducted as outlined in Section 5.4.2 of the closure plan. The excess wash water will be collected and transferred from the portable berm used to contain excess wash water to a container for waste characterization sampling.

After decontamination of the asphalt pad, excess wash water may exhibit high levels of organic compounds due to leaching of the asphalt during washdown. If this occurs, record reviews (e.g., manufacturer's specifications, Material Safety Data Sheets) and additional analyses may be performed to determine if leaching organics from the asphalt contributed to the organic compound concentration in the excess wash water. If the asphalt is the source of organic contamination, baseline concentrations for the verification solution will be adjusted accordingly. If decontamination verification cannot be demonstrated, the container storage pad may be evaluated using an alternative demonstration of closure. If all alternative demonstrations of closure fail, the container storage pad will be removed.

B.2.4. Contaminated Soil Removal

Record reviews and visual inspection of soils along the margins of the TA-50-69 Outdoor CSU will be conducted during the pre-closure and structural assessment and used to identify areas where soil contamination from waste management activities may have occurred. If records indicate that no release of hazardous waste to soils has occurred and no staining is seen, no soil sampling will be conducted. If required, soil sampling in any areas that are suspected to be contaminated as a result of storage at the CSU will be conducted following sample collection procedures in Section 6.4.3 of the closure plan. For example, soil sampling would be conducted in areas where the operating records indicate that a release of hazardous waste from the CSU to the surrounding soil has occurred and/or areas where a crack in the asphalt penetrated through the asphalt. A statistically representative number of soil samples will be collected from contaminated area(s) to a 6-inch (in.) depth. Sampling locations to determine the extent of contamination will be chosen using a biased sampling approach, including areas with historical evidence of releases, visual staining, and any other information that indicates potential contamination. These samples will be compared to background/baseline concentrations. Background samples will be established using analysis results from soil samples collected from appropriate areas before closure activities begin or, if available, established baseline concentration levels for the area (e.g., using corrective action program analytical data).

If contamination resulting from container storage activities is discovered above acceptable levels as described in the verification criteria listed in Section 5.5, the contaminated soils will be removed for proper disposal. Soil sampling results that are above background/baseline levels will be used to identify the extent of soil contamination. Contaminated soils will be removed in layers and verification sampling will be conducted in accordance with Section B.3.1.1 following removal of each layer. This procedure will be used to minimize the amount of soil removed. If analysis from the verification indicates it does not meet acceptable levels after removal of each layer, more soil will be removed and verification sampling will be

repeated, or the decision will be made to proceed with an alternative demonstration of closure, as described in Section 5.6 of the closure plan.

B.3. SAMPLING ACTIVITIES

All general sample management, documentation, handling, preservation, storage, and packaging and transportation procedures for the closure of the TA-50-69 Outdoor CSU are described in Section 6 of the closure plan. The following specific information applies to the sampling location strategy and approach for closure of the TA-50-69 Outdoor CSU. Samples will be collected from discrete locations according to the methods and procedures provided in Section 6.4 of the closure plan and analyzed for the appropriate hazardous constituents identified during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan. Table B-1 identifies potential hazardous waste constituents of concern for the TA-50-69 Outdoor CSU. Samples will be analyzed by an independent analytical laboratory for the constituents included in Table B-1, as necessary, using the methods outlined in Table B-2. Tables B-1 and B-2 will be modified, if necessary, at the time of notification of closure to incorporate changes based on the operating record review that will be conducted for the CSU.

B.3.1. Sampling Strategy/Approach

Verification sampling will be conducted to verify that decontamination efforts described herein and in Section 5.4 of the closure plan were effective at removing hazardous residues. Soil sampling may initially be conducted to establish the presence or absence of contamination.

B.3.1.1. Soil Sampling Strategy

Sampling locations to determine the extent of contamination will be chosen using a biased sampling approach, based on historical evidence of releases, physical evidence of distressed vegetation, visual staining, and any other information that indicates potential contamination. Soil samples will be collected using the procedures in Section 6.4.3 of the closure plan. At least two and up to eighteen samples will be collected to a 6-in. depth around the perimeter of the pad. Individual locations and depths will be determined during the pre-closure and structural assessment of the unit, as described in Section 5.3.2 of the closure plan. Analytical results will be compared to background samples and/or baseline concentration levels, as described in Section B.2.4.

B.3.1.2. Verification Sampling Strategy

Verification samples will be collected from each of the locations where decontamination activities were performed. Liquid or wipe sampling will be conducted using the procedures in Sections 6.4.1 and 6.4.2 of the closure plan; sampling results will be used for decontamination verification of the asphalt pad, transportainer walls and floors, or equipment. Soil sampling will be conducted for soil verification sampling. For the transportainers and pad, one sample will be collected for every 6-ft x 7-ft area. No

fewer than two samples will be collected and analyzed for the hazardous constituents identified by the pre-closure and structural assessment, described in Section 5.3.2 of the closure plan. Verification sampling will be conducted for the walls of the transportainer and then the floor to prevent cross contamination of the samples. If required to verify that contaminated soil removal was effective, at least two and a maximum of eight verification samples will be collected at the TA-50-69 Outdoor CSU when soil removal is complete.

B.4. ANALYTICAL REQUIREMENTS

All general analytical requirements, quality assurance/quality control, and data requirements procedures for closure of the TA-50-69 Outdoor CSU are described Section 7 of the closure plan.

Analytical methods to be used for decontamination verification during the TA-50-69 Outdoor CSU closure activities are summarized in Table B-2. Each sample will be analyzed for the constituents identified in Table B-1, if applicable . Analytes, test methods/instrumentation, target detection limits, and rationale for metals and organic analyses are also presented in Table B-2.

B.5. WASTE MANAGEMENT

Decontamination and sample collection activities will be conducted with waste minimization goals in mind. All waste generated will be controlled, handled, characterized, and disposed of in accordance with LANL waste management procedures. Closure activities may generate different types of waste materials, which are listed with potential disposal options in Table 2 of the closure plan.

B.6. REFERENCES

DOE, 1995. "DOE Methods for Evaluating Environmental and Waste Management Samples," DOE/EM-0089T, Rev. 2. Prepared for the U.S. Department of Energy by Pacific Northwest Laboratory, Richland, Washington.

EPA, 1986 and all approved updates. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA-*SW-846*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C.

EPA, 2002. "RCRA Waste Sampling Draft Technical Guidance Planning, Implementation, and Assessment," EPA530-D-02-002, August 2002, Office of Solid Waste, U.S. Environmental Protection Agency, Washington, D.C.

Table B-1

Hazardous Waste Constituents of Concern at the TA-50-69 Outdoor Container Storage Unit[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Cadmium, Chromium, Lead, Mercury, Selenium, Silver
Organic Compounds	D018, D019, D021, D022, D035, D038, D039, D040	Benzene, Carbon tetrachloride, Chlorobenzene, Chloroform, Methyl ethyl ketone, Pyridine, Tetrachloroethylene, Trichloroethylene
	F002, F003, F005	Various
	U080	Dichloromethane

[a] Based on the unit operating record.
EPA = U.S. Environmental Protection Agency

Table B-2

Summary of Proposed Analytical Methods

Analyte	EPA SW-846 Analytical Method [a]	Test Methods/ Instrumentation	Target Detection Limit [b]	Rationale
Metal Analysis				
Arsenic	7060A [c], 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A [d], 7081 [c]	FLAA, GFAA	200 ug/L	
Cadmium	7130 [d], 7131A [c]	FLAA, GFAA	2 ug/L	
Chromium	7190 [d], 7191 [c]	FLAA, GFAA	10 ug/L	
Lead	7420 [d], 7421 [c]	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A [e]	CVAA	0.2 ug/L	
Selenium	7740[c], 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A[d], 7761 [c]	FLAA, GFAA	10 ug/L	
Organic Analysis				
Target compound list VOCs	8260B	GC/MS	10 mg/L	Determine the VOC concentration in the samples.
Target compound list SVOCs	8270D [c]	GC/MS	10 mg/L	Determine the SVOC concentration in the samples.

[a] U.S. Environmental Protection Agency (EPA), 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846.
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[e] Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy
FLAA = Flame atomic absorption spectroscopy
GC/MS = Gas chromatography/mass spectrometry
GFAA = Graphite furnace atomic absorption spectroscopy
mg/L = milligrams per liter
SVOC = semi volatile organic compounds
ug/L = micrograms per liter
VOC = volatile organic compounds

LA-UR-06-6916
September 2006

Los Alamos National Laboratory

Technical Area 54

Closure Plan

Revision 0.0

Prepared by:

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Los Alamos National Laboratory

Technical Area 54
Closure Plan

Revision 0.0
LA-UR-06-6916

Facility ID No.:	**NM0890010515**
Facility Name:	**Los Alamos National Laboratory**
Facility Address:	**Los Alamos National Laboratory** **P.O. Box 1663** **Los Alamos, New Mexico 87545**
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Legal Operators:	**U.S. Department of Energy** **Los Alamos Site Office** **528 35th Street** **Los Alamos, New Mexico 87544** **Los Alamos National Security, LLC.** **4200 West Jemez Road, Suite 4000** **Los Alamos, New Mexico 87544**
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Date:	**September 2006**

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LIST OF ACRONYMS AND ABBREVIATIONS

20.4.1 NMAC	New Mexico Administrative Code, Title 20, Chapter 4, Part 1
CFR	Code of Federal Regulations
CSU	container storage unit(s)
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ESL	Ecological Screening Levels
ft	feet
HWB	Hazardous Waste Bureau
in.	inch(es)
LANL	Los Alamos National Laboratory
NIOSH	National Institute of Occupational Safety and Health
NMED	New Mexico Environment Department
PPE	personal protective equipment
P&T	Packaging and Transportation
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
SSL	Soil Screening Levels
SW-846	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods
TA	Technical Area
WIPP	Waste Isolation Pilot Plant

LOS ALAMOS NATIONAL LABORATORY TECHNICAL AREA 54 CLOSURE PLAN

1 INTRODUCTION

The information provided in this closure plan is submitted to address the closure requirements specified in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart V (20.4.1.500 NMAC), incorporating the Code of Federal Regulations (CFR), Title 40, Part 264, Subparts G and I, as revised October 1, 2003 [10-1-03], for waste management units operated at the Los Alamos National Laboratory (LANL) under the Resource Conservation and Recovery Act (RCRA) and the New Mexico Hazardous Waste Act. This closure plan describes the activities necessary to close the active hazardous/mixed waste container storage units (CSUs) at LANL Technical Area (TA) 54.

General information for the closure activities at the TA-54 CSUs is presented in this closure plan. Specific information on closure decontamination, sampling strategies, and analytical requirements for the different types of CSUs at TA-54 is included in Attachments A through C.

Until closure is complete and has been certified in accordance with 20.4.1.500 NMAC, §264.115 [10-1-03], a copy of the approved closure plan, any approved revisions, and closure activity documentation associated with the closure will be on file at the LANL Environmental Protection Division Water Quality and RCRA Group and at the U.S. Department of Energy (DOE) Los Alamos Site Office.

2 GENERAL CLOSURE INFORMATION

2.1 Closure Performance Standard

As required by 20.4.1.500 NMAC, §264.111 [10-1-03], the TA-54 CSUs will be closed to meet the following performance standards:

- Minimize the need for further maintenance;
- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground, or surface waters, or to the atmosphere; and
- Comply with the closure requirements of 20.4.1.500 NMAC, Part 264, Subparts G and I [10-1-03], including, but not limited to, the requirements of 20.4.1.500 NMAC, §264.178 [10-1-03].

This will be accomplished by removal of hazardous and mixed (hazardous waste with a radioactive component) waste from the CSUs; decontamination, if necessary, of the surfaces and equipment that may have come into contact with the wastes; and/or disposal of contaminated CSU structures or

equipment. Verification sampling may be performed after the removal of site structures to assess the potential for residual contamination at the closure site if any evidence is found that indicates there may have been a release of hazardous constituents from the unit. If sampling indicates contamination, 1) the level of such contamination will be evaluated for further decontamination activities; 2) remaining unit structures will be managed as contaminated waste using appropriate LANL waste management procedures; or 3) if appropriate, necessary activities will be coordinated with the LANL corrective action program for final remediation. Decontamination activities will ensure the removal of hazardous waste residues from the TA-54 CSUs to established cleanup levels as agreed upon with the New Mexico Environment Department (NMED) or as outlined in Section 5.5 of this closure plan.

2.2 Partial and Final Closure Activities

This closure plan has been written for partial closure rather than final closure of the entire LANL facility. Partial closure will consist of closing an individual CSU, while leaving the other regulated hazardous/mixed waste management units at LANL in service. Partial closure of each CSU (hereinafter referred to simply as "closure") will be deemed complete when 1) all surfaces and equipment have been decontaminated, or otherwise properly disposed, if necessary; 2) closure has been certified by an independent, professional engineer licensed in the State of New Mexico; and 3) closure certification has been submitted to and approved by the NMED.

Final closure of the LANL facility will occur when the remaining hazardous/mixed waste management units at LANL are closed. Final closure will consist of assembling documentation on the closure status of each unit, including all previous partial closures as well as land-based units that have been or are being addressed via coordination with corrective action projects. Final closure will be deemed complete when the information has been submitted to the NMED and approved.

3 DESCRIPTION OF UNITS TO BE CLOSED

LANL is located in Los Alamos County, an incorporated county, in north-central New Mexico, approximately 60 miles north of Albuquerque and 25 miles northwest of Santa Fe. LANL is divided into TAs. TA-54 is located on a finger mesa between Cañada del Buey to the north and Pajarito Canyon to the south. The CSUs are located at TA-54 in Area L, Area G, and 54 West.

The TA-54 CSUs include large fabric-covered domes on asphalt pads, storage areas within various types of buildings, and outside storage structures. The remainder of this section provides descriptions of the specific waste management units at TA-54 to which this closure plan applies, followed by the waste types managed and capacity descriptions for the units.

Additional information on the TA-54 CSUs, hazardous component(s) of the wastes stored at the TA-54 CSUs, and pictures and figures of the units are provided in the "Los Alamos National Laboratory General Part A Permit Application," Revision 5.0 (LANL, 2006) and the "Los Alamos National Laboratory Technical Area 54 Part B Permit Renewal Application," Revision 3.0 (LANL, 2003b).

3.1 Asphalt Pad CSUs

There are asphalt pad CSUs in Area L, Area G, and 54-West. Most of these asphalt pads support covered domes and store hazardous and mixed waste. The domes consist of rigid aluminum frames spanning the width of the structure that support a tensioned-membrane fabric and are anchored to the underlying asphalt pad. The membrane material is a fire-retardant polyester fabric coated with ultraviolet-stabilized polyvinyl chloride. Each dome is equipped with multiple personnel doors and a vehicle access entrance. The interior floor perimeter of each dome is surrounded with a minimum six-inch (in.) high asphalt curb or ring wall. The underlying asphalt pads are of varying sizes and have been constructed to be approximately four to six inches (in.) thick. The asphalt pad CSUs at TA-54 are described below.

3.1.1 Area L

- Storage Dome 215, constructed in 1995, is located on the north side of Area L. It is 60 feet (ft) wide, 266 ft long, and 26 ft high. The dome includes an external double-walled holding tank for any liquid accumulation that exceeds the dome's ring wall capacity. The dome stores containers with both liquid and solid type mixed waste.
- Storage Canopy 216, constructed in 1993, is located on the southeast side of Area L. It is 33 ft wide and 120 ft long. The canopy fabric has been rolled up into the aluminum dome framework on three sides. The canopy stores hazardous and mixed waste gas cylinders in individual containment structures and is anchored directly to the underlying asphalt pad without a ring wall.
- Area L within the fence line will be closed in the same manner as the discrete asphalt pads described for Area G. Although it is not covered by a single dome structure, it is constructed similarly and most of the area was used for storage of solid type hazardous waste with temporary storage of mixed waste in 1995 and 1996 when Dome 215 was erected. Pending renewal of the LANL Hazardous Waste Facility Permit, additional outside storage of solid type hazardous and mixed waste may occur in the area.

3.1.2 Area G

- Storage Dome 226 on Pad 1 is located in the northeastern portion of Area G. The dome is 286 ft long and approximately 89 ft wide. The dome was erected in 1995 and is used to store solid type mixed waste. Pad 1 is approximately 358 ft long and 213 ft wide.

- Storage Dome 48 is located in the eastern end of Area G on Pad 3 and has been in operation since 1980. The dome is 285 ft long and 50 ft wide and is used to store solid type mixed waste containers on pallets and liquid waste containers in secondary containment pallets. Pad 3 is approximately 339 ft long and 50 ft wide.
- Storage Domes 49 and 224 are located in the south-central portion of Area G on Consolidated Pad 5. The pad unit consists of three adjacent smaller pads; Pads 5, 8, and 7. Dome 49 is 440 ft long and 60 ft wide, was built in 1986, and is located on Pad 5, which is approximately 500 ft long and 65 ft wide. Dome 49 stores solid type mixed waste and liquid mixed waste on secondary containment pallets. Dome 224 is 110 ft long and 60 ft wide and is located on Pad 8, which is approximately 150 ft long and 95 ft long. The dome was constructed in 1989. Dome 224 stores solid and liquid type mixed waste and was designed for secondary containment of liquids with a concrete collection sump in the center of the dome and a plastic liner underneath the asphalt pad. Liquid mixed wastes are stored on Pads 5, 7, and 8.
- Storage Domes 153 and 283 are located in the north-central portion of Area G on Pad 6. Dome 153 is 326 ft long and 60 ft wide. Dome 283 is 250 ft long and 60 ft wide. Pad 6 is approximately 633 ft long and 99 ft wide. These domes store solid type mixed waste, including large fiberglass-reinforced boxes containing contaminated equipment. Liquid mixed wastes are also stored on secondary containment pallets.
- Storage Domes 229, 230, 231, and 232 are located at the east end of Area G on Pad 9. Each dome is 246 ft long and 88 ft wide. Pad 9 is approximately 570 ft long and 275 ft wide. These structures were built in 1994 and 1995. Dome 230 stores liquid and solid type mixed waste and has a plastic liner underneath the asphalt portion of the dome floor with an additional concrete sump at the east end of the dome for secondary containment. Domes 229, 231, and 232 store solid type mixed waste only.
- Storage Pad 10 is in the eastern portion of Area G and consolidates the units previously identified as Pad 2 and Pad 4. The pad was built in 2002 and does not support any dome structures. The pad is used to store solid type mixed waste containers with liquid waste containers in secondary containment pallets.

3.1.3 TA-54 West

- The Outside Storage Pad at TA-54 West is located north of Building TA-54-38. The pad measures 40 ft by 40 ft and is not covered by a dome structure. It stores primarily solid type mixed waste undergoing waste characterization and packaging activities for shipment to the Waste Isolation Pilot Plant (WIPP). The pad became operational in 1998. Pending renewal of the LANL Hazardous Waste Facility Permit, this area may be increased to include the entire asphalt area within the fence line of TA-54 West. If the area is increased, the conditions of this closure plan will be extended to cover the expanded area.

3.2 Building CSUs

CSUs located within various types of buildings are present in Area L, Area G, and TA-54 West. These are interior storage areas within rooms of larger buildings, within portable buildings dedicated to waste management activities, and within metal sheds. The Building CSUs at TA-54 are described below.

3.2.1 Area L

- Building 31 is located on the southwest side of Area L near the main entrance gate. The small prefabricated building is constructed of steel and is approximately 14 ft long and 13 ft wide. The shed, built in 1979, sits on a concrete foundation that provides secondary containment and includes recessed sumps. The CSU within Building 31 stores solid and liquid hazardous waste.
- Building 39, built in 1979, is located on the south-east side of Area L and contains an interior storage area in Room 101. The CSU covers an area of about 878 square ft. Room 101 has an epoxy-coated floor and includes a six-in.-high interior curb for secondary containment. The room will store liquid and solid hazardous waste containers pending renewal of the LANL RCRA Hazardous Waste Facility Permit.
- Storage Sheds 68, 69, and 70 are prefabricated steel sheds dedicated to waste storage. The sheds are currently located in the north and south central areas of Area L, but can be moved. Each shed is about 23 ft long and nine ft wide and is constructed with integral liquid containment sumps. The sheds store liquid and solid hazardous waste containers and were placed in Area L in 1988.

3.2.2 Area G

- Storage Shed 8 is located on the north-central side of Area G. The shed is 40 ft long by 16 ft wide and was constructed in 1979. The steel shed includes a concrete foundation and stores solid type mixed waste.
- Storage Sheds 144, 145, 146, and 177 are located in the western part of Area G on Storage Pad 7. They are prefabricated steel and measure six ft long by five ft wide. The sheds were placed between 1986 and 1988. Each shed is constructed with a liquid-tight containment sump. These sheds store liquid mixed waste.
- Storage Sheds 1027, 1028, 1029, and 1041 are located on the southern side of Storage Pad 7 at Area G, but can be moved. Each shed is about 23 ft long and nine ft wide and is constructed with integral liquid containment sumps. The sheds store liquid and solid mixed waste and were placed between 1986 and 1988.
- Building TA-54-412 is located on Pad 1 in the northeastern portion of Area G. The building is 220 ft long and 60 ft wide and was constructed in 1999. The building stores solid and liquid type mixed waste.

- Dome/Building TA-54-33 is located in the north-central portion of Area G and consists of a dome attached to a concrete-block building with a concrete foundation and sump. The dome is 157 ft long and 50 ft wide; the attached building is 40 ft long by 34 ft wide. The structure was built in 1994 and stores solid and liquid type mixed waste.

3.2.3 Indoor CSU at TA-54 West

- The Indoor CSU at TA-54 West includes two storage areas in Building 38. The building was constructed in 1993. The High Bay is 40 ft wide and 80 ft long and includes a concrete floor with drainage sump. This unit stores solid type mixed waste while shipping packages for transport to WIPP are prepared. The Low Bay is 40 ft long by 34 ft wide. The storage area was used for staging mixed solid and liquid waste while radioassay waste characterization activities are performed.

3.3 Outside Storage Structures

Areas L and 54 West at TA-54 also include outside storage structure CSUs. These concrete containment structures or pads are protected from rainfall by roofs. Outside storage structures at TA-54 are described below.

3.3.1 Area L

- TA-54-32 consists of a concrete pad that is 116 ft long by 16 ft wide and is covered by a steel canopy. The structure, located in the southern central part of Area L, was built in 1986. The pad is divided into six containment cells by a minimum six-in.-high concrete curb. The pad is grated and stores various types of solid and liquid hazardous waste.
- TA-54-35, -36, and -58 are concrete pads in the west-central portion of Area L. They are covered by one large steel canopy and were constructed in 1986. Pads 36 and 58 are adjacent to each other and measure about 33 ft long by 31 ft wide with six-in.-high concrete curbs for secondary containment. Pad 35 is located slightly east of the other two pads, is approximately the same size and construction, and supported the barium sands treatment and storage waste management tanks. The pads store liquid and solid hazardous waste. Pad 36 stores mixed waste while waste characterization studies are performed within a temporary storage structure placed on the pad. Pad 58 also stores mixed waste.
- TA-54-39, built in 1987, includes an outside storage area on the southeast side of Area L. Pending the renewal of the LANL Hazardous Waste Facility Permit, this unit will store hazardous waste. The area contains a 58-ft-long by 16–ft-wide section surrounded by a six-in.-high concrete curb for secondary containment of liquid hazardous waste. There is also an 83–ft-long by 23–ft-wide storage section for containers of solid type hazardous waste. A steel canopy covers both areas.

3.3.2 54 West

- The Loading Dock CSU at TA-54 West is located on the north-east side of Building 38. The CSU is 39 ft long and 16 ft wide and is covered with a steel awning. Building 38 was built in 1993. The CSU stores containers of solid and liquid type mixed waste.

3.4 Estimate of Maximum Waste in Storage

Tables 1, 2, and 3 of this closure plan present the estimated volumes for the maximum waste inventory present in the unit at any one time, and the major waste categories for each of the TA-54 CSUs. The estimate of the total maximum inventory of hazardous and mixed waste stored in Area L, Area G, and TA-54 West are provided in Attachment F of the "Los Alamos National Laboratory Technical Area 54 Part B Permit Renewal Application," Revision 3.0 (LANL, 2003b).

3.5 Description of Waste Managed

The TA-54 CSUs are used to store containers of solid and liquid hazardous and mixed waste. The waste is generated during research and development activities, processing and recovery operations, decontamination and decommissioning projects, and environmental remediation/restoration activities conducted at various TAs throughout LANL. The waste types include corrosive liquids, sludge, debris, equipment, and chemical waste containing metals and volatile and semi-volatile organic hazardous constituents. Specific hazardous waste constituents that are managed are described by U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers. These are captured by past Part A permit applications, most recently in Section XIV, "Technical Area 54, Area L," "Technical Area 54, Area G," and "Technical Area 54 West" of the "Los Alamos National Laboratory General Part A Permit Application," Revision 5.0 (LANL, 2006). A detailed and comprehensive description of the waste streams managed is presented in the "Waste Analysis Plan" in Appendix B of the "Los Alamos National Laboratory General Part B Permit Renewal Application," Revision 2.0 (LANL, 2003b). Prior to closure activities, the waste management history of the individual CSUs will be reviewed to determine the specific waste constituents that apply for each unit.

4 CLOSURE SCHEDULE

The TA-54 CSUs will close on a schedule that reflects the needs of the LANL Compliance Order on Consent (Consent Order) signed by the DOE, the University of California, and the NMED on March 1, 2005. The Consent Order requires completion of remediation at Area L and Area G by 2015. Many of the RCRA operating waste management units described in this closure plan need to be closed prior to or during the remediation activities necessary to meet that deadline. The partial closure of these units is currently anticipated for approximately 2012. The estimated closure date for the CSUs located at TA-54 West is 2020. Final closure activity for the entire LANL facility is estimated not to occur before the year 2100.

Written notification will be provided to the NMED 45 days before the start of closure activities for each of the TA-54 CSUs. However, pursuant to 20.4.1.500 NMAC, §264.112(e) [10-1-03], removing hazardous waste and decontaminating or dismantling equipment in accordance with an approved closure plan may be conducted at any time before or after notification of closure. Closure activities will begin in accordance with 20.4.1.500 NMAC, §264.112(d)(2) [10-1-03]. Treatment, removal, or disposal of hazardous waste will begin in accordance with the approved closure plan, as required by 20.4.1.500 NMAC, §264.113(a) [10-1-03], within 90 days after final receipt of waste at each of the TA-54 CSUs. This timeframe will be met if facilities are available for storage, treatment, or disposal of these waste types. In the event that closure activities cannot begin within 90 days, LANL will notify the Secretary of the NMED in accordance with the extension requirements in 20.4.1.500 NMAC, §264.113(a) [10-1-03]. Closure activities and reporting requirements will be completed within 180 days of receipt of the final volume of waste at each of the CSUs. Closure will be conducted in accordance with the schedules presented in Tables A-2, B-2, and C-2 in Attachments A through C of this closure plan.

In the event that closure of the TA-54 CSUs cannot proceed according to schedule, LANL will notify the Secretary of the NMED in accordance with 20.4.1.500 NMAC, §264.113(b) [10-1-03]. In addition, the demonstrations in 20.4.1.500 NMAC, §264.113(a)(1) and (b)(1) [10-1-03], will be made in accordance with 20.4.1.500 NMAC, §264.113(c) [10-1-03].

5 GENERAL CLOSURE PROCEDURES

Closure activities at the TA-54 CSUs will involve treatment or removal of hazardous and mixed wastes; proper management and disposition of hazardous waste residues, contaminated equipment, and contaminated structures associated with the CSUs and subsequent appropriate disposition; and verification that the closure performance standards have been achieved. The following sections describe general closure procedures applicable to the TA-54 CSUs closure activities.

5.1 Security

Because of the ongoing nature of operations at TA-54, site security at the TA-54 CSUs will be maintained by the DOE for as long as necessary to prohibit public access. The security fence at TA-54 will be maintained to prevent public access. Further information regarding security provisions at TA-54 is available in Section G.1.2, “Security and Access Control,” in the “Los Alamos National Laboratory Technical Area 54 Part B Permit Renewal Application, “ Revision 3.0 (LANL, 2003b).

5.2 Removal of Waste

Prior to initiation of closure activities, all containerized wastes will be removed from the CSU scheduled for closure. Containers may be removed from each location with forklifts. Small containers may be handled manually or with dollies. Containers will be placed on flatbed trucks, trailers, or other appropriate vehicles for transport. Appropriate shipping papers will accompany the wastes during transport. Containers holding hazardous or mixed wastes will be moved to an approved on-site CSU or a permitted off-site treatment, storage, or disposal facility.

At closure, all remaining hazardous/mixed waste and hazardous waste residues will be removed from the TA-54 CSUs. Unit structures, liners, bases, and equipment contaminated with hazardous/mixed waste or hazardous waste residues will be decontaminated or removed/dispositioned. All waste material will be controlled, handled, characterized, and dispositioned in accordance with LANL waste management procedures. Tables A-3, B-3, and C-3 of Attachments A through C of this closure plan provide a list of the potential waste materials that may be generated during closure, possible waste type(s), and disposal options.

5.3 Preliminary Closure Procedures

5.3.1 Safety Precautions

In accordance with LANL safety procedures, job hazards associated with closure activities will be identified, controls developed, and workers briefed before closure activities are conducted. Personnel involved in closure activities will wear appropriate personal protective equipment (PPE) specified by LANL industrial hygiene and health physics procedures and will follow good hygiene practices to protect themselves from exposure to hazardous and/or mixed waste. The level of PPE required will depend upon the physical hazards present and the levels of radiological and/or chemical contamination detected, if any. Contaminated PPE will be decontaminated or managed in accordance with appropriate waste management regulations.

All workers involved in closure activities will be required to have appropriate training as required by site-specific work procedures. Workers who will manage hazardous/mixed waste or hazardous waste constituents during closure activities will follow the training requirements in the LANL RCRA Training Plan in the LANL Hazardous Waste Facility Permit.

5.3.2 Pre-Closure and Structural Assessment

Before starting closure decontamination and sampling activities, the operating and inspection records for the CSU will be reviewed to determine any previous finding(s) or action(s) that may influence closure activities or potential sampling locations. Goals of this review will be to determine the specific hazardous waste constituents of concern; determine potential sampling locations for the CSU by identifying any spills

or chronic conditions in the operating record that would indicate the type and location of released constituents; and differentiate equipment or other materials that will undergo decontamination from those to be recycled or reused, or managed as waste. Disposition options for equipment and surface materials at the CSUs, locations for potential soil sampling, and locations and types of decontamination verification sampling (if determined to be necessary) will be identified during this assessment. In addition, background samples or data derived from studies developed under the LANL corrective action program or other programs will be reviewed to determine levels or concentration thresholds applicable for the purposes of closure.

CSU inspections are conducted at the TA-54 CSUs while waste is in storage in accordance with the LANL Hazardous Waste Facility Permit. If any defects, deterioration, damage, or hazards affecting containment developed, appropriate remedial actions (including sampling, repairs, maintenance, or replacement) are completed and noted in the inspection record. This information will be reviewed to determine whether these activities have resulted in conditions affecting the closure or determination of sampling needs.

Prior to beginning any decontamination activities at the TA-54 CSUs, the base or secondary containment will be inspected for any existing cracks or conditions that indicate a potential for release of contaminants. If a crack, gap, or stained area is present, the operating record will be reviewed to determine the possible presence or release of contamination and the condition will be noted as a factor in determining the need for sampling the defect or the underlying substrate. Such findings will be documented with photographs and noted on scaled site drawings of the unit. If contamination is present above baseline/background levels, the surface flaw will be decontaminated to meet, as necessary, the applicable requirements for disposition (e.g., leaving in place, reuse, or disposal). Material may be partially or completely removed until contamination is no longer detected or it is established that contamination present is not due to storage activities at the TA-54 CSUs.

5.4 General Decontamination Procedures

To the extent necessary, all contaminated equipment present at closure, unit surfaces, and structures will be decontaminated. Discarded materials and equipment that cannot or will not be decontaminated will be managed as waste or otherwise dispositioned in compliance with applicable regulations. Decontamination procedures specific for the different types of CSUs at TA-54 are further described in Attachments A through C of this closure plan.

If decontamination is necessary, all sampling during closure and decontamination will be conducted in accordance with quality assurance (QA)/quality control (QC) procedures defined by the latest revision of

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846) (EPA, 1986). Monitoring for contamination will occur throughout closure activities, as appropriate.

5.4.1 Equipment Located at the TA-54 CSUs

Equipment will be washed down with a solution of Alconox®, or similar non-phosphate detergent, in water. Portable berms, protective liners, secondary containment pallets, or other provisions will be used to collect excess wash water and provide containment during the decontamination procedure. To minimize the quantity of wash solution used, it will be dispensed from buckets, spray bottles, or other types of containers. Cloth wipes, sponges, or other absorbent materials will be used to wipe down the equipment after being wetted in the wash solution or after spraying solution onto the equipment. If necessary, portable berms or other devices (e.g., absorbent socks, plastic sheeting, wading pools, or existing secondary containment) designed to collect and provide containment will collect excess wash water and provide containment during the decontamination process. The used wash water will be transferred to a container and sampled to determine the appropriate disposal path. Sampling procedures for the clean and/or used wash water solution will be performed in accordance with the most recent and appropriate LANL sampling plan incorporating SW-846 or other approved methods.

5.4.2 Floors and Walls Decontamination

Decontamination of the floors and walls of the TA-55 CSUs will consist of washing with a solution of an Alconox®, or equivalent cleaner, and water. Mops, cloths, or other absorbent cleaning devices will be used to wipe down the surfaces after being wetted in the wash solution or after spraying solution onto the surfaces. To minimize the amount of liquid waste generated as a result of decontamination activities, the wash solution will be dispersed from buckets, spray bottles, or other types of small containers. Portable berms or other devices, if necessary, will be used to collect excess wash water and provide containment during the decontamination procedure. Sumps may also be used to collect used wash water in those units that have them. After decontamination of the surfaces, the containment system will be wiped down and any excess wash water will be transferred to containers for characterization and disposition.

When decontamination of the CSU is complete, verification will be conducted as described in Section 5.5. If sampling and analyses indicate that hazardous constituents are present above acceptable levels, as described in Section 5.5, the wash cycles and verification analyses will continue until the surfaces, structures, or equipment have been decontaminated or the decision is made to proceed with an alternative demonstration of closure, as described in Section 5.6. Upon determination that a surface or structure is waste, it may be removed, transported, and stored at other hazardous waste storage units to facilitate the closure process.

5.4.3 Decontamination Waste Management

After any decontamination wash down process needed for the closing unit, used wash water will be collected, transferred to containers, sampled, and analyzed for the hazardous constituents likely to be present. Results of this analysis will determine if the used wash water should be managed as hazardous or non-hazardous wastewater. The wastewater, PPE, and any other waste generated as a result of closure will be managed as indicated in Tables A-3, B-3, and C-3 of Attachments A through C.

The dome fabric membrane and aluminum support structures will be assessed for reuse, recycling, or waste disposition. In the event the material cannot be reused or recycled, it will be characterized for waste disposition using LANL waste characterization procedures. Depending on the waste characterization results, this waste will be disposed of on-site as potentially radioactively contaminated or sent off site to an authorized hazardous waste facility for disposal or treatment as hazardous or mixed waste.

The waste asphalt or concrete removed from the pads will be characterized using LANL waste characterization procedures. Information derived from the facility operating record and the pre-closure and structural assessment will be used to determine whether any factors such as spills or stabilized hazardous waste residues may exist that would indicate the asphalt is hazardous or to determine the boundaries to be used to segregate contaminated asphalt areas on removal. Waste sampling and analysis according to the Waste Analysis Plan in the LANL RCRA Hazardous Waste Facility Permit will be used for characterization in the absence of facility records.

Portions of the removed asphalt or concrete that are found to be contaminated with hazardous constituents derived from the stored or treated waste at the CSU will be characterized and managed as waste in compliance with LANL procedures and applicable regulations. Clean removed asphalt may be re-cycled or re-used within the facility as construction fill or as product material for new asphalt.

5.4.4 Equipment Used During Closure

Reusable protective clothing, tools, and equipment used during decontamination activities will be cleaned with a wash water solution. Residue, disposable equipment, and reusable equipment that cannot be decontaminated will be containerized and managed as waste in accordance with LANL waste management procedures, depending on the regulated constituents present.

5.5 Verification of Decontamination

LANL proposes analysis of water and/or wipe samples for equipment decontamination verification at the TA-54 CSUs. Wipe samples may be used where the surfaces of the equipment, the analytical constituents, and any analytical constraints are appropriate. In cases where wipe sampling is not

appropriate or feasible, verification will be confirmed by sampling and analyzing the collected verification solutions. Decontamination verification will use the following methods:

- When liquid sampling, the verification solution will be limited to an amount that is sufficient to wipe down the surface to be verified and collect the required number of samples. This will minimize dilution of hazardous constituents present at the location.
- For wipe sampling, guidance from the analytical laboratory must be obtained prior to wipe verification sampling to confirm that the solution chosen for each analysis is appropriate for the analysis to be conducted.
- Decontamination will be verified by comparing the discrete analytical results for liquid sampling to a baseline result (blank) obtained from the verification solution prior to its use for the verification wipe down. Comparison of wipe sample analytical results to an unused wipe media sample (blank) will be used to determine the presence or absence of contamination.
- If the result is at or below that of the blank, decontamination is verified for the discrete area sampled.
- If the result is above the blank, decontamination and verification will be repeated for the discrete location in accordance with Section 5.4 of this closure plan; closure will be verified as described below; or the decision will be made to proceed with an alternative demonstration of closure, as described in Section 5.6.

These proposed methods minimize dilution and establish criteria by which successful decontamination is verified. Analytical procedures will conform to the methods found in Section 7.

If analysis of the decontamination verification water or wipes indicates that hazardous constituents are present and the verification criteria described below cannot be met, decontamination and sampling will continue until the equipment has been decontaminated; the decision is made to proceed with an alternative demonstration of decontamination, as described in Section 5.6; or the decision is made to manage the equipment as contaminated waste.

5.5.1 Verification Criteria

Successful decontamination of the TA-54 CSUs will meet a minimum of one of the following criteria:

- No detectable RCRA-regulated constituent residues from the management of stored authorized RCRA-regulated waste are identified in samples collected during closure activities.

- Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline/background data.

- Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health and the environment, based on the results of risk assessment methods.

- Detectable concentrations of RCRA-regulated constituents that cannot be removed or decontaminated to acceptable levels, as described above, will be allowed to remain, provided that these RCRA-regulated constituents do not pose an unacceptable risk when combined with technical or administrative control measures agreed upon with the NMED.

Further discussion of specific verification criteria for the closure of different types of units at TA-54 is contained in Attachments A through C of this closure plan. In the event that the above verification criteria cannot be met, an alternative demonstration of decontamination may be proposed and justified to NMED at the time of unit closure. The Secretary may review the proposed alternative in accordance with the standards and guidance then in effect. If approved, any changes in the verification criteria implemented will be reported as a variance in the closure certification report described in Section 10 of this closure plan.

5.6 Alternative Closure Requirements under Corrective Action

The TA-54 CSUs are interspersed with other waste management and disposal units subject to the LANL Consent Order of March 1, 2005. In the event that residual hazardous waste constituents remain at the TA-54 CSUs after the procedures discussed above, LANL may petition NMED to combine these units' closure requirements with the corrective action activities contained in the Consent Order pursuant to and including the conditions of 20.4.1.500 NMAC, §264.110(c) [10-1-03].

6 SAMPLE MANAGEMENT PROCEDURES

The following information presents general sample management and sampling equipment cleaning procedures shared in common for closure of the waste management units described in this closure plan. Unit-specific sampling strategies to be used to demonstrate decontamination and provide waste determinations for the different types of waste generated during closure are included in Attachments A through C of this closure plan.

Samples will be collected and transported using documented chain-of-custody and sample management procedures to ensure the integrity of the sample and provide an accurate and defensible written record of the possession and handling of a sample from the time of collection through laboratory analysis. Sample collection equipment will include coolers, EPA-certified clean containers, preservatives, labels, chain-of-custody forms, and custody seals. The following provides a description of sample documentation; sample handling, preservation, and storage; and sample packaging and transportation requirements that will be followed during the sampling activities associated with the closure.

6.1 Sample Documentation

Sampling personnel will complete and maintain records to document sampling and analysis activities. Sample documentation will include sample identification numbers, chain-of-custody forms, analyses requested, sample logbooks detailing sample collection activities, and shipping forms (if necessary).

6.1.1 Chain-of-Custody

Chain-of-custody forms will be maintained by sampling personnel until the samples are relinquished to the analytical laboratory. One chain-of-custody form may be used to document all of the samples collected from a single sampling event. The sample collector will be responsible for the integrity of the samples collected until properly transferred to another person.

The EPA considers a sample to be in a person's custody if it is:

- In a person's physical possession,
- In view of the person in possession, or
- Secured by that person in a restricted access area to prevent tampering.

The sample collector will document all pertinent sample collection data. Individuals relinquishing or receiving custody of the samples will sign, date, and note the time on the analysis request/chain-of-custody form. A chain-of-custody form must accompany all samples from collection through laboratory analysis. The completed original chain-of-custody form will be returned by the analytical laboratory and will become a part of the permanent record documenting the sampling effort.

6.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- A unique sample identification number;
- Name of the sample collector;

- Date and time of collection;
- Type of preservatives used, if any; and
- Location from which the sample was collected.

A custody seal will be placed on each sample container to detect unauthorized tampering with the samples. These labels must be initialed, dated, and affixed by the sample collector in such a manner that the seal must be broken to open the container.

6.1.3 Sample Logbook

All pertinent information on the sampling effort must be recorded in a bound logbook. Information must be recorded in ink and any cross-outs must be made with a single line and the change initialed and dated by the author. The sample logbook will include the following information:

- The sample location,
- Suspected composition,
- Sample identification number,
- Volume/mass of sample taken,
- Purpose of sampling,
- Description of sample point and sampling methodology,
- Date and time of collection,
- Name of the sample collector,
- Sample destination and how it will be transported,
- Observations, and
- Signatures of personnel responsible for the observations.

6.2 Sample Handling, Preservation, and Storage

Samples will be collected and containerized in appropriate pre-cleaned sample containers. Table 4 presents the requirements specified in SW-846 (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE Orders, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate LANL documents establish these requirements for packaging design, testing, acquisition, acceptance, use, maintenance,

and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, waste, and defense program materials.

Off-site transportation of samples will occur via private, contract, or common motor carrier; air carrier; or freight. All off-site transportation will be processed through the LANL Packaging and Transportation (P&T) Organization, unless the shipper is specifically authorized through formal documentation by the P&T Organization to independently tender shipments to common motor or air carriers.

6.4 Sample Collection Procedures

Samples will be collected in accordance with the most recent and appropriate LANL sampling plan incorporating guidance from the EPA (EPA, 2002) and DOE (DOE, 1995), or other approved procedures.

6.4.1 Liquid Sampling

For verification sampling, each discrete sample location will be wiped down with clean water. A mop, cloth, and/or other absorbent material will be submerged into the container and squeezed out prior to wiping down the discrete surface to be verified. Excess solution will collect in a bermed area if necessary. To minimize dilution of the samples, the wipe down solution will be limited to a quantity sufficient to collect the appropriate number of samples. Liquid sampling will be conducted using glass or plastic tubes, a composite liquid waste sampler, a bacon bomb, a bailer, or by pouring liquid into sample containers.

6.4.2 Solids (Wipe) Sampling

In some cases, equipment may need to be decontaminated prior to removal from the CSU and is not amenable to liquid wash down due to its size or composition. This equipment may include items such as monitoring equipment or the aluminum beams and supports making up the structure of the domes. In such cases, surface wipe samples may be used to determine whether hazardous waste constituents are present. The use of radioactive swipe samples as surrogates may also be employed for the closure of CSUs where the operating records indicate only mixed waste containers were stored.

Surface wipe samples will be taken in accordance with the National Institute of Occupational Safety and Health (NIOSH) *Manual of Analytical Methods*, Method 9100 (NIIOSH, 1994), or other approved methodology. The appropriate use of wipe sample methods will consider the type of surface being sampled, the type of contaminant, the solution used, and the desired contaminant concentration detection limits. The NIOSH method includes wiping a 100 square centimeter area at each discrete location with a gauze wipe wetted with a liquid solution appropriate for the desired analysis (e.g., deionized water for lead). The solution used depends on the analysis; therefore, the analytical laboratory will be consulted prior to sampling activities to ensure that the correct solution is employed for each analysis and that wipe sampling is a proper technique for the specific analysis.

6.4.3 Soil Sampling

Surface or shallow subsurface soil samples will be collected using stainless steel scoops or hand augers. Samples for VOC analysis will be collected using disposable En Core® samplers or equivalent. Surface soil samples will be collected at each sample location in accordance with the most recent and appropriate LANL sampling plan, incorporating SW-846 or other approved methods.

6.4.4 Cleaning of Sampling Equipment

Reusable sampling equipment will be cleaned and rinsed prior to use. Sampling equipment rinsate blanks will be collected and analyzed only if reusable sampling equipment is used. Reusable decontamination equipment, including protective clothing and tools, used during closure activities will be scraped as necessary to remove residue and cleaned with a wash water solution. Sampling equipment will be cleaned prior to each use with a wash solution, rinsed several times with tap water, and air-dried or wiped dry to prevent cross contamination of samples. A disposable sampler is considered clean if still in a factory-sealed wrapper. Residue, disposable decontamination equipment, and reusable decontamination equipment that cannot be decontaminated will be containerized and managed appropriately at an approved on-site facility.

7 ANALYSIS REQUIREMENTS

The following information presents general analysis procedures shared in common for closure of the waste management units described in this closure plan. Specific analytical requirements to be used to demonstrate decontamination, if necessary, are included in Attachments A through C of this closure plan.

7.1 Analytical Laboratory Requirements

The analytical laboratory will perform the detailed qualitative and quantitative chemical analyses specified in Attachments A through C of this closure plan. The qualifications for the analytical laboratory will include:

- A documented comprehensive QA and QC program,
- Technical analytical expertise,
- A document control/records management plan, and
- The capability to perform data reduction, validation, and reporting.

The selection of the analytical testing methods identified in Attachments A through C was based on the following considerations:

- The physical form of the waste,
- Constituents of interest,

- Required detection limits (e.g., regulatory thresholds), and
- Information requirements (e.g., waste classification).

7.2 Quality Assurance/Quality Control

Field sampling procedures and laboratory analyses will be evaluated through the use of QA/QC samples to assess the overall quality of the data produced. QC samples used to evaluate precision, accuracy, and potential sample contamination associated with the sampling/analysis process are described in the following sections, along with information on calculations necessary to evaluate the QC results. . These QA/QC samples will be collected in accordance with the most recent and appropriate LANL sampling plan incorporating guidance from the EPA (EPA, 2002) and DOE (DOE, 1995), or other approved procedures. Analysis will be conducted in accordance with procedures given in SW-846 (EPA, 1986), or other approved procedures or methods.

7.2.1 Field Quality Control

The field QC samples that may be collected include trip blanks, field blanks, field duplicates, and equipment rinsate blanks. Table 5 summarizes QC sample types, applicable analyses, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample.

7.2.2 Analytical Laboratory QC Samples

QA/QC considerations are an integral part of analytical laboratory operations. Laboratory QA ensures that analytical methods generate data that are technically sound, statistically valid, and that can be documented. Individual QC procedures measure the degree to which these QA objectives are met.

7.3 Data Reduction, Verification, Validation, and Reporting

Analytical data generated by the activities described in this closure plan will be verified and validated. Data reduction involves the conversion of raw data to reportable units; transfer of data between recording media; and computation of summary statistics, standard errors, confidence intervals, and statistical tests.

7.4 Data Reporting Requirements

Analytical results will include all pertinent information about the condition and appearance of the sample-as-received. Analytical reports will include:

- A summary of analytical results for each sample;
- Results from QC samples such as blanks, spikes, and calibrations;
- Reference to standard methods or a detailed description of analytical procedures; and
- Raw data printouts for comparison with summaries.

The laboratory will describe off-normal sample preparations that occur during the analysis in sufficient detail so that the data user can understand how the sample was analyzed.

8 AMENDMENT OF THE CLOSURE PLAN

In accordance with 20.4.1.500 NMAC, §264.112(c) [10-1-03], LANL will submit a written change in the approved closure plan whenever:

- There are changes in operating plans or facility design that affect the closure plan, or
- There is a change in the expected date of closure, or
- Unexpected events occur during closure that require modification of the approved closure plan.

LANL will submit a written request for a permit modification with a copy of the amended closure plan at least 60 days prior to the proposed change in unit design or operation or no later than 60 days after an occurrence of an unexpected event that affects the closure plan. If the unexpected event occurs during closure, the permit modification will be requested within 30 days of the occurrence. The Secretary of the NMED may request a modification of the closure plan under the conditions presented in the bulleted items above. LANL will submit the modified plan in accordance with the request within 60 days of notification, or within 30 days of notification if a change in facility condition occurs during the closure process.

9 CLOSURE COST ESTIMATE, FINANCIAL ASSURANCE, AND LIABILITY REQUIREMENTS

In accordance with 20.4.1.500 NMAC, §264.140(c) [10-1-03], LANL, as a federal facility, is exempt from the requirements of 20.4.1.500 NMAC, Part 264, Subpart H [10-1-03], to provide a cost estimate, financial assurance mechanisms, and liability insurance for closure actions.

10 CLOSURE CERTIFICATION REPORT

Upon completion of the closure activities at any of the TA-54 CSUs, a closure certification report will be prepared and submitted to the Secretary of the NMED. The report will document the closure and contain the following:

- A copy of the certification described in Section 2.2 of this closure plan.
- Any significant variance from the approved activities and the reason for the variance.
- A summary of all sampling results, showing:
  - -Sample identification
  - -Sampling location
  - -Datum reported
  - -Detection limit for each datum

-A measure of analytical precision (e.g., uncertainty, range, variance)

-Identification of analytical procedure

-Identification of analytical laboratory.

- A QA/QC statement on analytical data validation and decontamination verification.
- The location of the file of supporting documentation, including:

  -Field logbooks

  -Laboratory sample analysis reports

  -QA/QC documentation

  -Chain-of-custody forms.
- Storage or disposal location of regulated hazardous/mixed waste resulting from closure activities.
- A certification of accuracy of the report.

11 NEW MEXICO ENVIRONMENT DEPARTMENT CLOSURE ASSESSMENT

LANL will notify the NMED Hazardous Waste Bureau (HWB) prior to the pre-closure and structural assessment of the waste management unit, described in Section 5.3.2, to provide an opportunity to participate in the unit's physical condition review. LANL may also arrange for other on-site reviews of closure activities at reasonable times upon request by NMED representatives. Upon submittal of the closure certification report described in Section 10 of this closure plan, LANL will arrange an on-site closure review with representatives of the HWB or equivalent NMED representatives to assess the completion of the closure activities for each CSU.

12 REFERENCES

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Table 1

Technical Area 54 Asphalt Pads Container Storage Units, Capacities, and Waste Categories

Structure	Estimated Maximum Waste in Storage (gallons)	Maximum Storage in 55-gallon Drum Equivalents	Waste Category with Most Commonly Managed EPA Hazardous Waste Numbers
Area L			
TA-54-215	261, 360	4,752	Mixed waste-solid and liquids – solvents, aqueous solutions, debris D001, D006, D007, D008, D009, F002, F003, F005
TA-54-216 Canopy	36, 960	672	Mixed and hazardous waste gas cylinders D001, D002, D003, P056
Area L within fence line	15,840	288	Hazardous and mixed waste- solids D001, D003, F002
Area G			
TA-54-226, Pad 1	411,840	7,488	Mixed waste- solids D007, D008, F001, F002
TA-54-48, Pad 3	213,840	3,888	Mixed waste- solids and liquids D007, D008, F001, F002, F005
TA-54-49, Pad 5	520,080	9,456	Mixed waste- solids and liquids D006, D007, D008, F001, F002, F005
TA-54-224, Pad 5	95,040	1,728	Mixed waste – solids and liquids D008, F001, F002
TA-54-153, Pad 6	316,140	5,748	Mixed waste – solids and liquids D008, F001, F002
TA-54-283, Pad 6	281,160	5,112	Mixed waste – solids and liquids D006, D007, D008, F001
TA-54-229, Pad 9	330,000	6000	Mixed waste - solids D007, D008, F001, F002
TA-54-230, Pad 9	330,000	6000	Mixed waste - solids and liquids D007, D008, F001, F002
TA-54-231, Pad 9	393,360	7,152	Mixed waste – solids D007, D008, F001, F002
TA-54-232, Pad 9	393,360	7,152	Mixed waste – solids D007, D008, D009, F001, F002, F003
TA-54, Pad 10	159, 770	2905	Mixed waste- solids and liquids D007, D008, F001, F002, F003
54 West			
Outside Storage Pad	7,920	144	Mixed waste- solids and liquids D005, D006, D007, D008, D009, F001, F002, F003, F005

TA = Technical Area

Table 2

Technical Area 54 Buildings Container Storage Units, Capacities, and Waste Categories

Structure	Estimated Maximum Waste in Storage (gallons)	Maximum Storage in 55-gallon Drum Equivalents	Waste Category with Most Commonly Managed EPA Hazardous Waste Numbers
Area L			
TA-54-31	1,320	24	Hazardous waste – liquid and solid D001, D002, D003, D005, F001, F002
TA-54-39, Room 101[a]	9900	180	Hazardous waste – liquid and solid
TA-54-68	1,760	32	Hazardous waste – liquid and solid D001, D002, D003, D005, D007, D008, D011
TA-54-69	1,760	32	Hazardous waste – liquid and solid D001, D003, D005, D006, D007, D008, D009, D010, D011, D022, F001, F002, F003, F005
TA-54-70	1,760	32	Non-RCRA regulated waste – liquid and solid
Area G			
TA-54-8	11,880	216	Mixed waste-solid and liquid D008, F001
TA-54-144	330	6	Mixed waste-solid and liquid F001, F003
TA-54-145	330	6	Mixed waste-solid and liquid F001, F003
TA-54-146	330	6	Mixed waste-solid and liquid F001, F003
TA-54-177	330	6	Mixed waste-solid and liquid F001, F003
TA-54-1027	1,760	32	Mixed waste-solid and liquid D001, D003, D009
TA-54-1028	1,760	32	Mixed waste-solid and liquid D001, D003, D009
TA-54-1029	1,760	32	Mixed waste-solid and liquid D001, D003, D009
TA-54-1041	1,760	32	Mixed waste-solid and liquid D001, D003, D009
TA-54-33	108,240	1968	Mixed Waste-solid and liquid D006, D007, D008, D009, F001, F002, F003
TA-54-412	91,080	1656	Mixed waste-solid and liquid D006, D007, D008, D009, F001, F003
54 West			
High Bay	2,200	40	Mixed waste-solid D005, D006, D007, D008, D009, F001, F002, F003, F005
Low Bay	880	16	Mixed waste-solid and liquid D005, D006, D007, D008, D009, F001, F002, F003, F005

[a] Pending renewal of the Los Alamos National Laboratory Resource Conservation and Recovery Act Hazardous Waste Facility Permit. TA = Technical Area

Table 3

Technical Area 54 Outside Structures Container Storage Units, Capacities, and Waste Categories

Structure	Estimated Maximum Waste in Storage (gallons)	Maximum Storage in 55-gallon Drum Equivalents	Waste Category with Most Commonly Managed EPA Hazardous Waste Numbers
Area L			
TA-54-32	17,160	312	Hazardous waste – liquid D001, D002, D007, D008, D011, F001, F002, F003, F005
TA-54-35	15,840	288	Hazardous waste – liquid and solid D005
TA-54-36	13,200	240	Hazardous and mixed waste – liquid and solid D001, D002, D007, D008, D011, F001, F002, F003, F005
TA-54-58	15,840	288	Hazardous and mixed waste – liquid and solid D001, D002, D007, D008, D011, F001, F002, F003, F005
TA-54-39, Outside[a]	15,180	276	Hazardous waste – liquid and solid
54 West			
Loading Dock	660	12	Mixed waste – solid D005, D006, D007, D008, D009, F001, F002, F003, F005

[a] Pending renewal of the Los Alamos National Laboratory Resource Conservation and Recovery Act Hazardous Waste Facility Permit.

TA = Technical Area

Table 4

Recommended Sample Containers[a], Preservation Techniques, and Holding Times[b]

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP Metals: Arsenic, Barium, Cadmium,Chromium, Lead, Selenium, Silver	Aqueous Media: 500-mL Wide-Mouth Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO_3 to pH <2 Cool to 4°C	180 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4°C	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide-Mouth Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO_3 to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4°C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40 mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass jar with Teflon-Lined Septa or Two 40 mL Amber Glass Vials with Teflon-Lined Septa	Solid Media: Cool to 4°C Add 5 mLs Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	
Semi-Volatile Organic Compounds			
Target Compound Semi-volatile Organic Compounds	Aqueous Media: Four 1-L Amber Glass with Teflon-Lined Lid	Aqueous Media: Cool to 4 °C	Seven days from field collection to preparative extraction. 40 days from preparative extraction to determinative analysis.
	Solid Media: 250-mL Glass	Solid Media: Cool to 4°C	

[a] Smaller sample containers may be required due to health and safety concerns associated with potential radiation exposure, transportation requirements, and waste management considerations.

[b] Information obtained from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, U.S. Environmental Protection Agency, 1986 and all approved updates.

°C = degrees Celsius
HNO_3 = nitric acid
HCl = hydrochloric acid
L = Liter
mL = milliter
TCLP = Toxicity Characteristic Leaching Procedure

Table 5

Recommended Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis[a]	Frequency	Acceptance Criteria
Trip Blank	VOC	One set per shipping cooler containing samples to be analyzed for VOCs	Not Applicable
Field Blank	VOC/SVOC, metals,	One sample daily per analysis	Not Applicable
Field Duplicate	Chemical	One for each sampling sequence	Relative percent difference less than or equal to 20 percent
Equipment Rinsate Blank[b]	VOC/SVOC, metals,	One sample daily	Not Applicable

[a] For VOC and SVOC analysis, if blank shows detectable levels of any common laboratory contaminant (e.g., methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.
[b] Collected only if reusable sampling equipment used.
QC = quality control
VOC = volatile organic compound
SVOC = semi-volatile organic compound

ATTACHMENT A

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES FOR CLOSURE OF THE TECHNICAL AREA 54 ASPHALT PADS CONTAINER STORAGE UNITS

TABLE OF CONTENTS

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LIST OF ACRONYMS AND ABBREVIATIONS

CSU	container storage unit(s)
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
LANL	Los Alamos National Laboratory
SW-846	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods
SWMU	solid waste management unit
TA	Technical Area

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES FOR CLOSURE OF THE TECHNICAL AREA 54 ASPHALT PADS CONTAINER STORAGE UNITS

A.1 INTRODUCTION

This attachment describes specific decontamination, sampling strategies, and analytical requirements applicable to closure of the Los Alamos National Laboratory (LANL) Technical Area (TA) 54 Asphalt Pads Container Storage Units (TA-54 Pads CSUs). General closure procedures for the TA-54 Pads CSUs are presented in the closure plan. The general procedures include discussion of removal and appropriate disposition of the waste inventory in a unit prior to the beginning of closure, and a pre-closure and structural assessment of a unit, as described in Section 5.3.2 of the closure plan, for conditions that may adversely affect decontamination and verification sampling activities.

Closure activities at the TA-54 Pads CSUs will involve decontamination and/or removal of the equipment in the units, the storage dome structures on the pads, the asphalt and other materials making up the pads, and underlying soil potentially contaminated by the hazardous/mixed wastes managed during the operating life of the units. Sampling and analysis will be performed to determine the proper management of the materials associated with the closure and to verify that the decontamination activities were successful.

Decontamination will be conducted as described in Section 5.4 of the closure plan and in Section A.2 herein. Sampling will be conducted in accordance with the most recent LANL sampling and analysis plan incorporating guidance from the U.S. Environmental Protection Agency (EPA) (EPA, 2002) and the U.S. Department of Energy (DOE) (DOE, 1995). Section A.3 in this attachment and Section 6 of the closure plan describe sampling activities and sample collection procedures, respectively. Analysis will be conducted in accordance with procedures given in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods” (SW-846) (EPA, 1986), or other approved procedures or methods. Analytical requirements are provided in Section A.4 herein and in Section 7 of the closure plan. All waste generated will be managed in accordance with applicable regulatory requirements. All wastes will be removed from each unit as specified in Section 5.2 of the closure plan.

Closure of the TA-54 Asphalt Pads CSUs will be conducted in accordance with the schedule presented in Table A-1. In the event that the closure of the CSUs cannot proceed according to schedule, LANL will request an extension as discussed in Section 4 of the closure plan.

A.2 SPECIFIC DECONTAMINATION PROCEDURES

To the extent necessary, all contaminated equipment present at closure, unit surfaces, and structures will be decontaminated. Sampling and analysis will be performed to verify that decontaminated equipment, surfaces, and structures meet the verification criteria specified in Section 5.5 of the closure plan. Discarded materials and equipment that cannot or will not be decontaminated will be managed as waste in compliance with applicable regulations.

A.2.1 Equipment Decontamination

The need for decontamination of equipment present in the CSUs will be reviewed and documented during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan. The equipment may include items such as secondary containment pallets and miscellaneous waste management equipment (e.g., drum dollies). Equipment present in the TA-54 Pads CSUs will be determined to be clean or will be decontaminated before removal from the unit. Decontamination activities will be conducted on equipment that cannot be certified as clean until verification sampling determines that decontamination is successful, or a decision is made to remove and manage the equipment as contaminated waste in compliance with applicable regulations.

In many cases, mixed waste has been stored in the TA-54 Pads CSUs and any detected radioactivity above background levels for this waste will serve as an indicator for potential contamination by hazardous constituents. Any portable equipment in the mixed waste CSUs will be swiped or monitored using radioassay procedures or equipment to determine the presence of radioactive contaminants before the equipment is removed. Depending upon the results of this assay, the final use or disposition of the equipment will be determined based upon the appropriate regulations or DOE policies. If radioactive contamination is determined to be below background or action limits, the equipment will be deemed to be clean and will be removed. Above background results for radioactivity will indicate the need for decontamination.

In other cases, the potential for contamination by hazardous waste or hazardous constituents will be determined based upon review of the operating record for the CSU. In the event that equipment is known to be contaminated and must be decontaminated for disposition, decontamination will be accomplished using wash water decontamination techniques in accordance with the general procedures described in Section 5.4.1 of the closure plan. No decontamination will be performed in areas of the unit where cracking or any other condition that affects secondary containment has been observed or indicated during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan. Contact of the decontamination solution with the asphalt surface of the pads will also be avoided to minimize the

potential for contamination of the wash water with organic constituents of the asphalt. The wash water will be sampled and analyzed to determine whether further decontamination activities are necessary.

A.2.2 Removal of the TA-54 Pads CSUs Materials

This phase of closure at the TA-54 Pads CSUs will consist of removing the components of the dome structures and the underlying asphalt pads. These materials will be assessed for potential recycling and/or characterized for subsequent disposition as waste.

The first step in making this assessment will be to review the closing unit's operating and inspection records to identify areas with a higher likelihood of waste contamination, as described in Section 5.3.2 of the closure plan. The review will include identification of the types of wastes managed at the unit (e.g., solid or liquid, and types of constituents); and any records of spills, run-on or run-off problems, radioactive material events, or maintenance procedures that had a potential to release hazardous and/or mixed waste or hazardous constituents. Inventory records will also be reviewed to determine the specific hazardous waste constituents to be sampled for closure verification analysis. The review will identify areas of the asphalt pads, either within or outside the dome secondary containment areas, where a release of hazardous waste or hazardous waste constituents beyond the boundary of the CSU is indicated.

The tensioned-fabric membranes on the dome structures may be weathered at closure to a degree that does not allow further use. This material will be characterized for waste deposition using LANL waste characterization procedures and the Waste Analysis Plan in the LANL Resource Conservation and Recovery Act Hazardous Waste Facility Permit. In some cases, however, this material will be reserved for reuse at other waste management structures without further characterization, assuming there is no record of hazardous waste spills or releases affecting the fabric.

The aluminum beams and ancillary equipment supporting the domes will also be assessed for reuse, recycle, or waste disposition. If decontamination and verification sampling is needed for these materials, the procedures described for equipment in Section A.2.1 of this attachment and Section 5.4.1 in the closure plan will be used.

Pursuant to guidance from the NMED Hazardous Waste Bureau, the asphalt pads underlying the TA-54 Pads CSUs do not represent materials that can be efficiently decontaminated using wash down techniques. Therefore, the plan for closure of these structures is to remove the asphalt and

other pad materials and to characterize them for reuse or waste disposal using LANL waste characterization procedures.

If any evidence of releases of hazardous constituents onto or through the asphalt pad is discovered during the pre-closure and structural assessment for the CSU (e.g., evidence of spills that have run into or through cracks in the pads and that were not completely decontaminated), decontamination activities may be used to clean the area before removal of the asphalt pad or additional protective procedures will be implemented during removal of the asphalt to preserve the site under the pad for sampling. Immediate decontamination will consist of removing layers of asphalt from the site of the release until sampling determines that the contamination has been removed to background levels. Removal techniques may include manual methods such as lifting and prying or mechanical methods such as grinding. The asphalt that has been removed will be segregated for further characterization and disposal as waste. Sampling of the removed asphalt material will be consistent with solids sampling methods in SW-846. If the asphalt near the release site demonstrates decontamination or if the fracture or release area does not extend to the underlying soil, the soil will be presumed to be uncontaminated and no further sampling at the site will be required.

If the fracture is determined to be contaminated through the asphalt, the asphalt will be removed down to the soil layer, or the entire asphalt pad will be removed before decontamination of the localized release site is achieved. Soil underlying the pad will be sampled to determine the presence or extent of contamination. In this case, the asphalt associated with a spill or crack will be removed separately and segregated. Removal of the asphalt in these areas will minimize disturbance of the soil layer beneath the pads and preserve the surface for any further soil sampling necessary to determine the extent of the release. Where possible, removal will be managed from the existing asphalt side of the workface or from the outside of the work area to avoid churning the underlying soil. In addition, loading of transport trucks with the removed asphalt will not take place on the exposed soil area. Use of dust suppression procedures at the potentially contaminated location will be assessed using LANL or DOE construction policies to restrict spreading of any hazardous waste constituents before sampling can be implemented.

A.3 SAMPLING ACTIVITIES

All general sample management, documentation, handling, preservation, storage, and packaging and transportation procedures for closure of the TA-54 Pads CSUs are described in the closure plan. The following specific information applies to the sampling strategy and approach for closure of the TA-54 Pads CSUs. To determine whether hazardous/mixed waste and hazardous waste

residues have been effectively removed, samples will be collected from discrete locations according to the methods and procedures provided in Section 6.4 of the closure plan, and analyzed for the appropriate hazardous constituents identified during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan. Samples will be analyzed by an independent laboratory using the methods outlined in Table A-2. Table A-2 will be modified, if necessary, at the time of notification of closure to incorporate changes based on the operating record review that will be conducted for each CSU.

Many of the materials and equipment removed from and used in the closure of the TA-54 Pads CSUs will be handled as solid and potentially hazardous wastes. These wastes will be characterized to meet applicable waste acceptance criteria using LANL waste characterization procedures and the Waste Analysis Plan in the LANL Hazardous Waste Facility Permit. The sample collection procedures described in Section 6.4 of the closure plan will be utilized in cases where materials or equipment are removed from the closure site and require decontamination before further use or to demonstrate that the structures are not contaminated.

A.3.1 Sampling Strategy/Approach

Verification sampling will be conducted to verify that decontamination efforts described in Section 5.4 of the closure plan and in Section A.2 in this attachment were effective at removing hazardous waste residues.

A.3.1.1 Solids Sampling Strategy

In some cases, equipment may need to be decontaminated prior to removal from the CSU and is not amenable to liquid wash down due to its size or composition. This equipment may include items such as monitoring equipment or the aluminum beams and supports making up the structure of the domes. In such cases, surface wipe samples collected using the procedure in Section 6.4.2 of the closure plan may be used to determine whether hazardous waste constituents are present. The use of radioactive swipe samples as surrogates may also be employed for the closure of CSUs where the operating records indicate only mixed waste containers were stored. The number of appropriate equipment wipe samples will be determined during the pre-closure and structural assessment for the unit.

A.3.1.2 Soil Sampling Strategy

Record reviews and visual inspection of the TA-54 Pads CSUs and soils along the margins of the asphalt pads will be conducted during the pre-closure and structural assessment to identify any areas where contamination of the soil under or near the pads from waste management activities

may have occurred. Such findings will be documented with photographs and noted on scaled site drawings of the unit. Soil sampling will be performed in any areas suspected of being contaminated by hazardous/mixed waste from the CSUs to aid in the removal of the contamination or to demonstrate that the contamination is removed. If no indications of releases are found, no soil sampling will be conducted.

A.3.1.3 Verification Sampling Strategy

Verification samples will be collected from each of the locations where decontamination activities described in Section A.2 were performed. Liquid or wipe sampling will be used for decontamination verification of surfaces, structures, and other equipment.

Decontamination verification sampling will only be performed for the soil underlying or near the TA-54 Pads CSUs if hazardous constituents may have escaped the unit during its operation. Sampling and analysis will be performed to establish that hazardous waste and hazardous waste residues are no longer present or to provide information regarding the degree to which remaining residues are present. Soil sampling methods will be selected to meet the analysis and detection limits required to demonstrate the removal or absence of hazardous waste residues associated with the wastes managed in the closing unit. Methods will also be selected to allow comparison of historical or background constituent concentrations to the selected hazardous constituents, if necessary.

The verification soil samples will be analyzed for the hazardous constituents identified as stored at the CSU by the operating record or may be limited to the known hazardous waste constituents released at that site if sufficient information documenting the release is available. Analyses will be done in accordance with SW-846 or other authorized methods as indicated in Table A-2.

The TA-54 Pads CSUs are located in close proximity to solid waste management units (SWMUs) that are subject to the LANL corrective action program. LANL seeks to utilize the same sampling and analysis procedures during closure of operating units as these SWMUs to ensure comparable site characterization data for TA-54. LANL anticipates seeking alternative closure requirements for operating units at TA-54 pursuant to 20.4.1.500 NMAC, §264.110(c) [10-1-03] if extensive residual contamination is associated with the asphalt pads. Therefore, the sampling strategies described below are consistent with those used in the LANL corrective action program.

Two types of soil sampling schemes will be used depending upon the nature of the hazardous waste constituent release. In the case of highly localized releases, such as those that would be associated with a discrete release source like a crack in the asphalt pad, sample locations will be

determined using a focused approach that takes into account the factors known for the release. These would include the amount of potential wastes spilled or released, the size and nature of the release point, the type of soil or rock underlying the release point, and any visual clues present. Sampling points will be determined to follow the path of potential contamination and to support an evaluation of the need for material removal.

If hazardous waste constituents have been released over a larger area such as a portion of the side of an asphalt pad, a random or biased random sampling program to determine the presence and extent of hazardous constituents may be appropriate. Such a release could require coordination of sampling activities with the LANL corrective action program if the conditions of 20.4.1.500 NMAC, §264.110(c) [10-1-03] are met. To facilitate this coordination, sampling locations will be determined by the most recently approved version of sampling design software used by the LANL Environmental Remediation program. Currently, the equations used to calculate the number of samples necessary to determine soil contamination use a Wilcoxon Signed-Ranks test. The equation is based upon the hypothesis that the average site value for the targeted hazardous constituents found in the sampling program is less than the agreed upon threshold background or risk-based concentration for the analyte. Input parameters include analytical errors for the target analyte, acceptable decision probabilities, and appropriate standard normal distribution values. Use of the appropriate formula will define the sampling grid, the total number of samples to be taken, and the locations for randomized samples.

A.4 ANALYTICAL REQUIREMENTS

All general analytical laboratory requirements, quality assurance/quality control, and data requirements procedures for closure of the TA-54 Pads CSUs are described in Section 7 of the closure plan.

Analytical methods to be used for decontamination verification during the TA-54 Pads CSUs closure activities are summarized in Table A-2. Each sample will be analyzed for the appropriate constituents identified in during the pre-closure and structural assessment. Analytes, test methods/instrumentation, target detection limits, and rationale for metals and organic analyses are also presented in Table A-2.

A.5 WASTE MANAGEMENT

Decontamination and sample collection activities will be conducted with waste minimization goals in mind. All waste material generated during closure will be controlled, handled, characterized, and disposed of in accordance with LANL waste management procedures. Table A-3 provides a list of the waste materials that could be generated during closure and possible disposal options.

A.6 REFERENCES

DOE, 1995. "DOE Methods for Evaluating Environmental and Waste Management Samples," DOE/EM-0089T, Rev. 2. Prepared for the U.S. Department of Energy by Pacific Northwest Laboratory, Richland, Washington.

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EPA, 2002. "RCRA Waste Sampling Draft Technical Guidance Planning, Implementation, and Assessment," EPA530-D-02-002, August 2002, Office of Solid Waste, U.S. Environmental Protection Agency, Washington, D.C.

Table A-1

Closure Schedule for the Asphalt Pads Container Storage Units at Technical Area 54

Activity	Maximum Time Required [a]
Submit amended closure plan, if necessary.	-90 Days
Notify the New Mexico Environment Department (NMED) of intent to close.	-45 Days
Final receipt of waste.	Day 0
Remove stored waste.	Day 5
Conduct pre-closure and structural assessment.	Day 6
Decontaminate surfaces and equipment.	Day 10
Sample excess decontamination materials for disposal. Perform equipment swipes or monitoring, as necessary.	Day 15
Perform verification sampling.	Day 15
Evaluate analytical data from verification sampling.	Day 30
Complete dome structure removal.	Day 60
Complete asphalt removal.	Day 90
Perform soil sampling, if necessary.	Day 100
Complete assessment of underlying soil and determine need for coordination with LANL corrective action program.	Day 140
Prepare closure certification report.	Day 150
Certify closure.	Day 175
Submit final report to NMED.	Day 180

[a] The schedule above indicates calendar days from the beginning by which activities will be completed. Some activities may be conducted simultaneously and/or may not require the maximum time listed. Extensions to this schedule may be requested, as needed.

Table A-2

Summary of Proposed Analytical Methods

Analyte	EPA SW-846 Analytical Method [a]	Test Methods/ Instrumentation	Target Detection Limit [b]	Rationale
Metal Analysis				
Arsenic	7060A [c], 7061A	FLAA, GFAA	10 ug/L	Determine the total metal concentration in the samples.
Barium	7080A [d], 7081 [c]	FLAA, GFAA	200 ug/L	
Cadmium	7130 [d], 7131A [c]	FLAA, GFAA	2 ug/L	
Chromium	7190 [d], 7191 [c]	FLAA, GFAA	10 ug/L	
Lead	7420 [d], 7421 [c]	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A [e]	CVAA	0.2 ug/L	
Selenium	7740[c], 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A[d], 7761 [c]	FLAA, GFAA	10 ug/L	
Organic Analysis				
Target compound list VOCs	8260B	GC/MS	10 mg/L	Determine the VOCs concentration in the samples.
Target compound list SVOCs	8270D [c]	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.

[a] U.S. Environmental Protection Agency (EPA), 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846.
[b] Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.
[c] Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.
[d] Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.
[e] Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy
FLAA = Flame atomic absorption spectroscopy
GC/MS = Gas chromatography/mass spectrometry
GFAA = Graphite furnace atomic absorption spectroscopy
mg/L = milligrams per liter
SVOC = semi volatile organic compounds
ug/L = micrograms per liter.
VOC = volatile organic compounds

Table A-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Technical Area 54 (TA-54) Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous liquid waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed liquid waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Verification water	Non-regulated liquid waste	Sanitary sewer
	Hazardous liquid waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	RLWTF
	Mixed liquid waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal and fabric dome materials and equipment	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Discarded asphalt	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment

Potential Waste Materials	Waste Types	Disposal Options
		standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded concrete	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radio active solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

ATTACHMENT B

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES FOR CLOSURE OF THE TECHNICAL AREA 54 BUILDINGS CONTAINER STORAGE UNITS

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LIST OF ACRONYMS AND ABBREVIATIONS

CSU	container storage unit(s)
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
LANL	Los Alamos National Laboratory
TA	Technical Area

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES FOR CLOSURE OF THE TECHNICAL AREA 54 BUILDINGS CONTAINER STORAGE UNITS

B.1. INTRODUCTION

This attachment describes specific decontamination, sampling strategies, and analytical requirements applicable to closure of the Los Alamos National Laboratory (LANL) Technical Area (TA) 54 Buildings Container Storage Units (TA-54 Buildings CSUs). General closure procedures for the TA-54 Buildings CSUs are presented in the closure plan. The general procedures include discussion of removal and appropriate disposition of the waste inventory in a unit prior to the beginning of closure, and a pre-closure and structural assessment of a unit, as described in Section 5.3.2 of the closure plan, for conditions that may adversely affect decontamination and verification sampling activities.

Closure activities at the TA-54 Buildings CSUs will involve decontamination and/or removal of the equipment in the units and decontamination and decontamination verification of the unit surfaces. Sampling and analysis will be performed to determine the proper management of the materials associated with the closure and to verify that the decontamination activities were successful.

Decontamination will be conducted as described in Section 5.4 of the closure plan and in Section B.2 herein. Sampling will be conducted in accordance with the most recent LANL sampling and analysis plan incorporating guidance from the U.S. Environmental Protection Agency (EPA) (EPA, 2002) and the U.S. Department of Energy (DOE) (DOE, 1995). Section B.3 in this attachment and Section 6 of the closure plan describe sampling activities and sample collection procedures, respectively. Analysis will be conducted in accordance with procedures given in the "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1986), or other approved procedures or methods. Analytical requirements are provided in Section B.4 herein and in Section 7 of the closure plan. All waste generated will be managed in accordance with applicable regulatory requirements. All wastes will be removed from each unit as specified in Section 5.2 of the closure plan.

Closure of the TA-54 Buildings CSUs will be conducted in accordance with the schedule presented in Table B-1. In the event that the closure of the CSUs cannot proceed according to schedule, LANL will request an extension as discussed in Section 4 of the closure plan.

B.2. SPECIFIC DECONTAMINATION PROCEDURES

To the extent necessary, all contaminated equipment present at closure, unit surfaces, and structures will be decontaminated. Sampling and analysis will be performed to verify that decontaminated equipment, surfaces, and structures meet the verification criteria specified in Section 5.5 of the closure plan. Discarded materials and equipment that cannot or will not be decontaminated will be managed as waste in compliance with applicable regulations.

B.2.1. Equipment Decontamination

The need for decontamination of equipment present in the CSUs will be reviewed and documented during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan. The equipment may include items such as secondary containment pallets and miscellaneous waste management equipment (e.g., drum dollies). Equipment present in the TA-54 Buildings CSUs will be determined to be clean or will be decontaminated before removal from the unit. Decontamination activities will be conducted on equipment that cannot be certified as clean until verification sampling determines that decontamination is successful, or a decision is made to remove and manage the equipment as contaminated waste in compliance with applicable regulations.

In many cases, mixed waste has been stored in the TA-54 Buildings CSUs and any detected radioactivity above background levels for this waste will serve as an indicator for potential contamination by hazardous constituents. Any portable equipment in the mixed waste CSUs will be swiped or monitored using radioassay procedures or equipment to determine the presence of radioactive contaminants before the equipment is removed. Depending upon the results of this assay, the final use or disposition of the equipment will be determined based upon the appropriate regulations or DOE policies. If radioactive contamination is determined to be below background or action limits, the equipment will be deemed to be clean and will be removed. Above background results for radioactivity will indicate the need for decontamination.

In other cases, the potential for contamination by hazardous waste or hazardous constituents will be determined based upon review of the operating record for the CSU. In the event that equipment is known to be contaminated and must be decontaminated for disposition, decontamination will be accomplished using wash water decontamination techniques in accordance with the general procedures described in Section 5.4.1 of the closure plan. No decontamination will be performed in areas of the unit where cracking or any other condition that affects secondary containment has been observed or indicated during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan. The wash water will be sampled and analyzed to determine whether further decontamination activities are necessary.

B.2.2. Floors and Walls Decontamination

This phase of closure of the Buildings CSUs will consist of decontaminating the floors and walls of the storage units using wash water decontamination techniques in accordance with the general procedures described in Section 5.4.2 of the closure plan. The walls of the units will be washed up to a height of two feet above the highest level of waste previously stored in the unit. The wash water will be transferred to clean containers for further characterization and review. After the decontamination process, the used wash water will be collected, sampled for analysis, and stored in appropriate containers at the site. Each surface or structure may undergo several wash cycles; however, the option to remove the material and manage it as waste may be exercised at any time.

B.3. SAMPLING ACTIVITIES

All general sample management, documentation, handling, preservation, storage, and packaging and transportation procedures for closure of the TA-54 Buildings CSUs are described in the closure plan. The following specific information applies to the sampling strategy and approach for closure of the TA-54 Buildings CSUs. To determine whether hazardous/mixed waste and hazardous waste residues have been effectively removed, samples will be collected from discrete locations according to the methods and procedures provided in Section 6.4 of the closure plan, and analyzed for the appropriate hazardous constituents identified during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan. Samples will be analyzed by an independent laboratory using the methods outlined in Table B-2. Table B-2 will be modified, if necessary, at the time of notification of closure to incorporate changes based on the operating record review that will be conducted for each CSU.

Many of the materials and equipment removed from and used in the closure of the TA-54 Buildings CSUs will be handled as solid and potentially hazardous wastes. These wastes will be characterized to meet applicable waste acceptance criteria using LANL waste characterization procedures and the Waste Analysis Plan in the LANL Hazardous Waste Facility Permit. The sample collection procedures described in Section 6.4 of the closure plan will be utilized in cases where materials or equipment are removed from the closure site and require decontamination before further use or to demonstrate that the structures are not contaminated.

B.3.1. Sampling Strategy/Approach

Verification sampling will be conducted to verify that decontamination efforts described in Section 5.4 of the closure plan and in Section B.2 in this attachment were effective at removing hazardous waste residues.

B.1.1.1. Solids Sampling Strategy

In some cases, equipment may need to be decontaminated prior to removal from the CSU and is not amenable to liquid wash down due to its size or composition. In such cases, surface wipe samples collected using the procedure in Section 6.4.2 of the closure plan may be used to determine whether hazardous waste constituents are present. The use of radioactive swipe samples as surrogates may also be employed for the closure of CSUs where the operating records indicate only mixed waste containers were stored. The appropriate number of equipment wipe samples will be determined during the pre-closure and structural assessment for the unit.

B.1.1.2. Soil Sampling Strategy

The TA-54 Buildings CSUs are located inside buildings that provide containment and run-on protection. The CSUs have either concrete or prefabricated floors (modular buildings). Many of the concrete floors are coated with chemical-resistant epoxy coatings and paint, which effectively prevent the migration of any liquids through the concrete and into the environment. Pending the results of the pre-closure and structural assessment described in Section 5.3.2 of the closure plan, these features will have prevented the release of hazardous constituents to the surrounding environment. Soil sampling will not be conducted within or around the TA-54 Buildings CSUs unless the pre-closure and structural assessment and the operating record indicate hazardous waste or hazardous constituents were released to the environment. In that case, LANL will notify the New Mexico Environment Department to discuss further proposals, such as utilizing soil sampling techniques contained in Section 6.4.3 of the closure plan.

B.1.1.3. Verification Sampling Strategy

Verification samples will be collected from each of the locations where decontamination activities described in Section B.2 were performed. Liquid or wipe sampling will be used for decontamination verification of surfaces, structures, and other equipment. Verification sampling will be conducted for the floor and then the walls to prevent cross contamination of the samples and allow for the identification of contaminated areas. Samples will be collected from discrete locations according to the applicable procedure in Section 6.4 of the closure plan and analyzed by an independent laboratory for the appropriate hazardous constituents identified during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan.

The use of radioactive swipe samples as surrogates may be employed for the closure of the CSUs where the preliminary review of the operating records indicate only mixed waste containers were stored.

B.4. ANALYTICAL REQUIREMENTS

All general analytical laboratory requirements, quality assurance/quality control, and data requirements procedures for closure of the TA-54 Buildings CSUs are described in Section 7 of the closure plan.

Analytical methods to be used for decontamination verification during the TA-54 Buildings CSUs closure activities are summarized in Table B-2. Each sample will be analyzed for the appropriate constituents identified in during the pre-closure and structural assessment. Analytes, test methods/instrumentation, target detection limits, and rationale for metals and organic analyses are also presented in Table B-2.

B.5. WASTE MANAGEMENT

Decontamination and sample collection activities will be conducted with waste minimization goals in mind. All waste material generated during closure will be controlled, handled, characterized, and disposed of in accordance with LANL waste management procedures. Table B-3 provides a list of the waste materials that could be generated during closure and possible disposal options.

B.6. REFERENCES

DOE, 1995. "DOE Methods for Evaluating Environmental and Waste Management Samples," DOE/EM-0089T, Rev. 2. Prepared for the U.S. Department of Energy by Pacific Northwest Laboratory, Richland, Washington.

EPA, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste/Physical/Chemical Methods" EPA-SW-846, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington D.C.

EPA, 2002. "RCRA Waste Sampling Draft Technical Guidance Planning, Implementation, and Assessment," EPA530-D-02-002, August 2002, Office of Solid Waste, U.S. Environmental Protection Agency, Washington, D.C.

Table B-1

Closure Schedule for the Buildings Container Storage Units at Technical Area 54

Activity	Maximum Time Required [a]
Submit amended closure plan, if necessary.	-90 Days
Notify the New Mexico Environment Department (NMED) of intent to close.	-45 Days
Final receipt of waste.	Day 0
Remove stored waste.	Day 5
Conduct pre-closure and structural assessment.	Day 6
Decontaminate surfaces and equipment.	Day 20
Sample excess decontamination materials for disposal. Perform equipment swipes or monitoring as necessary.	Day 20
Perform verification sampling.	Day 30
Evaluate analytical data from verification sampling.	Day 50
Perform additional decontamination, if necessary.	Day 55
Perform additional verification sampling, if necessary.	Day 60
Evaluate additional analytical data.	Day 75
Perform final cleanup and disposal (i.e., removal of decontaminated equipment and decontamination waste).	Day 140
Prepare closure certification report.	Day 150
Certify closure.	Day 175
Submit final report to NMED.	Day 180

[a] The schedule above indicates calendar days from the beginning by which activities will be completed. Some activities may be conducted simultaneously and/or may not require the maximum time listed. Extensions to this schedule may be requested, as needed.

Table B-2

Summary of Proposed Analytical Methods

Analyte	EPA SW-846 Analytical Method [a]	Test Methods/ Instrumentation	Target Detection Limit [b]	Rationale
Metal Analysis				
Arsenic	7060A [c], 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A [d], 7081 [c]	FLAA, GFAA	200 ug/L	
Cadmium	7130 [d], 7131A [c]	FLAA, GFAA	2 ug/L	
Chromium	7190 [d], 7191 [c]	FLAA, GFAA	10 ug/L	
Lead	7420 [d], 7421 [c]	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A [e]	CVAA	0.2 ug/L	
Selenium	7740[c], 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A[d], 7761 [c]	FLAA, GFAA	10 ug/L	
Organic Analysis				
Target compound list VOCs	8260B	GC/MS	10 mg/L	Determine the VOCs concentration in the samples.
Target compound list SVOCs	8270D [c]	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.

[a] U.S. Environmental Protection Agency (EPA), 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846.

[b] Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.

[c] Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.

[d] Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.

[e] Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy
FLAA = Flame atomic absorption spectroscopy
GC/MS = Gas chromatography/mass spectrometry
GFAA = Graphite furnace atomic absorption spectroscopy
mg/L = milligrams per liter
SVOC = semi volatile organic compounds
ug/L = micrograms per liter.
VOC = volatile organic compounds

Table B-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Technical Area 54 (TA-54) Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous liquid waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed liquid waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Verification water	Non-regulated liquid waste	Sanitary sewer
	Hazardous liquid waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	RLWTF
	Mixed liquid waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Discarded Equipment	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

Potential Waste Materials	Waste Types	Disposal Options
Discarded concrete	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radio active solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

ATTACHMENT C

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES FOR CLOSURE OF THE TECHNICAL AREA 54 OUTSIDE STORAGE STRUCTURE CONTAINER STORAGE UNITS

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LIST OF ACRONYMS AND ABBREVIATIONS

CSU	container storage unit(s)
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
LANL	Los Alamos National Laboratory
TA	Technical Area

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES FOR CLOSURE OF THE TECHNICAL AREA 54 OUTSIDE STORAGE STRUCTURE CONTAINER STORAGE UNITS

C.1 INTRODUCTION

This attachment describes specific decontamination, sampling strategies, and analytical requirements applicable to closure of the Los Alamos National Laboratory (LANL) Technical Area (TA) 54 Outside Storage Structure Container Storage Units (TA-54 Outside Storage CSUs). General closure procedures for the TA-54 Outside Storage CSUs are presented in the closure plan. The general procedures include discussion of removal and appropriate disposition of the waste inventory in the unit prior to the beginning of closure, and a pre-closure and structural assessment of the unit, as described in Section 5.3.2 of the closure plan, for conditions that may adversely affect decontamination and verification sampling activities.

Closure activities at the TA-54 Outside Storage CSUs will involve decontamination and/or removal of the equipment and support structures for the canopies and roofs at the units followed by decontamination and decontamination verification of the unit surfaces. Sampling and analysis will be performed to determine the proper management of the materials associated with the closure and to verify that the decontamination activities were successful.

Decontamination will be conducted as described in Section 5.4 of the closure plan and in Section C.2 herein. Sampling will be conducted in accordance with the most recent LANL sampling and analysis plan incorporating guidance from the U.S. Environmental Protection Agency (EPA) (EPA, 2002) and the U.S. Department of Energy (DOE) (DOE, 1995). Section C.3 in this attachment and Section 6 of the closure plan describe sampling activities and sample collection procedures, respectively. Analysis will be conducted in accordance with procedures given in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods” (EPA, 1986), or other approved procedures or methods. Analytical requirements are provided in Section C.4 herein and in Section 7 of the closure plan. All waste generated will be managed in accordance with applicable regulatory requirements. All wastes will be removed from each unit as specified in Section 5.2 of the closure plan.

Closure of the TA-54 Outside Structures CSUs will be conducted in accordance with the schedule presented in Table C-1. In the event that the closure of the CSUs cannot proceed according to schedule, LANL will request an extension as discussed in Section 4 of this closure plan.

C.2 SPECIFIC DECONTAMINATION PROCEDURES

To the extent necessary, all contaminated equipment present at closure, unit surfaces, and structures will be decontaminated. Sampling and analysis will be performed to verify that decontaminated equipment, surfaces, and structures meet the verification criteria specified in Section 5.5 of the closure plan. Discarded materials and equipment that cannot or will not be decontaminated will be managed as waste in compliance with applicable regulations.

C.2.1 Equipment Decontamination

The need for decontamination of equipment present in the CSUs will be reviewed and documented during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan. Equipment present in the TA-54 Outside Storage CSUs will be determined to be clean or will be decontaminated before removal from the unit. Decontamination activities will be conducted on equipment that cannot be certified as clean until verification sampling determines that decontamination is successful, or a decision is made to remove and manage the equipment as contaminated waste in compliance with applicable regulations.

In many cases, mixed waste has been stored in the TA-54 Outside Storage CSUs and any detected radioactivity above background levels for this waste will serve as an indicator for potential contamination by hazardous constituents. Any portable equipment in the mixed waste CSUs will be swiped or monitored using radioassay procedures or equipment to determine the presence of radioactive contaminants before the equipment is removed. Depending upon the results of this assay, the final use or disposition of the equipment will be determined based upon the applicable regulations or DOE policies. If radioactive contamination is determined to be below background or action limits, the equipment will be deemed to be clean and will be removed. Above background results for radioactivity will indicate the need for decontamination.

In other cases, the potential for contamination by hazardous waste or hazardous constituents will be determined based upon review of the operating record for the CSU. In the event that equipment is known to be contaminated and must be decontaminated for disposition, decontamination will be accomplished using wash water decontamination techniques in accordance with the general procedures described in Section 5.4.1 of the closure plan. No decontamination will be performed in areas of the unit where cracking or any other condition that affects secondary containment has been observed or indicated by the pre-closure and structural assessment described in Section 5.3.2 of the closure plan. The wash water will be sampled to determine whether further decontamination is necessary. If analysis of the wash water indicates that hazardous constituents are present, the decontamination and sampling will continue until the equipment has been decontaminated, the decision is made to proceed with an alternate

demonstration of decontamination as described in Section 5.5 of this closure plan, or the decision is made to manage the equipment as a contaminated waste.

C.2.2 Floors/Containment Curbs Decontamination

This phase of closure of the Outside Structures CSUs will consist of decontaminating the floors and containment curbs of the storage units using wash water decontamination techniques in accordance with the general procedures described in Section 5.4.2 of the closure plan. The wash water will be transferred to clean containers for further characterization and review. After the decontamination process, the used wash water will be collected, sampled for analysis, and stored in appropriate containers at the site. Each surface or structure may undergo several wash cycles; however, the option to remove the material and manage it as waste may be exercised at any time.

C.2.3 Canopies and Roofs

The support structures for the overhead canopies and roofs at the TA-54 Outside Structure CSUs are not placed within the secondary containment pads for the CSUs. Unless the operating record review described in Section 5.3.2 of this closure plan indicates otherwise, these will not be decontaminated or sampled as part of closure activities. If needed, the decontamination procedures described in Section C.2.1 of this attachment will be used.

C.3 SAMPLING ACTIVITIES

All general sample management, documentation, handling, preservation, storage, and packaging and transportation procedures for closure of the TA-54 Outside Storage CSUs are described in the closure plan. The following specific information applies to the sampling strategy and approach for closure of the TA-54 Outside Storage CSUs. To determine whether hazardous/mixed waste and hazardous waste residues have been effectively removed, samples will be collected from discrete locations according to the methods and procedures provided in Section 6.4 of the closure plan, and analyzed for the appropriate hazardous constituents identified during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan. Samples will be analyzed by an independent laboratory using the methods outlined in Table C-2. Table C-2 will be modified, if necessary, at the time of notification of closure to incorporate changes based on the operating record review that will be conducted for each CSU.

Many of the materials and equipment removed from and used in the closure of the TA-54 Outside Storage CSUs will be handled as solid and potentially hazardous wastes. These wastes will be characterized to meet applicable waste acceptance criteria using LANL waste characterization procedures and the Waste Analysis Plan in the LANL Hazardous Waste Facility Permit. The sample collection procedures described in Section 6.4 of the closure plan will be utilized in cases

where materials or equipment are removed from the closure site and require decontamination before further use or to demonstrate that the structures are not contaminated.

C.3.1 Sampling Strategy/Approach

Verification sampling will be conducted to verify that decontamination efforts described in Section 5.4 of the closure plan and in Section C.2 in this attachment were effective at removing hazardous waste residues.

C.3.1.1 Soil Sampling Strategy

The TA-54 Outside Structures CSUs include secondary containment curbs or, for solid type wastes, are elevated to prevent run-on from flooding or precipitation. Many of the units that store liquids are constructed of concrete and the floors making up the units are coated with chemical-resistant epoxy coatings and paint, which effectively prevent the migration of any spills. Pending the results of the pre-closure and structural assessment described in Section 5.3.2 of this closure plan, these features will have prevented the release of hazardous constituents to the surrounding environment. Therefore, soil sampling will not be applicable for the Building CSUs unless the structural assessment and operating record indicate otherwise. In that case, LANL will notify the New Mexico Environment Department to discuss additional sampling activities utilizing the soil sampling techniques contained in Section 6.4.3 of the closure plan.

C.3.1.2 Solids Sampling Strategy

In some cases, equipment may need to be decontaminated prior to removal from the CSU and is not amenable to liquid wash down due to its size or composition. In such cases, surface wipe samples collected using the procedure in Section 6.4.2 of the closure plan may be used to determine whether hazardous waste constituents are present. The use of radioactive swipe samples as surrogates may also be employed for the closure of CSUs where the operating records indicate only mixed waste containers were stored. The appropriate number of equipment wipe samples will be determined during the pre-closure and structural assessment for the unit.

In other cases, equipment removed from the TA-54 Outside Structures CSUs may need to be decontaminated before further use and is amenable to liquid wash down. Decontamination will be accomplished using wash water decontamination techniques in accordance with the general procedures described in Section 5.4.1 of the closure plan. The equipment may include items such as secondary containment pallets and miscellaneous waste management equipment (e.g., drum dollies). The used wash water will be transferred to a container where it will be sampled to determine the appropriate disposal path.

C.3.1.3 Verification Sampling Strategy

Verification samples will be collected from each of the locations where decontamination activities described in Section A.2 were performed. Liquid or wipe sampling will be used for decontamination verification of surfaces, structures, and other equipment. The use of radioactive swipe samples as surrogates may be employed for the closure of the CSUs where the preliminary review of the operating records indicate only mixed waste containers were stored. Samples will be collected from discrete locations according to the applicable procedure in Section 6.4 of the closure plan and analyzed by an independent laboratory for the appropriate hazardous constituents identified during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan.

C.4 ANALYTICAL REQUIREMENTS

All general analytical laboratory requirements, quality assurance/quality control, and data requirements procedures for closure of the TA-54 Outside Storage CSUs are described in Section 7 of the closure plan.

Analytical methods to be used for decontamination verification during the TA-54 Outside Storage CSUs closure activities are summarized in Table C-2. Each sample will be analyzed for the appropriate constituents identified in during the pre-closure and structural assessment. Analytes, test methods/instrumentation, target detection limits, and rationale for metals and organic analyses are also presented in Table C-2.

C.5 WASTE MANAGEMENT

Decontamination and sample collection activities will be conducted with waste minimization goals in mind. All waste material generated during closure will be controlled, handled, characterized, and disposed of in accordance with LANL waste management procedures. Table C-3 provides a list of the waste materials that could be generated during closure and possible disposal options.

C.6 REFERENCES

DOE, 1995. “DOE Methods for Evaluating Environmental and Waste Management Samples,” DOE/EM-0089T, Rev. 2. Prepared for the U.S. Department of Energy by Pacific Northwest Laboratory, Richland, Washington.

EPA, 1986 and all approved updates, “Test Methods for Evaluating Solid Waste/Physical/Chemical Methods” EPA-SW-846, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington D.C.

EPA, 2002. “RCRA Waste Sampling Draft Technical Guidance Planning, Implementation, and Assessment,” EPA530-D-02-002, August 2002, Office of Solid Waste, U.S. Environmental Protection Agency, Washington, D.C.

Table C-1

Closure Schedule for the Outside Structures Container Storage Units at Technical Area 54

Activity	Maximum Time Required [a]
Submit amended closure plan, if necessary.	-90 Days
Notify the New Mexico Environment Department (NMED) of intent to close.	-45 Days
Final receipt of waste.	Day 0
Remove stored waste.	Day 5
Conduct pre-closure and structural assessment.	Day 6
Decontaminate surfaces and equipment.	Day 20
Sample excess decontamination materials for disposal. Perform equipment swipes or monitoring, as necessary.	Day 20
Perform verification sampling.	Day 30
Evaluate analytical data from verification sampling.	Day 50
Perform additional decontamination, if necessary.	Day 55
Perform additional verification sampling, if necessary.	Day 60
Evaluate additional analytical data.	Day 75
Perform final cleanup and disposal (i.e., removal of decontaminated equipment and decontamination waste).	Day 140
Prepare closure certification report.	Day 150
Certify closure.	Day 175
Submit final report to NMED.	Day 180

[a] The schedule above indicates calendar days from the beginning by which activities will be completed. Some activities may be conducted simultaneously and/or may not require the maximum time listed. Extensions to this schedule may be requested, as needed.

Table C-2

Summary of Proposed Analytical Methods

Analyte	EPA SW-846 Analytical Method [a]	Test Methods/ Instrumentation	Target Detection Limit [b]	Rationale
Metal Analysis				
Arsenic	7060A [c], 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A [d], 7081 [c]	FLAA, GFAA	200 ug/L	
Cadmium	7130 [d], 7131A [c]	FLAA, GFAA	2 ug/L	
Chromium	7190 [d], 7191 [c]	FLAA, GFAA	10 ug/L	
Lead	7420 [d], 7421 [c]	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A [e]	CVAA	0.2 ug/L	
Selenium	7740[c], 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A[d], 7761 [c]	FLAA, GFAA	10 ug/L	
Organic Analysis				
Target compound list VOCs	8260B	GC/MS	10 mg/L	Determine the VOCs concentrations in the samples.
Target compound list SVOCs	8270D [c]	GC/MS	10 mg/L	Determine the SVOCs concentrations in the samples.

[a] U.S. Environmental Protection Agency (EPA), 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846.

[b] Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.

[c] Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.

[d] Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.

[e] Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy
FLAA = Flame atomic absorption spectroscopy
GC/MS = Gas chromatography/mass spectrometry
GFAA = Graphite furnace atomic absorption spectroscopy
mg/L = milligrams per liter
SVOC = semi volatile organic compounds
ug/L = micrograms per liter
VOC = volatile organic compounds

Table C-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Technical Area 54 (TA-54) Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous liquid waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed liquid waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Verification water	Non-regulated liquid waste	Sanitary sewer
	Hazardous liquid waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	RLWTF
	Mixed liquid waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Discarded Equipment	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

Potential Waste Materials	Waste Types	Disposal Options
Discarded concrete	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radio active solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

LA-UR-06-6915
September 2006

Los Alamos National Laboratory

Technical Area 55

Closure Plan

Revision 0.0

Prepared by:

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

Los Alamos National Laboratory

Technical Area 55
Closure Plan

Revision 0.0
LA-UR-06-6915

Facility ID No.:	**NM0890010515**
Facility Name:	**Los Alamos National Laboratory**
Facility Address:	**Los Alamos National Laboratory** **P.O. Box 1663** **Los Alamos, New Mexico 87545**
Legal Owner:	**U.S. Department of Energy**
Legal Operators:	**U.S. Department of Energy** **Los Alamos Site Office** **528 35th Street** **Los Alamos, New Mexico 87544** **Los Alamos National Security, LLC.** **4200 West Jemez Road, Suite 4000** **Los Alamos, New Mexico 87544**
Contact Person:	**Gene E. Turner** **Environmental Permitting Manager** **Los Alamos Site Office** **National Nuclear Security Administration** **U.S. Department of Energy** **Owner/Operator**
Date:	**September 2006**

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LIST OF ACRONYMS AND ABBREVIATIONS

20.4.1 NMAC	New Mexico Administrative Code, Title 20, Chapter 4, Part 1
CFR	Code of Federal Regulations
CSU	container storage unit(s)
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ESL	Ecological Screening Levels
HWB	Hazardous Waste Bureau
LANL	Los Alamos National Laboratory
NIOSH	National Institute of Occupational Safety and Health
NMED	New Mexico Environment Department
PPE	personal protective equipment
P&T	Packaging and Transportation
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
SSL	Soil Screening Levels
SW-846	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods
TA	Technical Area
TRU	transuranic

LOS ALAMOS NATIONAL LABORATORY TECHNICAL AREA 55 CLOSURE PLAN

1 INTRODUCTION

The information provided in this closure plan is submitted to address the closure requirements specified in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart V (20.4.1.500 NMAC), incorporating the Code of Federal Regulations (CFR), Title 40, Part 264, Subparts G, I, J, and X, as revised October 1, 2003 [10-1-03], for waste management units operated at the Los Alamos National Laboratory (LANL) under the Resource Conservation and Recovery Act (RCRA) and the New Mexico Hazardous Waste Act. This closure plan describes the activities necessary to close the hazardous/mixed waste storage and treatment units at LANL Technical Area (TA) 55. General information for the closure activities at the TA-55 storage and treatment units is presented in this closure plan. Specific information on closure decontamination, sampling strategies, and analytical requirements for the different types of units at TA-55 is included in Attachments A through D.

Until closure is complete and has been certified in accordance with 20.4.1.500 NMAC, §264.115 [10-1-03], a copy of the approved closure plan, any approved revisions, and closure activity documentation associated with the closure will be on file at the LANL Environmental Protection Division Water Quality and RCRA Group Office and at the U.S. Department of Energy (DOE) Los Alamos Site Office.

2 GENERAL CLOSURE INFORMATION

2.1 Closure Performance Standard

As required by 20.4.1.500 NMAC, §264.111 [10-1-03], the TA-55 storage and treatment units will be closed to meet the following performance standards:

- Minimize the need for further maintenance;
- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground, or surface waters, or to the atmosphere; and
- Comply with the closure requirements of 20.4.1.500 NMAC, Part 264, Subparts G, I, J, and X [10-1-03].

This will be accomplished by removal of hazardous and mixed (hazardous waste with a radioactive component) waste from the storage and treatment units; decontamination, if necessary, of the surfaces and equipment that may have come into contact with the wastes; and/or disposal of contaminated structures or equipment. Verification sampling may be performed after the removal of site structures to assess the potential for residual contamination at the closure site if any evidence is found that indicates there may have been a potential release of hazardous constituents from the unit. If sampling indicates contamination, the level of such contamination will be evaluated for further decontamination activities or management of all remaining unit structures as contaminated waste using appropriate LANL waste management procedures. Decontamination activities will ensure the removal of hazardous waste residues from the TA-55 storage and treatment units to established cleanup levels as agreed upon with the New Mexico Environment Department (NMED) or as outlined in Section 5.5 of this closure plan.

2.2 Partial and Final Closure Activities

This closure plan has been written for partial closure rather than final closure of the entire LANL facility. Partial closure will consist of closing an individual waste management unit, while leaving the other regulated hazardous/mixed waste management units at LANL in service. Partial closure of each unit (hereinafter referred to simply as "closure") will be deemed complete when 1) all surfaces and equipment have been decontaminated, or otherwise properly dispositioned, if necessary; 2) closure has been certified by an independent, professional engineer licensed in the State of New Mexico; and 3) closure certification has been submitted to and approved by the NMED. Final closure of the LANL facility will occur when the remaining hazardous/mixed waste management units at LANL are closed. Final closure will consist of assembling documentation on the closure status of each unit, including all previous partial closures as well as land-based units that have been or are being addressed via coordination with corrective action projects. Final closure will be deemed complete when the information has been submitted to the NMED and approved.

3 DESCRIPTION OF UNITS TO BE CLOSED

LANL is located in Los Alamos County, an incorporated county, in north-central New Mexico, approximately 60 miles north of Albuquerque and 25 miles northwest of Santa Fe. LANL is divided into TAs. TA-55 is located in the north-central portion of LANL on a mesa between a branch of Mortandad Canyon on the north and Two Mile Canyon on the south. The TA-55 storage and treatment units are located in and near Building TA-55-4. The remainder of this section provides a listing of the waste management units at TA-55 to which this closure plan applies, followed by brief descriptions of the specific units.

3.1 TA-55 Waste Management Units

The TA-55 storage and treatment units addressed in this closure plan are:

- TA-55 Container Storage Units (CSU),
- TA-55-4 Storage Tank System,
- TA-55-4 Cementation Unit, and
- TA-55 Outside Storage Pad CSU.

Information on the hazardous component(s) of the wastes stored or treated at the TA-55 units and pictures and figures of the units are provided in the "Los Alamos National Laboratory General Part A Permit Application," Revision 5.0 (LANL, 2006) and the "Los Alamos National Laboratory Technical Area 55 Part B Permit Renewal Application," Revision 2.0 (LANL, 2003ab).

3.1.1 TA-55 Container Storage Units

Container storage within buildings at TA-55 consists of six units, including B40, B05, K13, B45, and the Vault located at TA-55-4, and TA-55-185. The first five CSUs are located in various areas in the basement of building TA-55-4 and began operating in 1978. TA-55-4-B40 and TA-55-4-K13 have been used for storage of hazardous and mixed waste that may contain liquids. The Vault in TA-55-4 has stored only mixed waste in both solid and liquid forms. Secondary containment pallets are used to store liquid waste in TA-55-4-B40, TA-55-4-K13, and the TA-55-4 Vault. TA-55-4-B05 and TA-55-4-B45 have been used for storage of only solid hazardous and mixed waste. TA-55-185, constructed in 1991, is located west of building TA-55-4 and consists of a steel-framed steel building with a concrete floor. TA-55-185 will be used to store containers of solid hazardous and mixed waste that do not contain liquids upon issuance of a renewed LANL Hazardous Waste Facility Permit.

3.1.2 TA-55 Storage Tank System

The storage tank system at TA-55 is located in Room 401 of TA-55-4. This tank system includes sixteen tanks in three component systems. Two of the components systems begin operations in 1989, the third component system will be installed upon issuance of a renewed LANL Hazardous Waste Facility Permit. The unit is used to store evaporator bottoms solutions, a liquid mixed waste, prior to stabilization in the TA-55 cementation unit. The storage tank system began operations in 1989.

3.1.3 TA-55 Cementation Unit

The cementation unit is located at TA-55-4, Room 401. The unit consists of a pH column, vacuum trap, two motor-driven mixers, four impellers, and piping inside a glovebox. The unit is used to stabilize liquid mixed waste into a cemented solid waste. It has been in operation since 1988.

3.1.4 TA-55 Outside Storage Pad Container Storage Unit

The TA-55 Outside Storage Pad CSU is located northwest of TA-55-4. The unit is used for storage of solid and liquid hazardous and mixed wastes and has been in operation since 1978.

3.2 Estimate of Maximum Waste in Storage/Treatment Units

Table 1 includes estimated volumes for the maximum inventory of wastes managed at any one time and the total waste inventory over the estimated lifespan for the individual storage and treatment units associated with TA-55. The lifetime of these units is estimated from the year 1980 to the year 2050.

3.3 Description of Waste Managed

TA-55 began plutonium processing operations in 1978. The TA-55 waste management units have been used for storage of hazardous and mixed waste in both liquid and solid form and to treat process waste. Due to the scope of waste management activities at TA-55, the wastes include corrosive liquids, sludge, debris, and chemical wastes with metals and volatile and semi-volatile organic constituents. Specific hazardous waste constituents managed are described by U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers. These are reflected in past Part A permit applications, and most recently in Section XIV, “Technical Area 55”, of the “Los Alamos National Laboratory General Part A Permit Application,” Revision 5.0 (LANL, 2006). A detailed description of the waste streams managed is presented in the Waste Analysis Plan in Appendix B of the “Los Alamos National Laboratory General Part B Permit Renewal Application,” Revision 2.0, (LANL, 2003b). At the time of closure, the history of each of the units will be reviewed to determine the specific waste constituents that apply for each of the units.

4 CLOSURE SCHEDULE

Closure of the TA-55 storage and treatment units will be initiated on an individual unit basis; however, all units will be closed by 2050. This closure plan is intended to address closure requirements for the units within the authorized timeframe of the current Hazardous Waste Facility Permit.

Written notification will be provided to the NMED 45 days before the start of closure activities for each of the TA-55 storage and treatment units. However, pursuant to 20.4.1.500 NMAC, §264.112(e) [10-1-03], removing hazardous wastes and decontaminating or dismantling equipment in accordance with an approved closure plan may be conducted at any time before or after notification of closure. Closure activities will begin according to the requirements of 20.4.1.500 NMAC, §264.112(d)(2) [10-1-03]. Treatment, removal, or disposal of hazardous wastes will begin in accordance with the approved closure plan, as required by 20.4.1.500 NMAC, §264.113(a) [10-1-03], within 90 days after final receipt of waste at each of the TA-55 waste management units. This timeframe will be met as long as facilities are available for storage, treatment, or disposal of these wastes. In the event that closure activities cannot begin within 90 days, LANL will notify the Secretary of the NMED in accordance with the extension requirements in 20.4.1.500 NMAC, §264.113(a) [10-1-03]. In addition, the demonstrations in 20.4.1.500 NMAC, §264.113(a)(1) and (b)(1) [10-1-03], will be made in accordance with 20.4.1.500 NMAC, §264.113(c) [10-1-03]. Closure activities and reporting requirements will be completed within 180 days of receipt of the final volume of waste at each of the units. Closure will be conducted in accordance with the schedule presented in Table 2. In the event that closure of the TA-55 waste management units cannot proceed according to schedule, LANL will notify the Secretary of the NMED in accordance with extension request requirements in 20.4.1.500 NMAC, §264.113(b) [10-1-03].

5 GENERAL CLOSURE PROCEDURES

Closure activities at the TA-55 storage and treatment units will involve removal of hazardous/mixed wastes; proper management and disposition of hazardous waste residues, contaminated structures, and contaminated equipment associated with the units and subsequent appropriate disposition; and verification that the closure performance standards have been achieved. The following sections describe the general closure procedures applicable to the TA-55 storage and treatment units' closure activities.

5.1 Security

Because of the ongoing nature of operations at TA-55, site security at the TA-55 storage and treatment units will be maintained by the DOE for as long as necessary to prohibit public access. The security fence at TA-55 will be maintained to prevent public access. Details on security and access control at TA-55 are available in Section J.1 of the "Los Alamos National Laboratory Technical Area 55 Part B Permit Renewal Application," Revision 2.0 (LANL, 2003a).

5.2 Removal of Waste

Prior to initiation of closure activities, all containerized wastes will be removed from the storage or treatment unit scheduled for closure. Containers may be removed from each location with forklifts. Small containers may be handled manually or with dollies. Containers will be placed on flat bed trucks, trailers, or other appropriate vehicles for transport. Appropriate shipping papers will accompany the wastes during transport. Containers holding hazardous or mixed wastes will be moved to an approved on-site CSU or a permitted off-site treatment, storage, or disposal facility.

At closure, all remaining hazardous/mixed waste and hazardous waste residues will be removed from the TA-55 waste management units. Unit structures, liners, bases, and equipment contaminated with hazardous/mixed waste or hazardous waste residues will be decontaminated or removed/dispositioned. All waste material will be controlled, handled, characterized, and dispositioned in accordance with LANL waste management procedures. Table 3 provides a list of the potential waste materials that may be generated during closure, possible waste type(s), and disposal options.

5.3 Preliminary Closure Procedures

5.3.1 Safety Precautions

In accordance with LANL safety procedures, job hazards associated with closure activities will be identified, controls developed, and workers briefed before closure activities are conducted. Personnel involved in closure activities will wear personal protective equipment (PPE) specified by LANL industrial hygiene and health physics personnel, and will follow good hygiene practices to protect themselves from exposure to hazardous and/or mixed waste. The level of PPE required will depend upon the physical hazards present and the levels of radiological and/or chemical contamination detected, if any. If surveys conducted by LANL industrial hygiene and health physics personnel indicate no detectable contamination levels, minimum PPE requirements will consist of coveralls, booties, gloves, steel-toed/composite-toed shoes, and safety glasses or face shields. Additional PPE will be required (e.g., hard hats, ear plugs) if other safety issues are identified. Contaminated PPE will be decontaminated or managed in accordance with applicable waste management regulations.

All workers involved in closure activities will be required to have appropriate training as required by site-specific work procedures. Workers who will manage hazardous/mixed waste or waste constituents during closure activities will follow the training requirements in the appropriate LANL RCRA Training Plan.

5.3.2 Pre-closure and Structural Assessment

Before starting closure decontamination and sampling activities, the operating and inspection records for the waste management units will be reviewed to determine any previous finding(s) or action(s) that may influence closure activities or potential sampling locations. Goals of this review will be to determine the specific hazardous waste constituents of concern; determine potential sampling locations for the storage or treatment unit by identifying any spills or chronic conditions in the operating record that would indicate the type and location of released constituents; and differentiate equipment or other materials that will undergo decontamination from those to be recycled or reused, or managed as waste. Tables in Attachments A through D list potential constituents of concern for the TA-55 storage and treatment units. Paths forward for equipment and surfaces at the units, locations for potential soil sampling, and locations and types of decontamination verification sampling (if determined to be necessary) will be identified during this assessment. In addition, background samples or data derived from LANL studies developed under the LANL corrective action program or other programs will be reviewed to determine levels or concentration thresholds applicable for the purposes of closure.

At least weekly, preventive maintenance inspections are conducted at the TA-55 units while waste is in storage or waste is being treated. If any defects, deterioration, damage, or hazards affecting containment developed, appropriate remedial actions (including sampling, repairs, maintenance, or replacement) are completed and noted in the inspection record. This information will be reviewed to determine whether these activities have resulted in conditions affecting the closure or determination of sampling needs.

Prior to beginning any decontamination activities at the TA-55 storage and treatment units, the base or secondary containment will be inspected for any existing cracks or conditions that indicate a potential for release of contaminants. This inspection will be documented with photographs and drawings, as necessary. If a crack, gap, or stained area is present, the operating record will be reviewed to determine the possible presence or release of contamination. If contamination could be present, a wipe sample or a representative sample of the media (e.g., concrete) will be taken and analyzed, following procedures outlined in Section 6.4.2 and in Attachments A through D of this closure plan, as appropriate, for the potential hazardous constituents identified during the assessment. If contamination is present above baseline/background levels, the surface flaw will be decontaminated to meet, as necessary, the applicable requirements for disposition (e.g., leaving in place, reuse, or disposal). Material may be partially or completely removed until contamination is no longer detected, or it is established that contamination present is not due to storage or treatment activities at the TA-55 units, but is part of historical contamination.

5.4 General Decontamination Procedures

To the extent necessary, all contaminated equipment present at closure, surfaces, and structures will be decontaminated. Discarded materials and equipment that cannot or will not be decontaminated will be managed as waste or otherwise dispositioned in compliance with applicable regulations. Decontamination procedures specific for the different types of storage and treatment units at TA-55 are further described in Attachments A through D of this closure plan.

If decontamination is necessary, all sampling during closure and decontamination will be conducted in accordance with quality assurance (QA)/quality control (QC) procedures defined by the latest revision of "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846) (EPA, 1986). Monitoring for contamination will occur throughout closure activities, as appropriate.

5.4.1 Equipment Located at the TA-55 Units

Equipment located at the TA-55 units will be wiped down with a solution of Alconox®, or equivalent cleaner, and water. To minimize the quantity of wash solution used, it will be dispensed from buckets, spray bottles, or other types of containers. Cheesecloth, rags, or other absorbent materials will be used to wipe down the equipment after being wetted in the wash solution or after spraying solution onto the equipment. If necessary, portable berms or other devices (e.g., absorbent socks, plastic sheeting, wading pools, or existing secondary containment) designed to collect and provide containment will collect excess wash water and provide containment during the decontamination process.

5.4.2 Floors and Walls at the TA-55 Units

Decontamination of the floors and walls of the TA-55 units will consist of washing with a solution of an Alconox®, or equivalent cleaner, and water. Mops, cloths, or other absorbent cleaning devices will be used to wipe down the surfaces after being wetted in the wash solution or after spraying solution onto the surfaces. To minimize the amount of liquid waste generated as a result of decontamination activities, the wash solution will be dispersed from buckets, spray bottles, or other types of small containers. Portable berms or other devices, if necessary, will be used to collect excess wash water and provide containment during the decontamination procedure. Sumps may also be used to collect excess wash water in those units that have them. After decontamination of the surfaces, the containment system will be wiped down and any excess wash water will be transferred to containers for characterization and disposition.

When decontamination of the CSU is complete, verification will be conducted as described in Section 5.5. If sampling and analyses indicate that hazardous constituents are present above acceptable levels, as described in Section 5.5, the wash cycles and verification analyses will continue until the surfaces, structures, or equipment have been decontaminated or the decision is made to proceed with an alternative demonstration of closure, as described in Section 5.6. Upon determination that a surface or structure is waste, it may be removed, transported, and stored at other hazardous waste storage units to facilitate the closure process.

5.4.3 Decontamination Waste Management

After any decontamination wash down process needed for the closing unit, any excess wash water will be collected, transferred to containers, sampled, and analyzed for the hazardous constituents identified in tables in Attachments A through D, as appropriate. The results of this analysis will be used to determine if the excess wash water should be managed as hazardous or non-hazardous wastewater. The wastewater, PPE, and any other waste generated as a result of closure will be managed as outlined in Table 3. All decontamination activities involving wash water will be conducted within the existing secondary containment for the unit or on secondary containment pallets in order to prevent migration to surface soils or waters. In addition, all waste management operations will be subject to LANL Hazardous Waste Facility Permit Contingency Plan conditions to further prevent potential contamination if spills occur. Subsequent disposition options for the decontaminated structures and equipment include reuse, recycling, or disposal.

5.4.4 Equipment Used During Closure

Reusable protective clothing, tools, and equipment used during decontamination activities will be cleaned with a wash water solution. Residue, disposable equipment, and reusable equipment that cannot be decontaminated will be containerized and managed as waste in accordance with LANL waste management procedures, depending on the regulated constituents present.

5.5 Verification of Decontamination

LANL proposes analysis of water and/or wipe samples for decontamination verification at the TA-55 storage and treatment units using the following methods:

- When liquid sampling, the verification solution will be limited to an amount that is sufficient to wipe down the surface to be verified and collect the required number of samples. This will minimize dilution of hazardous constituents present at the location.
- For wipe sampling, guidance from the analytical laboratory must be obtained prior to wipe verification sampling to confirm that the solution chosen for each analysis is

appropriate for the analysis to be conducted and that wipe sampling is a proper technique for the analysis.

- Sample area will be limited to a specific discrete location (e.g., a wall or portion thereof, depending on the size of the unit/equipment).
- Decontamination will be verified by comparing the discrete analytical results for liquid sampling to a baseline result (blank) obtained from the verification solution prior to its use for the verification wipe down. Comparison of wipe sample analytical results to an unused wipe media sample (blank) will be used to determine the presence or absence of contamination.
- If the result is at or below that of the blank, decontamination is verified for the discrete area sampled.
- If the result is above the blank, decontamination and verification will be repeated for the discrete location in accordance with Sections 5.4 and 5.5 of this closure plan; closure will be verified as described below; or the decision will be made to proceed with an alternative demonstration of closure, as described in Section 5.6.

These proposed methods minimize dilution and establish criteria by which successful decontamination is verified. Analytical procedures will conform to the methods found in Section 7.

5.5.1 Verification Criteria

Successful decontamination of the TA-55 storage and treatment units will meet a minimum of one of the following criteria:

- No detectable RCRA-regulated constituent residues from the management of stored or treated authorized RCRA-regulated wastes are identified in samples collected during closure activities.
- Analytical results of samples collected during decontamination verification activities identify no statistically significant concentrations of RCRA-regulated constituents above baseline/background data.
- Detectable concentrations of RCRA-regulated constituents in samples collected during verification activities are at or below levels agreed upon with the NMED to be protective of human health and the environment, based on the results of risk assessment methods.
    - Comparison of the analytical results to the appropriate NMED Soil Screening Levels (SSLs) (NMED, 2006) and/or the LANL Ecological Screening Levels (ESLs) (LANL, 1999), or most current applicable document(s). If the result is

below the SSL/ESL, the equipment/soil/surface will be considered free of contamination.

- Detectable concentrations of RCRA-regulated constituents that cannot be removed or decontaminated to acceptable levels, as described above, will be allowed to remain, provided that these RCRA-regulated constituents do not pose an unacceptable risk when combined with technical or administrative control measures agreed upon with the NMED.
    - Assessment of residual (i.e., above the SSL, ESL) contamination levels using an occupational risk scenario.

5.6 Alternative Demonstration of Closure

An alternative demonstration of closure may be justified at the TA-55 storage and treatment units addressed in this plan if verification methods described in the previous section are not feasible. LANL proposes the following alternative demonstrations:

- All equipment/materials/surfaces of the storage or treatment unit have been recycled or disposed of in accordance with applicable regulatory requirements.
- Pursuant to 20.4.1.200 NMAC §261.3(f)(2), LANL has requested and the NMED has approved a determination that the debris is no longer contaminated with hazardous waste.

Due diligence has been conducted to establish that contamination at the site is historical contamination (the difference between operating unit and historical operations cannot be distinguished) that should be addressed under corrective actions and not as part of the operating unit closure.

6 SAMPLE MANAGEMENT PROCEDURES

The following information presents general sample management and sampling equipment cleaning procedures shared in common for closure of the waste management units described in this closure plan. Specific sampling strategies to be used for this closure to demonstrate decontamination, if necessary, are included in Attachments A through D of this closure plan.

Samples will be collected and transported using documented chain-of-custody and sample management procedures to ensure the integrity of the sample and provide an accurate and defensible written record of the possession and handling of a sample from the time of collection through laboratory analysis. Sample collection equipment will include labels, chain-of-custody forms, EPA-certified clean containers, coolers, preservatives, and custody seals. The following

provides a description of sample documentation; sample handling, preservation, and storage; and sample packaging and transportation requirements that will be followed during the sampling activities associated with the closure.

6.1 Sample Documentation

Sampling personnel will complete and maintain records to document sampling and analysis activities. Sample documentation will include sample identification numbers, chain-of-custody forms, analysis requested, sample logbooks detailing sample collection activities, and shipping forms (if necessary).

6.1.1 Chain-of-Custody

Chain-of-custody forms will be maintained by sampling personnel until the samples are relinquished to the analytical laboratory. One chain-of-custody form may be used to document all of the samples collected from a single sampling event. The sample collector will be responsible for the integrity of the samples collected until properly transferred to another person. The EPA considers a sample to be in a person's custody if it is:

- In a person's physical possession,
- In view of the person in possession, or
- Secured by that person in a restricted access area to prevent tampering.

The sample collector will document all pertinent sample collection data. Individuals relinquishing or receiving custody of the samples will sign, date, and note the time on the analysis request/chain-of-custody form. A chain-of-custody form must accompany all samples from collection through laboratory analysis. The completed original chain-of-custody form will be returned by the analytical laboratory and will become a part of the permanent record documenting the sampling effort.

6.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- A unique sample identification number;
- Name of the sample collector;
- Date and time of collection;
- Type of preservatives used, if any; and

- Location from which the sample was collected.

A custody seal will be placed on each sample container to detect unauthorized tampering with the samples. These labels must be initialed, dated, and affixed by the sample collector in such a manner that it is necessary to break the seal to open the container.

6.1.3 Sample Logbook

All pertinent information on the sampling effort must be recorded in a bound logbook. Information must be recorded in ink and any cross outs must be made with a single line and the change initialed and dated by the author. The sample logbook will include the following information:

- The sample location,
- Suspected composition,
- Sample identification number,
- Volume/mass of sample taken,
- Purpose of sampling,
- Description of sample point and sampling methodology,
- Date and time of collection,
- Name of the sample collector,
- Sample destination and how it will be transported,
- Observations, and
- Names of personnel responsible for the observations.

6.2 Sample Handling, Preservation, and Storage

Samples will be collected and containerized in appropriate pre-cleaned sample containers. Table 4 presents the requirements in SW-846 (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE Orders, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate LANL documents establish these requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site

shipment preparation and transportation of general commodities, hazardous materials, substances, wastes, and defense program materials.

Off-site transportation of samples will occur via private, contract, or common motor carrier; air carrier; or freight. All off-site transportation will be processed through the LANL Packaging & Transportation (P&T) Organization, unless the shipper is specifically authorized through formal documentation by the P&T Organization to independently tender shipments to common motor or air carriers.

6.4 Sample Collection Procedures

Samples will be collected in accordance with the most recent and appropriate LANL sampling plan incorporating guidance from the EPA (EPA, 2002) and DOE (DOE, 1995), or other approved procedures.

6.4.1 Liquid Sampling

For verification sampling, each discrete sample location will be wiped down with clean water. A mop, cloth, and/or other absorbent material will be submerged into the container and squeezed out prior to wiping down the discrete surface to be verified. Excess solution will collect in a bermed area, if necessary. To minimize dilution of the samples, the solution used for the wipe down will be limited to a quantity sufficient to collect the appropriate number of samples. Liquid sampling will be conducted using glass or plastic tubes, a composite liquid waste sampler, a bacon bomb, a bailer, or by pouring liquid into sample containers.

6.4.2 Wipe Sampling

When surface wipe samples are used to determine if residual hazardous constituents remain within TA-55 waste management units, the samples will be taken in accordance with the National Institute of Occupational Safety and Health (NIOSH) *Manual of Analytical Methods*, Method 9100 (NIOSH, 1994), or other approved methodology. The appropriate use of wipe sample methods will consider the type of surface being sampled, the type of contaminant, the solution used, and the desired contaminant concentration detection limits. The NIOSH method includes wiping a 100 square centimeter area at each discrete location with a gauze wipe wetted with a liquid solution appropriate for the desired analysis (e.g., deionized water for lead). The solution used depends on the analysis; therefore, the analytical laboratory will be consulted prior to sampling activities to ensure that the correct solution is employed for each analysis and that wipe sampling is a proper technique for the analysis.

6.4.3 Soil Sampling

If necessary, soil will be sampled using a spade, scoop, auger, or trowel. Samples will be kept at their at-depth temperature or lower, protected from ultraviolet light, sealed tightly in the recommended container, and analyzed within the specific holding times listed in Table 4.

6.5 Cleaning of Sampling Equipment

Reusable sampling equipment will be cleaned and rinsed prior to use. Sampling equipment rinsate blanks will be collected and analyzed only if reusable sampling equipment is used. Reusable decontamination equipment, including protective clothing and tools, used during closure activities will be scraped as necessary to remove residue and cleaned with a wash water solution. Sampling equipment will be cleaned prior to each use with a wash solution, rinsed several times with tap water, and air-dried or wiped dry to prevent cross contamination of samples. A disposable sampler is considered clean if still in a factory-sealed wrapper. Residue, disposable decontamination equipment, and reusable decontamination equipment that cannot be decontaminated will be containerized and managed appropriately at an approved on-site facility.

7 ANALYSIS REQUIREMENTS

The following information presents general analysis procedures shared in common for the closure of the waste management units described in this closure plan. Specific analytical requirements to be used to demonstrate decontamination, if necessary, are included in Attachments A through D of this closure plan.

7.1 Analytical Laboratory Requirements

The analytical laboratory will perform the detailed qualitative and quantitative chemical analyses specified in Attachments A through D of this closure plan. This analytical laboratory will have:

- A documented comprehensive QA/ QC program,
- Technical analytical expertise,
- A document control/records management plan, and
- The capability to perform data reduction, validation, and reporting.

The selection of the analytical testing methods identified in Attachments A through D was based on the following considerations:

- The physical form of the waste,
- Constituents of interest,

- Required detection limits (e.g., regulatory thresholds), and
- Information requirements (e.g., waste classification).

7.2 Quality Assurance/Quality Control

Field sampling procedures and laboratory analyses will be evaluated through the use of QA/QC samples to assess the overall quality of the data produced. QC samples evaluate precision, accuracy, and potential sample contamination associated with the sampling/analysis process, and are described in the following sections, along with information on calculations necessary to evaluate the QC results. QA/QC samples will be collected in accordance with the most recent and appropriate LANL sampling plan incorporating guidance from the EPA (EPA, 2002) and DOE (DOE, 1995), or other approved procedures. Analysis will be conducted in accordance with procedures given in SW-846 (EPA, 1986), or other approved procedures or methods.

7.2.1 Field Quality Control

The field QC samples that may be collected include trip blanks, field blanks, field duplicates, and equipment rinsate blanks. Table 5 presents a summary of QC sample types, applicable analyses, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample.

7.2.2 Analytical Laboratory QC Samples

QA/QC considerations are an integral part of analytical laboratory operations. Laboratory QA ensures that analytical methods generate data that are technically sound, statistically valid, and that can be documented. QC procedures are the tools employed to measure the degree to which these QA objectives are met.

7.3 Data Reduction, Verification, Validation, and Reporting

Analytical data generated by the activities described in this closure plan will be verified and validated. Data reduction is the conversion of raw data to reportable units; transfer of data between recording media; and computation of summary statistics, standard errors, confidence intervals, and statistical tests.

7.4 Data Reporting Requirements

Analytical results will include all pertinent information about the condition and appearance of the sample-as-received. Analytical reports will include:

- A summary of analytical results for each sample;
- Results from QC samples such as blanks, spikes, and calibrations;
- Reference to standard methods or a detailed description of analytical procedures; and
- Raw data printouts for comparison with summaries.

The laboratory will describe off-normal sample preparations that occur during the analysis in sufficient detail so that the data user can understand how the sample was analyzed.

8 AMENDMENT OF THE CLOSURE PLAN

In accordance with 20.4.1.500 NMAC, §264.112(c) [10-1-03], LANL will submit a written change in the approved closure plan whenever:

- There are changes in operating plans or facility design that affect the closure plan, or
- There is a change in the expected date of closure, or
- Unexpected events occur during closure that require modification of the approved closure plan.

LANL will submit a written request for a permit modification with a copy of the amended closure plan at least 60 days prior to the proposed change in unit design or operation or no later than 60 days after an occurrence of an unexpected event that affects the closure plan. If the unexpected event occurs during closure, the permit modification will be requested within 30 days of the occurrence. The Secretary of the NMED may request a modification of the closure plan under the conditions presented in the bulleted items above. LANL will submit the modified plan in accordance with the request within 60 days of notification, or within 30 days of notification if a change in facility condition occurs during the closure process.

9 CLOSURE COST ESTIMATE, FINANCIAL ASSURANCE, AND LIABILITY REQUIREMENTS

In accordance with 20.4.1.500 NMAC, §264.140(c) [10-1-03], LANL, as a federal facility, is exempt from the requirements of 20.4.1.500 NMAC, Part 264, Subpart H [10-1-03], to provide a cost estimate, financial assurance mechanisms, and liability insurance for closure actions.

10 CLOSURE CERTIFICATION REPORT

Upon completion of the closure activities at the TA-55 storage and treatment units, a closure certification report will be prepared and submitted to the Secretary of the NMED. The report will document the closure and contain the following:

- A copy of the certification described in Section 2.2 of this closure plan.

- Any significant variance from the approved activities and the reason for the variance.
- A summary of all sampling results, showing:

  -Sample identification

  -Sampling location

  -Datum reported

  -Detection limit for each datum

  -A measure of analytical precision (e.g., uncertainty, range, variance)

  -Identification of analytical procedure

  -Identification of analytical laboratory.

- A QA/QC statement on analytical data validation and decontamination verification.
- The location of the file of supporting documentation, including:

  -Field logbooks
  -Laboratory sample analysis reports
  -QA/QC documentation
  -Chain-of-custody forms.

- Storage or disposal location of regulated hazardous/mixed waste resulting from closure activities.
- A certification of accuracy of the report.

11 NEW MEXICO ENVIRONMENT DEPARTMENT CLOSURE ASSESSMENT

LANL will notify the NMED Hazardous Waste Bureau (HWB) prior to the pre-closure and structural assessment of the waste management unit, described in Section 5.3.2, to provide an opportunity to participate in the unit's physical condition review. LANL may also arrange for other on-site reviews of closure activities at reasonable times upon request by NMED representatives. Upon submittal of the closure certification report described in Section 10 of this closure plan, LANL will arrange an on-site closure review with representatives of the HWB or equivalent NMED representatives to assess the completion of the closure activities for each waste management unit. LANL may also arrange for other on-site reviews of prior closure activities during the closure period at reasonable times upon request by NMED representatives.

12 REFERENCES

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Table 1

Technical Area 55 Storage and Treatment Unit Capacities and Waste Categories

Structure	Estimated Maximum Waste[a] (gallons)	55-gallon Drum Equivalent	Estimated Inventory[b, c] (gallons)	Waste Category
TA-55 Container Storage Units				
TA-55-4-B40	21,500	391	3,010,000	Solid and liquid hazardous and mixed waste
TA-55-4-B05	3,600	65	504,000	Solid hazardous and mixed waste
TA-55-4-K13	2,500	45	350,000	Solid and liquid hazardous and mixed waste
TA-55-4-B45	11,000	200	1,540,000	Solid hazardous and mixed waste
TA-55-4 Vault	4,000	73	560,000	Solid and liquid mixed waste
TA-55-185[c]	30,000	545	2,700,000	Solid and liquid hazardous and mixed waste
TA-55 Storage Tank System				
Evaporator Glovebox Tank	71	Not Applicable (NA)	107,352	Liquid mixed waste
Cementation Unit Pencil Tanks	65 (5 tanks)	NA	98,280	Liquid mixed waste
Pencil Tanks[c]	130 (10 tanks)	NA	140,400	Liquid mixed waste
TA-55 Cementation Unit				
Cementation Unit	150	NA	226,800	Solid and liquid mixed waste
TA-55 Outside Storage Pad Container Storage Unit				
Storage Pad	135,000	2,454	18,900,000	Solid and liquid hazardous and mixed waste

[a] Estimated maximum quantity of waste that can be stored/treated at the unit at one time.

[b] Estimated lifetime inventory of waste stored/treated at the unit.

[c] Estimated waste inventories are based on future use, because the unit will not be used until the issuance of a new Los Alamos National Laboratory Hazardous Waste Facility Permit.

Table 2

Closure Schedule for the Storage and Treatment Units at Technical Area 55

Activity	Maximum Time Required [a]
Submit amended closure plan (if necessary).	-90 Days
Notify the New Mexico Environment Department (NMED) of intent to close.	-45 Days
Conduct pre-closure and structural assessment.	-25 Days
Final receipt of waste.	Day 0
Remove stored/treated waste.	Day 5
Decontaminate surfaces and equipment.	Day 20
Sample excess decontamination materials for disposal. Perform equipment swipes or monitoring as necessary.	Day 20
Perform verification sampling.	Day 30
Evaluate analytical data from verification sampling.	Day 50
Perform additional decontamination, if necessary.	Day 55
Perform additional verification sampling, if necessary.	Day 60
Evaluate additional analytical data.	Day 75
Perform final cleanup and disposal (i.e., removal of decontaminated equipment and decontamination waste).	Day 140
Prepare closure certification report.	Day 150
Certify closure.	Day 175
Submit final report to NMED.	Day 180

[a] The schedule above indicates calendar days from the beginning by which activities will be completed. Some activities may be conducted simultaneously and/or may not require the maximum time listed. Extensions to this schedule may be requested, as needed.

Table 3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Technical Area 54 (TA-54) Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or the Waste Isolation Pilot Plant (WIPP), as appropriate.
Decontamination wash water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	Radioactive Liquid Waste Treatment Facility (RLWTF)
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Verification water	Non-regulated liquid waste	Sanitary sewer
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Radioactive liquid waste	RLWTF
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.

Table 3 (continued)

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Discarded asphalt	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Discarded concrete	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Sampling equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radio active solid waste	TA-54 Area G or off-site radioactive waste disposal facility
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

Table 4

Recommended Sample Containers[a], Preservation Techniques, and Holding Times[b]

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP Metals: Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver	Aqueous Media: 500-mL Wide-Mouth-Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO_3 to pH <2 Cool to 4°C	180 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4°C	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide-Mouth-Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO_3 to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4°C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Solid Media: Cool to 4°C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	
Semi-Volatile Organic Compounds			
Target Compound Semi-volatile Organic Compounds	Aqueous Media: Four 1-L Amber Glass with Teflon-Lined Lid	Aqueous Media: Cool to 4 °C	Seven days from field collection to preparative extraction. 40 days from preparative extraction to determinative analysis.
	Solid Media: 250-mL Glass	Solid Media: Cool to 4°C	

[a] Smaller sample containers may be required due to health and safety concerns associated with potential radiation exposure, transportation requirements, and waste management considerations.

[b] Information obtained from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, U.S. Environmental Protection Agency, 1986 and all approved updates.

°C = degrees Celsius
HNO_3 = nitric acid
HCl = hydrochloric acid
L = Liter
mL = milliter
TCLP = Toxicity Characteristic Leaching Procedure

Table 5

Recommended Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis [a]	Frequency	Acceptance Criteria
Trip Blank	VOC	One set per shipping cooler containing samples to be analyzed for VOCs	Not Applicable
Field Blank	VOC/SVOC, metals	One sample daily per analysis	Not Applicable
Field Duplicate	Chemical	One for each sampling sequence	Relative percent difference less than or equal to 20 percent
Equipment Rinsate Blank[b]	VOC/SVOC, metals	One sample daily	Not Applicable

[a] For VOC and SVOC analysis, if blank shows detectable levels of any common laboratory contaminant (e.g., methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

[b] Collected only if reusable sampling equipment used.

QC = quality control
VOC = volatile organic compound
SVOC = semi-volatile organic compound

ATTACHMENT A

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES

FOR CLOSURE OF THE

TECHNICAL AREA 55 CONTAINER STORAGE UNITS

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LIST OF ACRONYMS AND ABBREVIATIONS

ALARA	as low as reasonably achievable
CSU	container storage unit(s)
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ft	foot/feet
LANL	Los Alamos National Laboratory
TA	Technical Area

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES FOR CLOSURE OF THE TECHNICAL AREA 55 CONTAINER STORAGE UNITS

A.1. INTRODUCTION

This attachment describes specific decontamination, sampling strategies, and analytical requirements applicable to closure of the Los Alamos National Laboratory (LANL) Technical Area (TA) 55 Container Storage Units (TA-55 CSUs). General closure procedures for the TA-55 waste management units are presented in the closure plan. The general procedures include removal and appropriate disposition of the waste inventory in the unit prior to the beginning of closure, and a pre-closure and structural assessment of the unit, as described in Section 5.3.2 of the closure plan, for conditions that may adversely affect decontamination and verification sampling activities.

The waste management units addressed in this attachment are the TA-55 CSUs, which include TA-55-4-B40, -B05, -K13, -B45, and the Vault located at TA-55-4, and TA-55-185. Table A-1 lists the location of and dimensions for each CSU. Tables A-2 through A-7 identify the category, U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers, and specific constituents of concern for the wastes stored in the CSUs.

Closure activities at the TA-55 CSUs will include decontamination, recycling, reuse, and/or disposal of portable equipment; decontamination of floors and/or walls of the CSUs; reuse, recycling, and/or disposal of concrete (based on information in the operating record); and disposal of waste materials generated during closure activities.

Decontamination will be conducted as described in Section 5.4 of the closure plan and in Section A.2 herein. Sampling will be conducted in accordance with the most recent LANL sampling and analysis plan incorporating guidance from the EPA (EPA, 2002) and the U.S. Department of Energy (DOE) (DOE, 1995). Section A.3 in this attachment and Section 6 of the closure plan describe sampling activities and sample collection procedures, respectively. Analysis will be conducted in accordance with procedures given in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods” (EPA, 1986), or other approved procedures or methods. Analytical requirements are provided in Section A.4 herein and in Section 7 of the closure plan. All waste generated will be managed in accordance with applicable regulatory requirements and all waste will be removed from the CSUs as specified in Section 5.2 of the closure plan.

A.2. SPECIFIC DECONTAMINATION PROCEDURES

To the extent necessary, all contaminated equipment present at closure, surfaces, and structures will be decontaminated. Sampling and analysis will be performed, as necessary, to verify that decontaminated

equipment, surfaces, and structures meet the verification criteria specified in Section 5.5 of the closure plan. Discarded materials and equipment that cannot or will not be decontaminated will be dispositioned appropriately.

Many of the materials and equipment associated with the closure of the TA-55 CSUs will be handled as solid and potentially hazardous wastes when removed as described in this attachment. In these cases, these wastes will be characterized to meet applicable waste acceptance criteria using appropriate LANL waste management procedures.

A.2.1. Equipment Decontamination

The decontamination needs for equipment present in the CSUs will be reviewed during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan. In most cases, mixed waste has been stored in the TA-55 CSUs and any detected radioactivity above background levels will serve as an indicator for potential contamination by hazardous constituents. Any portable equipment in the CSUs will be swiped or monitored using radioassay procedures or equipment to determine the presence of contaminants before the equipment is removed. Depending upon the results of this assay, the final use or disposition of the equipment will be determined based upon the appropriate regulations or DOE policies. In other cases, the potential for contamination by hazardous waste or hazardous constituents will be determined based upon the review of the operating record for the CSU.

Prior to decontamination of the main surfaces at the TA-55 CSUs, contaminated portable equipment (if present) to be removed from the areas will be wiped down, when appropriate, with a wash water solution in accordance with the general procedures described in Section 5.4.1 of the closure plan. The equipment may include items such as pallets and miscellaneous waste management equipment (e.g., drum dollies, glove boxes).

A.2.2. Surfaces/Structures Decontamination

The surfaces and structures (e.g., floors and walls) of the CSUs will be decontaminated if determined to be necessary during the pre-closure and structural assessment discussed in Section 5.3.2 of the closure plan. Only the floor where hazardous/mixed waste was stored and the adjacent walls will be decontaminated; the walls will be decontaminated to a height of one foot (ft) above the highest level of waste previously stored in the unit. After decontamination of the floors and walls, the containment system (e.g., sumps) will be wiped down and any excess wash water will be transferred to containers for characterization and disposition. Decontamination of CSU surfaces and structures will be performed in accordance with the general procedures described in Section 5.4.2 of the closure plan. After the decontamination process, the excess wash water will be collected, sampled for analysis, and stored in

appropriate containers at the site. Each surface or structure may undergo several wash cycles; however, the option to remove the material and manage it as waste may be exercised at any time.

A.2.3. Vault

It is anticipated that the Vault storage area will remain an active mixed waste management unit until the end of the active life of TA-55-4, and that the area will be decontaminated in the manner described in Section A.2.2 above. However, potential radioactive contamination and worker safety issues may impact these procedures. If radioactive considerations embodied in the DOE "as low as reasonably achievable" (ALARA) safety concept preclude decontaminating the area using the wash water techniques, alternative measures will be initiated, as necessary, to ensure that the area is closed in a manner consistent with ALARA requirements and the intent of the closure requirements contained in this plan.

A.3. SAMPLING ACTIVITIES

All general sample management, documentation, handling, preservation, storage, and packaging and transportation procedures for the closure of the TA-55 waste management units are described in Section 6 of the closure plan. The following specific information applies to the sampling strategy and approach for closure of the TA-55 CSUs. Samples will be collected from each of the discrete locations according to the methods and procedures provided in Section 6.4 of the closure plan and analyzed for the appropriate hazardous constituents identified during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan.

A.3.1. Sampling Strategy/Approach

Sampling will be conducted to verify that decontamination efforts described herein and in Section 5.4 of the closure plan were effective at removing hazardous waste residues.

A.3.1.1. Soil Sampling Strategy

The TA-55 CSUs include secondary containment provisions and are located within structures to prevent run-on from flooding or precipitation. The concrete floors making up the units are coated with a chemical-resistant epoxy primer and paint, which effectively prevent the migration of any liquids through the concrete and into the environment. Pending the results of the pre-closure and structural assessment described in Section 5.3.2 of this closure plan, these features will have prevented the release of hazardous constituents to the surrounding environment. Therefore, soil sampling will not be applicable for the TA-55 CSUs unless the structural assessment and operating record indicate otherwise. In that case, LANL will notify the New Mexico Environment Department to discuss further proposals, such as utilizing the soil sampling techniques contained in Section 6.4.3 of the closure plan.

A.3.1.2. Verification Sampling Strategy

Verification samples will be collected from each of the locations where decontamination activities described in Section A.2 were performed. Liquid or wipe sampling will be used for decontamination verification of surfaces and structures (e.g., walls, concrete floors, and equipment). Verification sampling will be conducted for the floor and then the walls to prevent cross contamination of the samples and allow for the identification of contaminated areas. After decontamination, at least one sample for every 12-ft x 5-ft area will be collected, with no fewer than two samples taken from each CSU floor. Table A-1 provides the location and dimensions of each CSU. Samples will be collected from discrete locations according to the applicable procedure in Section 6.4 of the closure plan and analyzed by an independent laboratory for the appropriate hazardous constituents identified during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan. Tables A-2 through A-7 identify specific hazardous waste constituents of concern for the TA-55 CSUs. Tables A-2 through A-7 will be modified, if necessary, at the time of notification of closure to incorporate changes based on the operating record review that will be conducted for the CSUs.

In some cases, equipment removed from the TA-55 CSUs may not be amenable to liquid wash down procedures due to its size or composition. This equipment may include items such as analytical instrumentation. In such cases, the use of wipe samples to determine whether hazardous waste constituents are present may be appropriate. The use of radioactive swipe samples as surrogates may also be employed for the closure of the CSUs where the preliminary review of the operating records indicate only mixed waste containers were stored. Wipe samples will be collected in accordance with the procedure in Section 6.4.2 of the closure plan.

A.4. ANALYTICAL REQUIREMENTS

All general analytical requirements, quality assurance/quality control, and data requirements procedures for closure of the TA-55 CSUs are described Section 7 of the closure plan.

Analytical methods to be used for decontamination verification during the TA-55 CSUs closure activities are summarized in Table A-8. Each sample will be analyzed for the constituents identified in Tables A-2 through A-7, as appropriate. Analytes, test methods/instrumentation, target detection limits, and rationale for metals and organic analyses are also presented in Table A-8.

A.5. WASTE MANAGEMENT

Decontamination and sample collection activities will be conducted with waste minimization goals in mind. All waste material generated will be controlled, handled, characterized, and disposed of in accordance with LANL waste management procedures. Table 3 in the closure plan provides a list of the waste materials that could be generated during closure and potential disposal options.

A.6. REFERENCES

DOE, 1995. "DOE Methods for Evaluating Environmental and Waste Management Samples," DOE/EM-0089T, Rev. 2. Prepared for the U.S. Department of Energy by Pacific Northwest Laboratory, Richland, Washington.

EPA, 1986 and all approved updates. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA-*SW-846*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C.

EPA, 2002. "RCRA Waste Sampling Draft Technical Guidance Planning, Implementation, and Assessment," EPA530-D-02-002, August 2002, Office of Solid Waste, U.S. Environmental Protection Agency, Washington, D.C.

Table A-1

Container Storage Units at Technical Area 55

Container Storage Unit	Location	Dimensions
B40	TA-55-4, Basement	L-shaped, long dimensions of 61.5 ft x 55 ft
B05	TA-55-4, Basement	26 ft x10 ft
K13	TA-55-4, Basement	16 ft x 13 ft
B45	TA-55-4, Basement	45 ft x 17.5 ft
Vault	TA-55-4, Basement	79.5 ft x 50.5 ft
TA-55-185	West of TA-55-4	60 ft x 40 ft

TA = Technical Area
ft = feet/foot

Table A-2

Hazardous Waste Constituents of Concern at the TA-55-4-B40 Container Storage Unit[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
Volatile Organic Compounds	F001, F002, F003, F005	Trichloroethylene, Xylene, Acetone
Semi-Volatile Organic Compounds	D018, D019, D021, D022, D035, D038, D039, D040	Benzene, Carbon tetrachloride, Chlorobenzene, Chloroform, Methyl ethyl ketone, Pyridine, Tetrachloroethylene, Trichloroethylene

[a] Based on the unit operating record.
EPA = U.S. Environmental Protection Agency

Table A-3

Hazardous Waste Constituents of Concern at the TA-55-4-B05 Container Storage Unit[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
Volatile Organic Compounds	F001, F002, F003, F005	Trichloroethylene, Xylene, Acetone
Semi-Volatile Organic Compounds	D018, D019, D021, D022, D035, D038, D039, D040	Benzene, Carbon tetrachloride, Chlorobenzene, Chloroform, Methyl ethyl ketone, Pyridine, Tetrachloroethylene, Trichloroethylene

[a] Based on the unit operating record.
EPA = U.S. Environmental Protection Agency

Table A-4

Hazardous Waste Constituents of Concern at the TA-55-4-K13 Container Storage Unit[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
Ignitable	D001	Not Applicable
Corrosive	D002	Not Applicable
Reactive	D003	Not Applicable
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
Volatile Organic Compounds	F001, F002, F003	Trichloroethylene, Xylene, Acetone
Semi-Volatile Organic Compounds	D018, D028	Benzene, 1,2-Dichloroethane

[a] **Based on the unit operating record.**
EPA = U.S. Environmental Protection Agency

Table A-5

Hazardous Waste Constituents of Concern at the TA-55-4-B45 Container Storage Unit[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
Volatile Organic Compounds	F001, F002, F003, F005	Trichloroethylene, Xylene, Acetone
Semi-Volatile Organic Compounds	D018, D019, D021, D022, D035, D038, D039, D040	Benzene, Carbon tetrachloride, Chlorobenzene, Chloroform, Methyl ethyl ketone, Pyridine, Tetrachloroethylene, Trichloroethylene

[a] **Based on the unit operating record.**
EPA = U.S. Environmental Protection Agency

Table A-6

Hazardous Waste Constituents of Concern at the TA-55-4 Vault Container Storage Unit[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
Volatile Organic Compounds	F001, F002, F003, F005	Trichloroethylene, Xylene, Acetone

[a] **Based on the unit operating record .**
EPA = U.S. Environmental Protection Agency

Table A-7

Hazardous Waste Constituents of Concern at the TA-55-185 Container Storage Unit[a]

Category	EPA Hazardous Waste Numbers[b]	Specific Constituents
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver

[a] Based on the unit operating record.
[b] Estimated EPA Hazardous Waste Numbers are based on future use, because the container storage unit will not be used until the issuance of a new Los Alamos National Laboratory Hazardous Waste Facility Permit.
EPA = U.S. Environmental Protection Agency

Table A-8

Summary of Proposed Analytical Methods

Analyte	EPA SW-846 Analytical Method [a]	Test Methods/ Instrumentation	Target Detection Limit [b]	Rationale
Metal Analysis				
Arsenic	7060A [c], 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A [d], 7081 [c]	FLAA, GFAA	200 ug/L	
Cadmium	7130 [d], 7131A [c]	FLAA, GFAA	2 ug/L	
Chromium	7190 [d], 7191 [c]	FLAA, GFAA	10 ug/L	
Lead	7420 [d], 7421 [c]	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A [e]	CVAA	0.2 ug/L	
Selenium	7740[c], 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A[d], 7761 [c]	FLAA, GFAA	10 ug/L	
Organic Analysis				
Target compound list VOCs	8260B	GC/MS	10 mg/L	Determine the VOCs concentration in the samples.
Target compound list SVOCs	8270D [c]	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.

[a] U.S. Environmental Protection Agency (EPA), 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846.
[b] Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.
[c] Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.
[d] Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.
[e] Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy
FLAA = Flame atomic absorption spectroscopy
GC/MS = Gas chromatography/mass spectrometry
GFAA = Graphite furnace atomic absorption spectroscopy
mg/L = milligrams per liter SVOC = semi volatile organic compounds
ug/L = micrograms per liter.
VOC = volatile organic compounds

ATTACHMENT B

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES

FOR CLOSURE OF THE

TECHNICAL AREA 55 STORAGE TANK SYSTEM

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LIST OF ACRONYMS AND ABBREVIATIONS

DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ft	foot/feet
LANL	Los Alamos National Laboratory
TA	Technical Area

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES FOR CLOSURE OF THE TECHNICAL AREA 55 STORAGE TANK SYSTEM

B.1. INTRODUCTION

This attachment describes specific decontamination, sampling strategies, and analytical requirements applicable to closure of the Los Alamos National Laboratory (LANL) Technical Area (TA) 55 Storage Tank System. General closure procedures for the TA-55 waste management units are presented in the closure plan. The general procedures include removal and appropriate disposition of the waste inventory in the unit prior to the beginning of closure, and a pre-closure and structural assessment of the unit, as described in Section 5.3.2 of the closure plan, for conditions that may adversely affect decontamination and verification sampling activities.

The waste management unit addressed in this attachment is the TA-55 Storage Tank System located in Room 401 at TA-55-4. This tank system includes 16 tanks in three component systems. Table B-1 lists the components, their locations, and the associated number of tanks. Table B-2 identifies the category, U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers, and specific constituents of concern for the wastes stored in the Storage Tank System.

Closure activities at the TA-55 Storage Tank System will include decontamination, recycling, reuse, and/or disposal of portable equipment; decontamination of the floor and/or walls of the unit and reuse, recycling, and/or disposal (as indicated by the operating record); and disposal of waste materials generated during closure activities.

Decontamination will be conducted as described in Section 5.4 of the closure plan and in Section A.2 herein. Sampling will be conducted in accordance with the most recent LANL sampling and analysis plan incorporating guidance from the EPA (EPA, 2002) and the U.S. Department of Energy (DOE) (DOE, 1995). Section A.3 in this attachment and Section 6 of the closure plan describe sampling activities and sample collection procedures, respectively. Analysis will be conducted in accordance with procedures given in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods” (EPA, 1986), or other approved procedures or methods. Analytical requirements are provided in Section A.4 herein and in Section 7 of the closure plan. All waste generated will be managed in accordance with applicable regulatory requirements. All waste will be removed from the unit as specified in Section 5.2 of the closure plan.

B.2. SPECIFIC DECONTAMINATION PROCEDURES

To the extent necessary, all contaminated equipment present at closure, surfaces, and structures will be decontaminated. Sampling and analysis will be performed to verify that decontaminated

equipment, surfaces, and structures meet the verification criteria specified in Section 5.5 of the closure plan. Discarded materials and equipment that cannot or will not be decontaminated will be dispositioned appropriately.

Many of the materials and equipment associated with the closure of the Storage Tank System will be handled as solid and potentially hazardous wastes when removed as described in this attachment. In these cases, these wastes will be characterized to meet applicable waste acceptance criteria using appropriate LANL waste management procedures.

B.2.1. Storage Tank System Components

Storage Tank System components will be decommissioned at closure. Due to the design of the storage tank components, decontamination is not possible. The decommissioned Storage Tank System components will be containerized, characterized using standard LANL waste characterization procedures, and managed in compliance with appropriate regulations.

B.2.2. Ancillary Equipment

The Storage Tank System ancillary equipment (e.g., piping, pumps) will either be decontaminated, decommissioned, or dismantled, depending on the extent of contamination and anticipated disposition or use after closure. Closure of the system will include removal of all tank components and ancillary equipment, including the shared portions of the piping system. The facility headers for ventilation, the wet vacuum system, and the radioactive liquid waste collection system will be left in place for other uses. If any of the ancillary equipment is to be decommissioned or dismantled, the resulting components will be containerized and managed in compliance with applicable regulations. If the ancillary equipment is to be decontaminated, the following procedures will be used.

Mixed waste has been stored in the Storage Tank System and any detected radioactivity above background levels will serve as an indicator for potential contamination by hazardous constituents. Equipment will be swiped or monitored using radioassay procedures or equipment to determine the presence of contaminants before the equipment is removed. Depending upon the results of this assay, the final use or disposition of the equipment will be determined based upon the appropriate regulations or DOE policies. In other cases, the potential for contamination by hazardous waste or hazardous constituents will be based upon the review of the operating record for the Storage Tank System.

Prior to decontamination of the main surfaces at the TA-55 Storage Tank System, any contaminated ancillary equipment to be removed from the area will be wiped down with a wash water solution in accordance with the general procedures described in Section 5.4.1 of the

closure plan. The interior surfaces of the ancillary equipment will be flushed with the decontamination solution. The exterior surfaces will be decontaminated using mops, cloths, and/or other absorbent materials to remove any potential hazardous constituents. Excess wash water will be collected, removed, and transferred to an appropriate container for storage pending receipt of analytical results.

B.2.3. Areas Adjacent to the Storage Tank System

Random wipe samples from the areas adjacent to the Storage Tank System (e.g., walls, floors, sumps, and drains) will be collected and analyzed for the hazardous constituents expected to be present, based on the operating record. Table B-2 lists specific hazardous waste constituents of concern for the Storage Tank System. If decontamination measures are deemed necessary based on the analytical results, the following procedures will be used.

If determined to be necessary, decontamination of surface areas associated with the TA-55 Storage Tank System will involve removing any contamination through washing the surface with appropriate decontamination solutions until decontamination is achieved. Decontamination of surfaces and structures will be performed in accordance with the general procedures described in Section 5.4.2 of the closure plan. After decontamination of the surfaces, the containment system (e.g., recessed areas, sumps, berms) will be wiped down in a similar manner. Upon completion of the decontamination process, the excess wash water will be collected, sampled for analysis, and stored in appropriate containers at the site pending receipt of analytical results.

B.3. SAMPLING ACTIVITIES

All general sample management, documentation, handling, preservation, storage, and packaging and transportation procedures for the closure of the TA-55 waste management units are described in Section 6 of the closure plan. The following specific information applies to the sampling strategy and approach for closure of the TA-55 Storage Tank System. Samples will be collected from discrete locations according to the methods and procedures provided in Section 6.4 of the closure plan and analyzed for the appropriate hazardous constituents identified during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan.

B.3.1. Sampling Strategy/Approach

Sampling will be conducted to verify that decontamination efforts described herein and in Section 5.4 of the closure plan were effective at removing hazardous waste residues.

B.3.1.1. Soil Sampling Strategy

The TA-55 Storage Tank System includes secondary containment provisions and is located within the TA-55-4 building, which prevents run-on from flooding or precipitation. The floors at the unit are coated with a chemical-resistant epoxy primer and paint, which effectively prevent the migration of any liquids through the concrete and into the environment. Pending the results of the pre-closure and structural assessment described in Section 5.3.2 of the closure plan, these features will have prevented the release of hazardous constituents to the surrounding environment. Therefore, soil sampling will not be applicable for the TA-55 Storage Tank System closure. In the case that the pre-closure and structural assessment and the operating record indicate otherwise, LANL will notify the New Mexico Environment Department to discuss further proposals, such as utilizing soil sampling techniques contained in Section 6.4.3 of the closure plan.

B.3.1.2. Verification Sampling Strategy

Verification samples will be collected from each of the locations where decontamination activities described in Section A.2 were performed. Liquid or wipe sampling will be used for decontamination verification of surfaces, structures, and other equipment. Verification sampling will be conducted for the floor and then the walls to prevent cross contamination of the samples and allow for the identification of contaminated areas. After decontamination, at least one sample for every 12-ft x 5-ft area will be collected, with no fewer than two samples taken from the adjacent areas. Samples will be collected from discrete locations according to the applicable procedure in Section 6.4 of the closure plan and analyzed by an independent analytical laboratory for the appropriate constituents identified during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan. Table B-2 identifies specific hazardous waste constituents of concern for the Storage Tank System. Table B-2 will be modified, if necessary, at the time of notification of closure to incorporate changes based on the operating record review that will be conducted for the Storage Tank System.

In some cases, equipment removed from the Storage Tank System may not be amenable to liquid wash down procedures due to its size or composition. This equipment may include items such as analytical instrumentation or vacuum pumps. In such cases, the use of wipe samples to determine whether hazardous waste constituents are present may be appropriate. The use of radioactive swipe samples as surrogates may also be employed for the closure of the unit where the operating records indicate only mixed waste was stored. Wipe samples will be collected in accordance with the procedure in Section 6.4.2 of the closure plan.

B.4. ANALYTICAL REQUIREMENTS

All general analytical requirements, quality assurance/quality control, and data requirements procedures for closure of the TA-55 Storage Tank System are described Section 7 of the closure plan. Analytical methods to be used for decontamination verification during the TA-55 Storage Tank System closure activities are summarized in Table B-3. Each sample will be analyzed for the constituents identified in Table B-2, as appropriate. Analytes, test methods/instrumentation, target detection limits, and rationale for metals and organic analyses are also presented in Table B-3.

B.5. WASTE MANAGEMENT

Decontamination and sample collection activities will be conducted with waste minimization goals in mind. All waste material generated will be controlled, handled, characterized, and disposed of in accordance with LANL waste management procedures. Table 3 in the closure plan provides a list of the waste materials that could be generated during closure and potential disposal options.

B.6. REFERENCES

DOE, 1995. "DOE Methods for Evaluating Environmental and Waste Management Samples," DOE/EM-0089T, Rev. 2. Prepared for the U.S. Department of Energy by Pacific Northwest Laboratory, Richland, Washington.

EPA, 1986 and all approved updates. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA-*SW-846*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C.

EPA, 2002. "RCRA Waste Sampling Draft Technical Guidance Planning, Implementation, and Assessment," EPA530-D-02-002, August 2002, Office of Solid Waste, U.S. Environmental Protection Agency, Washington, D.C.

Table B-1
Storage Tank System at Technical Area 55[a]

Tank Component	Location	Number of Tanks
Evaporator Glovebox Tank	TA-55-4, Room 401	1
Cementation Unit Pencil Tanks	TA-55-4, Room 401	5
Pencil Tanks	TA-55-4, Room 401	10

[a] The Storage Tank System consists of 3 components that store the same waste type and share a common piping network.

TA = technical area

Table B-2

Hazardous Waste Constituents of Concern at the TA-55-4 Storage Tank System[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
Corrosive	D002	Not Applicable
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver

[a] Based on the unit operating record.
EPA = U.S. Environmental Protection Agency

Table B-3

Summary of Proposed Analytical Methods

Analyte	EPA SW-846 Analytical Method [a]	Test Methods/ Instrumentation	Target Detection Limit [b]	Rationale
Metal Analysis				
Arsenic	7060A [c], 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A [d], 7081 [c]	FLAA, GFAA	200 ug/L	
Cadmium	7130 [d], 7131A [c]	FLAA, GFAA	2 ug/L	
Chromium	7190 [d], 7191 [c]	FLAA, GFAA	10 ug/L	
Lead	7420 [d], 7421 [c]	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A [e]	CVAA	0.2 ug/L	
Selenium	7740[c], 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A[d], 7761 [c]	FLAA, GFAA	10 ug/L	
Organic Analysis				
Target compound list VOCs	8260B	GC/MS	10 mg/L	Determine the VOCs concentration in the samples.
Target compound list SVOCs	8270D [c]	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.

[a] U.S. Environmental Protection Agency (EPA), 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846.
[b] Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.
[c] Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.
[d] Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.
[e] Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy
FLAA = Flame atomic absorption spectroscopy
GC/MS = Gas chromatography/mass spectrometry
GFAA = Graphite furnace atomic absorption spectroscopy
mg/L = milligrams per liter
SVOC = semi volatile organic compounds
ug/L = micrograms per liter.
VOC = volatile organic compounds

ATTACHMENT C

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES

FOR CLOSURE OF THE

TECHNICAL AREA 55 CEMENTATION UNIT

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LIST OF ACRONYMS AND ABBREVIATIONS

DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ft	foot/feet
LANL	Los Alamos National Laboratory
TA	Technical Area

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES FOR CLOSURE OF THE TECHNICAL AREA 55 CEMENTATION UNIT

C.1. INTRODUCTION

This attachment describes specific decontamination, sampling strategies, and analytical requirements applicable to closure of the Los Alamos National Laboratory (LANL) Technical Area (TA) 55 Cementation Unit. General closure procedures for the TA-55 waste management units are presented in the closure plan. The general procedures include removal and appropriate disposition of the waste inventory in the unit prior to the beginning of closure, and a pre-closure and structural assessment of the unit, as described in Section 5.3.2 of the closure plan, for conditions that may adversely affect decontamination and verification sampling activities.

The waste management unit addressed in this attachment is the TA-55 Cementation Unit, located in Room 401 at TA-55-4. The unit consists of a pH column, vacuum trap, two motor-driven mixers, four impellers, and piping inside of a glovebox. Table C-1 identifies the category, U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers, and specific constituents of concern for the wastes treated in the Cementation Unit.

Closure activities at the TA-55 Cementation Unit will include decontamination, recycling, reuse, and/or disposal of portable equipment; decontamination of the floor and/or walls of the unit and reuse, recycling, and/or disposal of concrete (as indicated by the operating record); and disposal of waste materials generated during closure activities.

Decontamination will be conducted as described in Section 5.4 of the closure plan and in Section A.2 herein. Sampling will be conducted in accordance with the most recent LANL sampling and analysis plan incorporating guidance from the EPA (EPA, 2002) and the U.S. Department of Energy (DOE) (DOE, 1995). Section A.3 in this attachment and Section 6 of the closure plan describe sampling activities and sample collection procedures, respectively. Analysis will be conducted in accordance with procedures given in the “Test Methods for Evaluating Solid Waste Physical/Chemical Methods” (EPA, 1986) or other approved procedures or methods. . Analytical requirements are provided in Section A.4 herein and in Section 7 of the closure plan. All waste generated will be managed in accordance with applicable regulatory requirements. All wastes will be removed from the unit as specified in Section 5.2 of the closure plan.

C.2. SPECIFIC DECONTAMINATION PROCEDURES

To the extent necessary, all contaminated equipment present at closure, surfaces, and structures will be decontaminated. Sampling and analysis will be performed to verify that decontaminated equipment, surfaces, and structures meet the verification criteria specified in Section 5.5 of the

closure plan. Discarded materials and equipment that cannot or will not be decontaminated will be dispositioned appropriately.

The TA-55 Cementation Unit is used to treat mixed waste and any detected radioactivity above background levels will serve as an indicator for potential contamination by hazardous constituents. Cementation Unit components may be swiped or monitored using radioassay procedures or equipment to determine the presence of contaminants before the component is removed. Depending upon the results of this assay, the final use or disposition of the component will be determined based upon the appropriate regulations or DOE policies.

Many of the materials and equipment associated with the closure of the Cementation Unit will be handled as solid and potentially hazardous wastes when removed as described in this attachment. In these cases, these wastes will be characterized to meet applicable waste acceptance criteria using appropriate LANL waste management procedures.

C.2.1. Cementation Unit Equipment and Glovebox

The Cementation Unit equipment (e.g., pH column, vacuum trap, motor-driven mixers, impellers) and glovebox will either be decontaminated, decommissioned, or dismantled, depending on the extent of contamination and anticipated disposition or use after closure. If the Cementation Unit equipment and/or the glovebox are to be decommissioned or dismantled, the resulting components will be containerized and managed appropriately at an approved on-site facility, depending on the regulated constituents present. If the Cementation Unit equipment and/or the glovebox are to be decontaminated, the following procedures will be used.

Prior to decontamination of any of the Cementation Unit equipment, any visible material located inside the glovebox will be removed to the extent possible and managed in compliance with appropriate regulations. The Cementation Unit equipment (while located inside the glovebox) and interior surfaces of the glovebox will be rinsed or flushed with wash water or wiped down with cloths and/or other absorbent materials in accordance with the general procedures described in Section 5.4.1 of the closure plan. Excess wash water will be collected, removed, and transferred to an appropriate container for storage pending receipt of analytical results.

C.2.2. Ancillary Equipment

The Cementation Unit ancillary equipment located inside Room 401 (outside the glovebox) will either be decontaminated, decommissioned, or dismantled, depending on the extent of contamination and anticipated disposition or use after closure. If any of the Cementation Unit ancillary equipment is to be decommissioned or dismantled, the resulting components will be containerized and managed appropriately at an approved on-site facility, depending on the

regulated constituents present. If decontamination measures are deemed appropriate, decontamination of ancillary equipment will be performed in accordance with the general procedures described in Section 5.4.1 of the closure plan. Excess wash water will be collected, removed, and transferred to an appropriate container for storage pending receipt of analytical results.

C.2.3. Areas Adjacent to the Cementation Unit Glovebox

Random wipe samples from the areas adjacent to the Cementation Unit glovebox (e.g., walls, floors, sumps, and drains) will be collected and analyzed for the hazardous constituents expected to be present, based on the operating record. Table C-1 lists specific hazardous waste constituents of concern for the Cementation Unit. If decontamination measures are deemed necessary based on the analytical results, the following procedures will be used.

Decontamination of areas adjacent to the Cementation Unit glovebox (e.g., walls, floors) will involve removing any contamination through washing the surface with appropriate decontamination solutions until decontamination is achieved. After decontamination of the surfaces, the containment system (e.g., recessed areas, sumps, berms) will be wiped down. Decontamination will be performed in accordance with the general procedures described in Section 5.4.2 of the closure plan. After the decontamination process, the excess wash water will be collected, sampled for analysis, and stored in appropriate containers at the site pending receipt of analytical results. Each area may undergo several wash cycles; however, the option to remove the material and manage it as waste may be exercised at any time.

C.3. SAMPLING ACTIVITIES

All general sample management, documentation, handling, preservation, storage, and packaging and transportation procedures for the closure of the TA-55 waste management units are described in the closure plan. The following specific information applies to the sampling strategy and approach for closure of the TA-55 Cementation Unit. Samples will be collected from discrete locations according to the methods and procedures provided in Section 6.4 of the closure plan and analyzed for the appropriate hazardous constituents identified during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan.

C.3.1. Soil Sampling Strategy/Approach

Sampling will be conducted to verify that decontamination efforts described in Section 5.4 of the closure plan were effective at removing hazardous waste residues.

C.3.1.1. Soil Sampling Strategy

The TA-55 Cementation Unit includes secondary containment provisions and is located within the TA-55-4 building, which prevents run-on from flooding or precipitation. The concrete floor is coated with a chemical-resistant epoxy primer and paint, which effectively prevents the migration of any liquids through the concrete and into the environment. Pending the results of the pre-closure and structural assessment described in Section 5.3.2 of the closure plan, these features will have prevented the release of hazardous constituents to the surrounding environment. Therefore, soil sampling will not be applicable for the Cementation Unit unless the structural assessment and operating record indicate otherwise. In that case, LANL will notify the New Mexico Environment Department to discuss further proposals, such as utilizing the soil sampling techniques contained in Section 6.4.3 of the closure plan.

C.3.1.2. Verification Sampling Strategy

Verification samples will be collected from each of the locations where decontamination activities described in Section A.2 were performed. Liquid or wipe sampling will be used for decontamination verification of surfaces, structures, and equipment. After decontamination, at least one sample for every 12-ft x 5-ft area will be collected, with no fewer than two samples taken from the Cementation Unit floor. Samples will be collected from discrete locations according to the applicable procedure in Section 6.4 of the closure plan and analyzed by an independent analytical laboratory for the appropriate constituents identified during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan. Table C-1 identifies specific hazardous waste constituents of concern for the Cementation Unit. C-1 will be modified, if necessary, at the time of notification of closure to incorporate changes based on the operating record review that will be conducted for the Cementation Unit.

In some cases, equipment removed from the TA-55 Cementation Unit may need to be determined to be clean before removal from the unit and further use but is not amenable to liquid wash down due to its size or composition. This equipment may include items such as the analytical instrumentation. In such cases, the use of wipe samples to determine whether hazardous waste constituents are present may be appropriate. The use of radioactive swipe samples as surrogates may also be employed for the closure of the unit where the operating records indicate only mixed waste was treated. Wipe samples will be collected in accordance with the procedure in Section 6.4.2 of the closure plan.

C.4. ANALYTICAL REQUIREMENTS

All general analytical requirements, quality assurance/quality control, and data requirements procedures for closure of the TA-55 Cementation Unit are described Section 7 of the closure plan.

Analytical methods to be used for decontamination verification during the TA-55 Cementation Unit closure activities are summarized in Table C-2. Each sample will be analyzed for the constituents identified in Table C-1, as appropriate. Analytes, test methods/instrumentation, target detection limits, and rationale for metals and organic analyses are also presented in Table C-2.

C.5. WASTE MANAGEMENT

Decontamination and sample collection activities will be conducted with waste minimization goals in mind. All waste material generated will be controlled, handled, characterized, and disposed of in accordance with LANL waste management procedures. Table 3 in the closure plan provides a list of the waste materials that could be generated during closure and potential disposal options.

C.6. REFERENCES

DOE, 1995. "DOE Methods for Evaluating Environmental and Waste Management Samples," DOE/EM-0089T, Rev. 2. Prepared for the U.S. Department of Energy by Pacific Northwest Laboratory, Richland, Washington.

EPA, 1986 and all approved updates. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA-*SW-846*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C.

EPA, 2002. "RCRA Waste Sampling Draft Technical Guidance Planning, Implementation, and Assessment," EPA530-D-02-002, August 2002, Office of Solid Waste, U.S. Environmental Protection Agency, Washington, D.C.

Table C-1

Hazardous Waste Constituents of Concern at the TA-55-4 Cementation Unit[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
Corrosive	D002	Not Applicable
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver

[a] Based on the unit operating record.

EPA = U.S. Environmental Protection Agency

Table C-2

Summary Of Proposed Analytical Methods

Analyte	EPA SW-846 Analytical Method [a]	Test Methods/ Instrumentation	Target Detection Limit [b]	Rationale
Metal Analysis				
Arsenic	7060A [c], 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A [d], 7081 [c]	FLAA, GFAA	200 ug/L	
Cadmium	7130 [d], 7131A [c]	FLAA, GFAA	2 ug/L	
Chromium	7190 [d], 7191 [c]	FLAA, GFAA	10 ug/L	
Lead	7420 [d], 7421 [c]	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A [e]	CVAA	0.2 ug/L	
Selenium	7740[c], 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A[d], 7761 [c]	FLAA, GFAA	10 ug/L	
Organic Analysis				
Target compound list VOCs	8260B	GC/MS	10 mg/L	Determine the VOCs concentration in the samples.
Target compound list SVOCs	8270D [c]	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.

[a] U.S. Environmental Protection Agency (EPA), 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846.
[b] Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.
[c] Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.
[d] Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.
[e] Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy
FLAA = Flame atomic absorption spectroscopy
GC/MS = Gas chromatography/mass spectrometry
GFAA = Graphite furnace atomic absorption spectroscopy
mg/L = milligrams per liter
SVOC = semi volatile organic compounds
ug/L = micrograms per liter.
VOC = volatile organic compounds

ATTACHMENT D

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES

FOR CLOSURE OF THE

TECHNICAL AREA 55 STORAGE PAD CONTAINER STORAGE UNIT

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

CSU	Container Storage Unit
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ft	foot/feet
in.	inch
LANL	Los Alamos National Laboratory
TA	Technical Area

SPECIFIC DECONTAMINATION, SAMPLING, AND ANALYSIS ACTIVITIES FOR CLOSURE OF THE TECHNICAL AREA 55 STORAGE PAD CONTAINER STORAGE UNIT

D.1. INTRODUCTION

This attachment describes specific decontamination, sampling strategies, and analytical requirements applicable to closure of the Los Alamos National Laboratory (LANL) Technical Area (TA) 55 Storage Pad Container Storage Unit (CSU). General closure procedures for the TA-55 waste management units are presented in the closure plan. The general procedures include removal and appropriate disposition of the waste inventory in the unit prior to the beginning of closure, and a pre-closure and structural assessment of the unit, as described in Section 5.3.2 of the closure plan, for conditions that may adversely affect decontamination and verification sampling activities.

The waste management unit addressed in this attachment is the TA-55 Storage Pad CSU located northwest of Building TA-55-4. The pad is trapezoidal in shape and measures 102 feet (ft) x 86 ft x 156 ft x 105 ft. A 70 ft x 10 ft rectangular area was added to the side of the pad. Table D-1 identifies the category, U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers, and specific constituents of concern for the wastes stored on the Storage Pad CSU.

Closure activities at the TA-55 Storage Pad CSU will include decontamination, recycling, reuse, and/or disposal of portable equipment; removal of the storage pad underlying the CSU and reuse, recycling, and/or disposal of asphalt (based on information in the operating record); removal of soil if determined to be contaminated above acceptable levels (based on information in the operating record or determined through analysis); and disposal of waste materials generated during closure activities.

Decontamination will be conducted as described in Section 5.4 of the closure plan and in Section A.2 herein. Sampling will be conducted in accordance with the most recent LANL sampling and analysis plan incorporating guidance from the EPA (EPA, 2002) and the U.S. Department of Energy (DOE) (DOE, 1995). Section A.3 in this attachment and Section 6 of the closure plan describe sampling activities and sample collection procedures, respectively. Analysis will be conducted in accordance with procedures given in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods” (EPA, 1986), or other approved procedures or methods. Analytical requirements are provided in Section A.4 herein and in Section 7 of the closure plan. All waste generated will be managed in accordance with applicable regulatory requirements. All wastes will be removed from the CSU as specified in Section 5.2 of the closure plan.

D.2. SPECIFIC DECONTAMINATION PROCEDURES

To the extent necessary, all contaminated equipment present at closure, surfaces, and media will be decontaminated. Sampling and analysis will be performed, as necessary, to verify that decontaminated equipment, surfaces, and media meet the verification criteria specified in Section 5.5 of the closure plan. Discarded materials and equipment that cannot or will not be decontaminated will be dispositioned appropriately.

Some of the materials and equipment associated with closure of the storage pad will be handled as solid and potentially hazardous wastes when removed as described in this attachment. In these cases, these wastes will be characterized to meet applicable waste acceptance criteria using appropriate LANL waste management procedures.

D.2.1. Equipment Decontamination

The decontamination needs for equipment present on the TA-55 Storage Pad will be reviewed during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan. Mixed waste has been stored on the pad and any detected radioactivity above background levels will serve as an indicator for potential contamination by hazardous constituents. Any portable equipment in the CSU will be swiped or monitored using radioassay procedures or equipment to determine the presence of contaminants before the equipment is removed. Depending upon the results of this assay, the final use or disposition of the equipment will be determined based upon the appropriate regulations or DOE policies. In other cases, the potential for contamination by hazardous waste or hazardous constituents will be determined based upon the review of the operating record for the CSU.

Prior to decontamination of the pad at the TA-55 Storage Pad CSU, any contaminated portable equipment (if present) to be removed from the area will be wiped down with a wash water solution in accordance with the general procedures described in Section 5.4.1 of the closure plan. The equipment may include items such as pallets and miscellaneous waste management equipment (e.g., drum dollies).

In some cases, equipment removed from the TA-55 Storage Pad may need to be determined to be clean before removal from the unit and further use, but is not amenable to liquid wash down due to its size or composition. In such cases, the use of wipe samples to determine whether hazardous waste constituents are present may be appropriate. The use of radioactive swipe samples as surrogates may also be employed for the closure of the unit where the preliminary operating records indicate only mixed waste containers were stored.

D.2.2. Storage Pad Decontamination

Pursuant to guidance from the New Mexico Environment Department Hazardous Waste Bureau, the asphalt pads underlying many LANL waste management units do not represent materials that can be efficiently decontaminated using wash down techniques. Therefore, the general plan for the closure of these structures is to remove the asphalt and characterize it for reuse or waste disposal using general LANL waste characterization procedures.

The first step in making this assessment will be to review the CSU's operating and inspection records to identify any potential areas with a higher likelihood of waste contamination, as described in Section 5.3.2 of the closure plan. This review will include records of spills, run-on or run-off problems, radioactive material events, or maintenance procedures that have a potential for the release of hazardous waste or hazardous constituents. Inventory records will also be reviewed to determine the potential hazardous waste constituents that will be identified for closure verification sampling and analysis for the unit. This review will also identify any areas of the asphalt pads where any event has occurred that would indicate the potential for release of hazardous waste or hazardous constituents beyond the boundary of the storage pad.

If any evidence of potential releases of hazardous constituents beyond the asphalt pad is discovered in the operating record for the unit (e.g., spills that have run off the pad or through cracks and were not completely decontaminated), additional protective procedures will be implemented to localize the site. Removal of the asphalt in these localized areas will be done using best management practice procedures to minimize disturbance of the soil layer beneath the pad and preserve the soil surface for any necessary sampling. Where possible, soil removal may be managed from the existing asphalt side of the workface or from the outside of the work area to avoid churning of the underlying soil. In addition, loading of transport trucks with the removed asphalt will not take place on the exposed soil area. The use of dust suppression spraying at the potentially contaminated location will be assessed using LANL or DOE construction policies to minimize spreading of any potential hazardous waste constituents before sampling of the area can be implemented.

D.2.3. Contaminated Soil Removal

Record reviews and visual inspection of soils along the margins of the TA-55 Storage Pad CSU will be conducted during the pre-closure and structural assessment and used to identify areas where soil contamination from waste management activities may have occurred. If records indicate that no hazardous waste to soils has occurred and no staining is seen, no soil sampling will be conducted. If required, soil sampling in any areas that are suspected to be contaminated as a result of storage at the CSU will be conducted following sample collection procedures in Section 6.4.3 of the closure plan. For example, soil sampling would be conducted in areas where the operating records indicate that a release of hazardous waste from the CSU to the surrounding soil has occurred and/or areas where a crack in the asphalt penetrated through the asphalt. A statistically representative number of soil samples will be

collected from contaminated area(s) to a 6-inch (in.) depth. Sampling locations to determine the extent of contamination will be chosen using a biased sampling approach, including areas with historical evidence of releases, visual staining, and any other information that indicates potential contamination. These samples will be compared to background/baseline concentrations. Background samples will be established using analysis results from soil samples collected from appropriate areas before closure activities begin or, if available, established baseline concentration levels for the area (e.g., using corrective action program analytical data).

If contamination resulting from container storage activities is discovered above acceptable levels as described in verification criteria listed in Section 5.5 of the closure plan, the contaminated soils will be removed for proper disposal. Soil sampling results that are above background/baseline levels will be used to identify the extent of soil contamination. Contaminated soils will be removed in layers and verification sampling will be conducted in accordance with Section D.3.1.2 following the removal of each layer. This procedure will be used to minimize the amount of soil removed. If analysis from the verification indicates it does not meet acceptable levels after removal of each layer, more soil will be removed and verification sampling will be repeated, or the decision will be made to proceed with an alternative demonstration of decontamination closure, as described in Section 5.6 of the closure plan.

D.3. SAMPLING ACTIVITIES

All general sample management, documentation, handling, preservation, storage, and packaging and transportation procedures for the closure of the TA-55 waste management units are described in the closure plan. The following specific information applies to the sampling strategy and approach for closure of the TA-55 Storage Pad CSU. Liquid or wipe sampling will be used for decontamination verification of equipment; these samples will be collected using the procedures in Sections 6.4.1 and 6.4.2 of the closure plan. Samples will be collected from discrete locations according to the methods and procedures provided in Section 6.4 of the closure plan and analyzed for the appropriate hazardous constituents identified during the pre-closure and structural assessment described in Section 5.3.2 of the closure plan. Samples will be analyzed by an independent analytical laboratory for the constituents included in Table D-1, as necessary, using the methods outlined in Table D-2. Table D-1 will be modified, if necessary, at the time of notification of closure to incorporate changes based on the operating record review that will be conducted for the Storage Pad CSU.

D.3.1. Sampling Strategy/Approach

Sampling will be conducted to verify that decontamination efforts described herein and in Section 5.4 of the closure plan were effective at removing hazardous waste residues. Soil sampling may initially be conducted to establish the presence of absence of contamination.

D.3.1.1. Soil Sampling Strategy

As described in Section D.2.3 of this attachment, initial and decontamination verification sampling will be performed for the soil underlying the TA-55 Storage Pad CSU if evidence is found that hazardous constituents may have escaped the unit during its operation. If so, sampling and analysis may be performed to establish that hazardous waste and hazardous residues are no longer present or to provide information regarding the degree to which remaining residues are present. Sampling locations to determine the extent of contamination will be chosen using a biased sampling approach, based on historical evidence of releases, physical evidence of distressed vegetation, visual staining, and any other information that indicates potential contamination. Soil samples will be collected using the procedure in Section 6.4.3 of the closure plan. At least two and up to 22 samples will be collected to a 6-in. depth around the perimeter of the pad. Individual locations and depths will be determined during the pre-closure and structural assessment of the unit, as described in Section 5.3.2 of the closure plan. Analytical results will be compared to background samples and/or baseline concentration levels, as described in Section D.2.3. When soil removal is complete, at least two and a maximum of 12 verification samples will be collected at the TA-55 Storage Pad CSU to verify that contaminated soil removal was effective.

D.3.1.2 Verification Sampling Strategy

To verify decontamination of the equipment or soil (if necessary), verification samples will be collected from each of the locations where decontamination activities as described in Section D.2 were performed. Liquid or wipe sampling will be conducted using the procedures in Sections 6.4.1 and 6.4.2 of the closure plan. Soil sampling will be conducted for soil verification sampling. If required to verify that contaminated soil removal was effective, at least two and a maximum of 12 verification samples will be collected at the TA-55 Storage Pad CSU when soil removal is complete.

D.4. ANALYTICAL REQUIREMENTS

All general analytical requirements, quality assurance/quality control, and data requirements procedures for closure of the TA-55 Storage Pad CSU are described Section 7 of the closure plan. Analytical methods to be used for decontamination verification during the TA-55 Storage Pad CSU closure activities are summarized in Table D-2. Each sample will be analyzed for the constituents identified in Table D-1, as appropriate. Analytes, test methods/instrumentation, target detection limits, and rationale for metals and organic analyses are also presented in Table D-2.

D.5. WASTE MANAGEMENT

Decontamination and sample collection activities will be conducted with waste minimization goals in mind. All waste material generated will be controlled, handled, characterized, and disposed of in accordance with LANL waste management procedures. Table D-3 in the closure plan provides a list of the waste materials that could be generated during closure and potential disposal options.

D.6. REFERENCES

DOE, 1995. "DOE Methods for Evaluating Environmental and Waste Management Samples," DOE/EM-0089T, Rev. 2. Prepared for the U.S. Department of Energy by Pacific Northwest Laboratory, Richland, Washington.

EPA, 1986 and all approved updates. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA-*SW-846*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C.

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Table D-1

Hazardous Waste Constituents of Concern at the TA-55 Storage Pad Container Storage Unit[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
Ignitable	D001	Not Applicable
Corrosive	D002	Not Applicable
Reactive	D003	Not Applicable
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
Volatile Organic Compounds	F001, F002, F003	
Semi-Volatile Organic Compounds	D018, D028	Benzene, 1,2-Dichloroethane

[a] Based on the unit operating record.

EPA = U.S. Environmental Protection Agency

Table D-2

Summary of Proposed Analytical Methods

Analyte	EPA SW-846 Analytical Method [a]	Test Methods/ Instrumentation	Target Detection Limit [b]	Rationale
Metal Analysis				
Arsenic	7060A [c], 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
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Cadmium	7130 [d], 7131A [c]	FLAA, GFAA	2 ug/L	
Chromium	7190 [d], 7191 [c]	FLAA, GFAA	10 ug/L	
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Target compound list VOCs	8260B	GC/MS	10 mg/L	Determine the VOCs concentration in the samples.
Target compound list SVOCs	8270D [c]	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.

[a] U.S. Environmental Protection Agency (EPA), 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846.
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[c] Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.
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[e] Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy
FLAA = Flame atomic absorption spectroscopy
GC/MS = Gas chromatography/mass spectrometry
GFAA = Graphite furnace atomic absorption spectroscopy
mg/L = milligrams per liter
SVOC = semi volatile organic compounds
ug/L = micrograms per liter.
VOC = volatile organic compounds

Document: LANL Closure Plans TA-16, 50, 54, & 55
Date: September 2006

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Richard S Watkins

9/28/06

Richard S. Watkins
Associate Director
Associate Directorate Environment, Safety, Health, & Quality
Los Alamos National Laboratory
Operator

Date Signed

9/28/06

Edwin L. Wilmot
Manager, Los Alamos Site Office
National Nuclear Security Administration
U.S. Department of Energy
Owner/Operator

Date Signed