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Date: July 13, 2011
Refer To: ENV-RCRA-11-0120
LAUR: 11-03324

Mr. John E. Kieling
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

Dear Mr. Kieling:

SUBJECT: SUBMITTAL OF CLOSURE PLAN FOR TECHNICAL AREA (TA) 14-23 INTERIM STATUS OPEN DETONATION UNIT AND BURN CAGE, LOS ALAMOS NATIONAL LABORATORY, EPA ID# NM0890010515

The purpose of this letter is to transmit the referenced closure plan as required by Section 1.4.1 of the renewed Los Alamos National Laboratory (LANL) Hazardous Waste Facility Permit (the Permit). For the interim status units listed in Table J-1 that will not be operated, Permit Section 1.4.1 requires the National Nuclear Security Administration and Los Alamos National Security, LLC (NNSA/LANS or collectively the Permittees) to submit a notice of intent to close or a revised closure plan within 180 days of the effective date of the Permit.

This plan addresses both the open detonation and open burn (Burn Cage) treatment units located at TA-14-23. For technical reasons explained in the closure plan, the Permittees elected to address both units in one closure plan. The Permittes are proposing not to operate either of these units, and hereby request the review and approval of this plan by the New Mexico Environment Department- Hazardous Waste Bureau (NMED-HWB). Pursuant to Permit Section 1.4.1, closure of these interim status units will be initiated in accordance with 40 CFR § 265.113(a) no later than 270 days after the effective date of the Permit.

Prior to completing closure of the units, this closure plan may be amended in accordance with Section 4.3 of the attached closure plan and 40 CFR § 265.112(c). Amendments would occur, if necessary and appropriate, to update the closure process and/or the sampling and analysis plan. An amended closure plan would then be submitted to the New Mexico Environment Department (NMED) for approval prior to completing the activities in the plan.

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Section 1.4.1 of the Permit requires that a closure plan must be submitted to the NMED-HWB within 180 days of the effective date of the Permit. Therefore, this transmittal was due no later than June 28, 2011. The Las Conchas Wildfire forced closure of LANL beginning Monday, June 27, 2011 and the Permittees requested a two-week extension from the date the Laboratory re-opened for this compliance deadline. The NMED-HWB granted this extension request on June 28, 2011. The Laboratory re-opened on July 6, 2011.

Until closure is complete and has been certified in accordance with Section 8.0 of the attached closure plan and 40 CFR § 265.115, a copy of the approved closure plan, any approved revisions, and closure activity documentation associated with the closure will remain on file with hazardous waste compliance personnel at LANL and at the U.S. Department of Energy/ National Nuclear Security Administration (DOE/NNSA) Los Alamos Site Office (LASO).

The opportunity to present and discuss our closure plans with you and your staff would be appreciated. Please contact Mark Haagenstad of the Water Quality and RCRA Group at (505) 665-2014 if additional information would be helpful.

Sincerely,

A R Grieggs

Anthony R. Grieggs
Group Leader
Water Quality & RCRA Group
Los Alamos National Laboratory

Sincerely,

Gene E Turner

Gene E. Turner
Environmental Permitting Manager
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ENV-RCRA File, w/enc., K490
IRM-RMMSO, w/enc., A150

LA-UR-11-03324
July 2011

Closure Plan

Technical Area 14 Open Burning and Open Detonation Units

(TA-14-23)

Prepared by:

Los Alamos National Laboratory

ENV-RCRA Group

Los Alamos, New Mexico 87545

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List of Acronyms and Abbreviations

40 CFR	Title 40, U.S. Code of Federal Regulations
AOC	Area of Concern
BMPs	Best Management Practices
CWA	Clean Water Act
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FFCA/AO	Federal Facility Compliance Agreement
HE	High Explosives
IFGMP	Individual Permit
IP	Interim Facility-Wide Groundwater Monitoring Plan
LANL	Los Alamos National Laboratory
MI	Multi-Incremental
MSGP	Multi-Sector General Permit
NIOSH	National Institute of Occupational Safety and Health
NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
OB	open burn
OD	open detonation
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SW-846	*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.
TA	Technical Area
TALs	Target Action Levels

CLOSURE PLAN

TECHNICAL AREA 14 OPEN BURNING AND OPEN DETONATION UNITS

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the interim status hazardous waste open burning (OB) and open detonation (OD) thermal treatment units at Technical Area 14 (TA-14) at the Los Alamos National Laboratory (LANL), hereinafter referred to as the TA-14-23 OB/OD Units. The information provided in this closure plan addresses the closure requirements specified in the Code of Federal Regulations (CFR), Title 40, Part 265, Subparts G and P for hazardous waste thermal treatment units at LANL under the Resource Conservation and Recovery Act (RCRA) and the New Mexico Hazardous Waste Act.

Until closure is complete and has been certified in accordance with Section 8.0 of this closure plan and 40 CFR § 265.115, a copy of the approved closure plan, any approved revisions, and closure activity documentation associated with the closure will be on file with hazardous waste compliance personnel at LANL and at the U.S. Department of Energy (DOE) Los Alamos Site Office. Prior to closure of the units, this closure plan may be amended in accordance with Section 4.2 of this closure plan and 40 CFR § 265.112(c), as necessary and appropriate, to provide, at a minimum, updated sampling and analysis plans and to incorporate updated decontamination technologies. Amended closure plans will be submitted to the New Mexico Environment Department (NMED) for approval prior to implementing closure decontamination and sampling activities.

TA-14 was established in 1944 to study small-explosive charges, and since that time has been actively used for the development and testing of explosives (LANL, 1994). The TA-14-23 OB/OD Units are collocated within or near other hazardous waste management units not yet scheduled for closure; therefore, if closure performance standards listed in Section 4.1 cannot be attained the TA-14-23 OB/OD Units will undergo RCRA clean closure activities in conjunction with the corrective action processes at TA-14. Final closure of the TA-14-23 OB/OD Units will be in accordance with the requirements set forth In 40 CFR Part 265, Subparts G and P.

2.0 DESCRIPTION OF UNITS TO BE CLOSED

This section provides an overview of past operations and waste management practices at the TA-14-23 OB/OD Units. It includes the location of the units, a description of the units, and past operational and waste management practices associated with the units.

2.1 Description of the Treatment Units

The TA-14-23 OB/OD Units are located in the western portion of LANL on the southern edge of Three-Mile Mesa (see Figure 1). Mesa-top elevations at TA-14 range from approximately 7,350 to 7,450 feet above mean sea level. TA-14 was established in 1944 as a small-explosive charges testing area, and since that time has been actively used for the development and testing of

explosives (LANL 1994). Structures at the site include explosives magazines, a Control Building (Building TA-14-23), and equipment boxes.

The TA-14-23 OB/OD Units are located approximately 180 feet south of Building TA-14-23; this area is referred to as Q-Site East. The location and layout of these units are shown on Figure 2. OB operations were conducted in a burn cage located adjacent to Firing Mound 3. The OD treatment area is located on Firing Mound 3 and is used to treat (i.e., open detonate) hazardous explosive waste. Nontreatment-related, experimental test detonations were also performed at TA-14, Q-Site East.

The burn cage, which measures approximately 3 feet high and 2 feet in diameter, is constructed of 1/4-inch-thick steel and sits in a steel tray with three-inch raised edges. The steel tray measures 4 feet long and 2.5 feet wide, and rests on a 2 foot by 2 foot concrete pad (thickness unknown). The burn cage, which is not lined, has a wire mesh and steel door measuring 2 feet 10 inches high and 1 foot 7 inches wide. The door is attached to the front of the unit and closes with a latch. A steel mesh screen is located inside the unit 1 foot above the containment tray. Explosives-contaminated wastes to be burned are placed on this screen. A wire mesh screen also covers the top of the OB unit. A photograph of the OB unit is provided under the TA-14 tab of the most recent *Los Alamos National Laboratory General Part A Permit Application* (LANL, 2009). OB operations are monitored from Building TA-14-23.

The OD area, referred to as Firing Mound 3, is a gently sloping, sand-covered area measuring approximately 40 feet by 75 feet. There are no trenches or pits associated with the OD unit. The topography and areal extent of the OD unit are shown on the topographic map of TA-14 within the most recent *Los Alamos National Laboratory General Part A Permit Application* (LANL, 2009). Following waste placement at Firing Mound 3, detonation operations were conducted from Building TA-14-23.

The TA-14-23 OB/OD Units are located approximately 100-200 feet from the closest arroyo. Run on is diverted around the site to the west by a road and swale. A rock lined earthen berm located down slope of the burn cage creates a run-off attenuation area. The overflow from this detention structure and slope southeast of the burn cage is covered with riprap. There is a rock check dam in the drainage channel located southeast of Mound 3 and west of the dirt access road. There are also several groups of rock check dams within a channel east of Mound 5. These structures reduce run-off velocity and allow sediment to settle out of the surface water run-off. During times of precipitation, water tends to flow eastward from the site into a tributary of Cañon de Valle. Additionally, best management practices (BMPs) to reduce run-off from the site were improved and upgraded in 2010. These BMPs included improved contouring of the road and drainage area east of the firing area and upgraded rock check dams.

2.2 Description of the Wastes Treated at the Units

The waste streams treated at the TA-14-23 OB/OD Units by OD included small quantities of excess explosives. The established RCRA interim status limit for TA14 is 20 pounds of waste per detonation, so only small quantities of high explosives (HE) could have been treated. Excess explosives include small bulk pieces, initiating devices (detonators/squibs), small quantities of powders, developmental energetic materials, and, potentially, excess propellants from gas guns. Because of the small load limit, larger quantities of excess explosives from the TA-14-23 OB/OD Units, TA-09, TA-22, and TA-40 were treated at TA-36.

The waste streams treated at the TA-14-23 OB/OD Units by OB included HE contaminated materials generated at TA-14 and TA-09. It is possible that some materials from TA-22 and TA-40 were also treated at the TA-14-23 OB/OD Units, but this is unlikely. From 2001 to the present, detonable HE contaminated materials from TA-22 and TA-40 have been treated by open detonation at Minie site. The burn cage was used for the treatment of HE contaminated combustibles. HE contaminated materials in the waste stream included cellulosics (kimwipes, paper towels, swabs, sheets of paper, etc.); plastics (weigh boats, gloves, plastic bags, anti-static bags, vials w/ stoppers, etc.); ceramics (crucibles); glassware (flasks, beakers, test tubes, small columns, vials w/ stoppers); and metals (wire, thin plates, small targets). The largest fraction of waste treated by OB was cellulosics.

Firing site debris consisted of wood scraps, cardboard, burlap, Plexiglas®/Lexan®, plastic, glass, styrofoam, electrical cables, and metallic foils used for pin switches or metals such as target plates were not generally explosives contaminated; however, occasionally potentially explosives contaminated firing site debris may have been generated. If explosive debris was not rendered safe immediately, through immediate detonation, it was stored in the satellite accumulation area within Building TA-14-23 and was treated as soon as possible.

The wastes treated were both homogeneous (e.g., solid explosives, scrap explosives) and heterogeneous (e.g., explosives-contaminated paper, rags, wood). These wastes were assigned the following U.S. Environmental Protection Agency (EPA) Hazardous Waste Numbers: D001 for ignitability; D003 for reactivity; D005 (for the barium in the explosives); D006, D007, D008, D009, D011, D018, D022, D028, D029, D030, D035, D036, D038, D040, F001, F002, F003, F004, and F005. Historically, there have been no significant changes in waste compositions. The wastes were treated primarily to remove the characteristic of reactivity. However, other characteristic wastes (i.e., ignitability, toxicity for barium) and listed hazardous wastes (solvents on the explosives-contaminated rags and wipes) may have been present in the wastes being treated.

2.3 Description of Treatments Conducted at the Units

Waste containers for explosives-contaminated waste and explosive material generally consist of paper-lined cardboard boxes, wooden boxes, or small metal boxes. Most wastes contaminated with explosives and actual pieces of explosives were not packaged together. Explosives-contaminated wastes were placed within a paper-lined cardboard box with a lid. Once a cardboard box was filled, it was closed, sealed with tape, and marked "HE Hazardous Waste." These waste containers were then stored in an accumulation area at the point of generation.

Wastes to be treated at the TA-14-23 OB/OD Units were collected from various accumulation areas at LANL. When loading waste, the cargo compartment of the transport vehicle was checked to ensure that it was clean and contained no loose items such as tools or pieces of metal. For transport, the wastes were placed in an enclosed compartment or secured with tie-downs. Wastes were transported by appropriately trained personnel in designated vehicles to the TA-14-23 OB/OD Units on the day of scheduled treatment. Only the amount of waste that could be treated in one day was transported to the units. A maximum of 50 pounds of explosives-contaminated materials may have been burned per treatment event at the OB unit. A maximum of 20 pounds of waste explosives may have been detonated per treatment event at the OD unit.

The waste was unloaded from the vehicle and placed at the OB or OD location by qualified technicians/specialists. Depending on preparation activities, the time during which waste may

remain at the units typically ranged from several minutes to a few hours. A visual examination was conducted after unloading to ensure that no explosive material remained in the transport vehicle. OB of explosives-contaminated waste consisted of placing the waste in the burn cage, coating the waste with starter fluid, and igniting the waste. OD of waste was accomplished by using a predetermined amount of explosive to initiate the detonation. The detonation may have created temperatures up to 3,000 degrees Fahrenheit (1,649 degrees Celsius). Initiation for all waste treatment operations was performed remotely by qualified personnel from inside Building TA-14-23. Thermal treatment operations were conducted in accordance with the most recent, approved versions of LANL operating procedures.

Procedures did not require wetting of the OB Unit before and after each operation. Measures taken to minimize releases of hazardous waste from the OB Unit to environmental media included using sufficient fuel to aid in ignition and enhance waste destruction, covering the top of the burn cage with wire mesh to minimize the release of burning material, not conducting operations during adverse weather conditions (e.g., high winds), and using secondary containment beneath the OB unit to contain residue which may have contained ash and incompletely treated material.

Ash resulting from OB operations was removed from the secondary containment tray within approximately 24 hours after each burn; it was not allowed to accumulate at the OB Unit. The ash was placed in a 55-gallon drum and stored in a satellite accumulation area near Building TA-14-23. The OB Unit was covered with a tarp after the ash was removed. In addition, the OB Unit was covered with a tarp when not in use. Procedures for OD required a thorough survey of the area after detonation, collection of identifiable pieces of material not consumed by the detonation, and subsequent detonation of these materials. The Firing Leader determined when it was safe to re-enter the detonation site.

Pieces of damaged explosives resulting from a misfire, sensitivity experiment, incomplete detonation, or exposure to severe testing were packaged separately from excess explosives. The waste explosives were managed and stored appropriately.

3.0 ESTIMATE OF MAXIMUM WASTE TREATED

Since RCRA Subtitle C regulations became effective in November 1980, an average of 125 pounds of waste has been treated annually at the OB Unit, and an average of 60 pounds of waste has been treated annually at the OD Unit. Based on these estimates, approximately 3,750 pounds of waste has been treated at the OB Unit through 2010. Approximately 1,800 pounds of waste has been treated at the OD Unit through 2010.

4.0 GENERAL CLOSURE INFORMATION

4.1 Closure Performance Standard

The TA-14-23 OB/OD Units will be closed to meet the following performance standards:

- Remove all hazardous waste residues and hazardous constituents; and
- ensure that contaminated media do not contain concentrations of hazardous constituents greater than established clean-up levels. The Permit does not address the closure of interim status units; however, the clean-up levels within Permit Section 11.4 of the *Los Alamos National Laboratory Hazardous Waste Facility Permit* (NMED, 2010) will be

used. For soils the cleanup levels will be established based on residential use. LANL will also demonstrate that there is no potential to contaminate groundwater.

If LANL is unable to achieve any one of the clean closure standards above, LANL will:

- Coordinate cleanup closure activities for the TA-14-23 OB/OD Unit with the corrective action cleanup processes at TA-14;
- comply with closure requirements in 40 CFR 265.113(b)(1)(ii)(C) and (2);
- control the migration of hazardous waste residues, hazardous constituents, and, as applicable, contaminated media such that they do not exceed a total excess cancer risk of 10^{-5} for carcinogenic substances and, for non-carcinogenic substances, a target Hazard Index of 1.0 for human receptors, and meet LANL's *Screening Level Ecological Risk Assessment Methods* (as updated and approved by the Department);
- 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 run-off, or hazardous waste decomposition products to the ground, groundwater, surface waters, or to the atmosphere; and
- comply with the closure requirements of 40 CFR Part 265 Subparts G and P;.

Closure of the TA-14-23 OB/OD Units will be deemed complete when: 1) all surfaces and equipment have been decontaminated, or otherwise properly managed as waste; 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.

4.2 Closure Schedule

This closure plan schedule is intended to address the closure requirements for the TA-14-23 OB/OD Units within the timeframe established in 40 CFR 265.113. The following section provides the schedule of closure activities (see also Table 1 in this closure plan).

Notification of closure will occur at least 45 days prior to when closure is expected to begin (see 40 CFR § 265.112(d)(1)). Closure activities will begin according to the requirements in 40 CFR § 265.112(d)(2). However, pursuant to 40 CFR § 265.112(e), 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. Notification of the structural assessment (assessment), as described in Section 5.1.1 and 5.1.2 of this closure plan, will occur at least 30 days prior to the scheduled assessment. The records review (review) and assessment will be completed and a written amended closure plan will be submitted, if necessary, to the NMED for review and approval in accordance with 40 CFR 265.112(c). Upon approval of the modified closure plan, if applicable, the unit surfaces and related equipment will be decontaminated. Soil sampling and decontamination verification sampling activities will be conducted to demonstrate that the soils, surfaces, and related equipment at the unit meet the closure performance standards in accordance with 40 CFR 265.111. All closure activities will be completed within 180 days after the final receipt of waste. Submittal of the final closure report and certification will be submitted to NMED 240 days after initiating closure. In the event that closure of the unit cannot proceed according to schedule, the NMED will be notified in accordance with the extension request requirements in 40 CFR 265.113(b) and comply with closure requirements in 40 CFR 265.113(b)(1)(ii)(C) and (2).

5.0 CLOSURE PROCEDURES

Closure activities at the units will include: a physical review of the units and a review of the units' records; proper management and disposal of hazardous waste residues, if applicable, and contaminated surfaces and equipment associated with the units; sampling to verify the closure performance standards in Section 4.1 of this closure plan have been achieved; and submittal of a final closure certification report. The following sections describe more specifically these closure activities applicable to the TA-14-23 OB/OD Units.

5.1 Records Review and Structural Assessment

Prior to commencing closure decontamination and sampling activities, the TA-14-23 OB/OD Units' Operating and Inspection Records will be reviewed and a structural assessment will be conducted to determine any previous finding(s) or action(s) that may influence closure activities or potential sampling locations.

5.1.1 Records Review

The TA-14-23 OB/OD Units' Operating Record (including, but not limited to, inspection and contingency plan implementation records) will be reviewed at the time of closure and in accordance with the schedule in Section 4.2 of this closure plan. The goals of the review will be to:

1. Confirm the specific hazardous waste constituents of concern listed in Table 2 of this closure plan;
2. update the above-mentioned list as necessary; and
3. identify additional sampling locations (*e.g.*, locations of spills or chronic conditions identified in the TA-14-23 OB/OD Units' Operating and Inspection Records).

A determination will be made on whether any spills or releases, defects, deterioration, damage, or hazards affecting waste containment or treatment occurred or developed during the operational life of the TA-14-23 OB/OD Units. If the records indicate any such incidents, LANL will amend this closure plan (Section 4.3) in order to update the Sampling and Analysis Plan (SAP) (Section 6.0) to incorporate the locations of these incidents as additional sampling locations. All additional sampling procedures, as applicable, will be included in the amended closure plan.

5.1.2 Structural Assessment

The structural assessment is an evaluation of the units' physical condition. The assessment will include inspecting the units for any conditions that indicate a potential for release of hazardous constituents. If the assessment reveals any evidence of a release (*e.g.*, stains), the closure plan will be amended in order to update the SAP (Section 6.0) to incorporate these additional sampling locations. All additional sampling procedures, as applicable, will be included in the amended closure plan. This assessment will be documented with photographs and drawings and other documentation, as necessary.

5.2 Decontamination and Removal of Structures and Related Equipment

In accordance with 40 CFR § 265.112(b)(4), the units' related equipment will be decontaminated, or removed, or both and managed according to Section 7.0 of this closure plan.

All related equipment removed from the site will be considered solid and potentially hazardous waste when removed, and will be disposed of in accordance with Section 7.0. Decontamination activities will ensure the removal of all hazardous waste residues and hazardous waste constituents from the units to meet the closure performance standards in Section 4.1.

5.2.1 Removal of Structures and Related Equipment

The burn cage, tray and concrete pad will be removed from the OB unit at closure. Building TA-14-23 will not be removed as part of closure of the TA-14-23 OB/OD Units, the potential removal of this building will be assessed as part of the closure of TA-14 at the time of corrective action activities.

5.2.2 Decontamination of Related Equipment

No equipment at the TA-14-23 OB/OD Units is expected to be left in place. However, if equipment, identified during the assessment, is expected to be left in place, it will be decontaminated by pressure washing or steam cleaning with a solution consisting of a surfactant detergent (*e.g.*, Alconox®) and water mixed in accordance with the manufacturer's recommendations. Portable berms or other such devices (*e.g.*, absorbent socks, plastic sheeting, wading pools) will collect excess wash water and provide containment during the decontamination process. Sampling of the equipment will be in accordance with Section 6.1.

5.2.3 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during decontamination activities will be cleaned with a wash water solution. Residue, disposable equipment, and small reusable equipment that cannot be decontaminated will be containerized and managed as waste in accordance with Section 7.0.

6.0 SAMPLING AND ANALYSIS PLAN

This SAP identifies the specific sampling and analysis requirements for the TA-14-23 OB/OD Units and ensures the closure requirements of 40 CFR Part 265 Subparts G and P are met. The SAP also describes the sampling, analysis, and quality assurance/quality control (QA/QC) methods that will be used to demonstrate that LANL has met the closure performance standards in Section 4.1 of this closure plan. LANL will comply with all the requirements in this closure plan section (6.0). Although the Permit does not address the closure of interim status units, LANL will also follow the methodology for SAPs set forth in Permit Section 9.4.7.1, and the sampling and analysis methods set forth in Permit Section 11.10.

This SAP is designed to verify decontamination of surfaces, equipment, and materials; and determine whether a release of hazardous constituents to any environmental media has occurred. The SAP includes:

1. The hazardous waste constituents of concern listed in Table 2 that will be included in the analysis for soil, wipe, and chip samples. This list includes all hazardous constituents defined as:
   a. any constituent identified in 40 CFR Part 261 Appendix VII that caused the EPA to list a hazardous waste in 40 CFR Part 261 Subpart D;
   b. any constituent identified in 40 CFR Part 261, Appendix VIII; or

c. any constituent identified in 40 CFR Part 264 Appendix IX, perchlorate, and nitrates.

2. The list of hazardous constituents of concern will be utilized to select the analytical methods capable of detecting those constituents.
3. A site plan for verification and soil samples. The site plan includes:
   a. Figure 3 depicting the boundaries of the units and verification and soil sampling locations. The locations include:
   b. Systematic composite soil sampling with no less than approximately 30 subsamples collected from each decision unit. at each location identified in Figure 3;
   c. locations of known spills or other releases of hazardous waste or hazardous constituents during operation of the units;
   d. other potential release locations; and
   e. a rationale for the number and locations of samples.
4. Type of samples. The type of samples to be collected (*e.g.*, wipe, chip, soil) and the rationale for the selection of the sample type.
5. Sampling methods including a description of the EPA-approved sampling methods and procedures that will be used to collect each type of sample as specified in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846) (EPA 1986).
6. A description of the approved EPA SW-846 laboratory analytical methods that will be used to measure hazardous constituent concentrations (see Table 4).
7. QA/QC procedures. This SAP includes a description of the QA/QC procedures that include, but are not limited to:
   a. duplicates, trip blanks, equipment blanks;
   b. a description of methods for decontamination of re-usable sampling equipment; and
   c. a description of all sample preservation, handling, labeling, and chain-of-custody procedures.

6.1 Sampling Activities

Sampling activities will be conducted to demonstrate that the units' related equipment, surfaces, and soils meet the closure performance standards in Section 4.1. All samples will be collected and analyzed in accordance with the procedures in Sections 6.2, 6.3, and 6.4 of this closure plan. Soil sample locations are shown in Figure 3. These locations include, but are not limited to, soils surrounding the units; soils in the vicinity of the units; and soils at the storm water discharge point.

- Wipe sample(s) will be collected from each piece of decontaminated equipment related to the units.
- Systematic composite samples will be collected from soils within and near the unit to include topographic lows or drainages.
  - Additional discrete soil samples will also be collected from locations where contamination is detected by composite sampling.
  - Discrete soil samples will be collected for volatile organic compounds (VOCs) analysis.

- One verification wipe sample will be collected from the floor at the entry way of Building TA-14-23.

Removal of the associated structures at the TA-14-23 OD Unit will occur at the time of closure of TA-14 in its entirety. Prior to removal of Building TA-14-23 chip samples will be collected along the concrete walls and floors.

6.2 Sample Collection Procedures

Samples will be collected in accordance with the procedures identified in this SAP which incorporates guidance from the EPA (EPA 2002), DOE (DOE 1995), and other NMED-approved procedures.

6.2.1 Surface Water and Groundwater Sampling

Surface water sampling is not included as part of the TA-14-23 closure activities because surface water compliance is demonstrated as part of compliance with the Clean Water Act (CWA) and the National Pollutant Discharge Elimination System (NPDES) permit program. The TA-14-23 OB/OD unit was subject to the 2008 CWA Multi-Sector General Permit (MSGP) for storm water until the modified LANL Storm water Individual Permit (IP) became effective on November 1, 2010. Section 1.6.1 of the 2008 MSGP notes, that there may be situations in which EPA may require a discharger to apply for and/or obtain authorization to discharge under either an IP or alternative NPDES general permit. EPA required the DOE to apply for an individual NPDES permit for LANL by December 31, 2004, pursuant to the Federal Facility Compliance Agreement - Administrative Order Docket No. CWA-06-205-1701 (FFCA/AO) entered into between the EPA and the DOE in February 2005 (EPA 2005). Further, Section 1.6.1 of the 2008 MSGP explains that for existing dischargers authorized to discharge under the MSGP, EPA's "notice will set a deadline to file the permit application, and will include a statement that on the effective date of the individual NPDES permit, or the alternative general permit as it applies to you, coverage under this general permit will terminate."

LANL's IP contains non-numeric technology-based effluent limitations, coupled with a comprehensive, coordinated monitoring program and corrective action where necessary, to minimize pollutants in LANL's storm water discharges. LANL is also required to implement site-specific control measures (including BMPs) to address the non-numeric technology-based effluent limits contained in the IP, followed by confirmation monitoring against New Mexico water-quality criteria-equivalent target action levels (TALs) to determine the effectiveness of the site-specific measures. If TALs are exceeded, corrective actions detailed in the IP are initiated and additional confirmation monitoring is conducted following completion of corrective actions. Monitoring for the IP will start in 2011 after installation and certification of baseline and certification of baseline control measures.

Groundwater in the vicinity of TA-14-23 is monitored as part of the LANL Interim Facility-Wide Groundwater Monitoring Plan (IFGMP). Under the 2010 IFGMP (LANL 2010, 109830), surface water is monitored down gradient of TA-14-23 below the confluence of Canon de Valle and Water Canyon at the Water at Beta station. Perched intermediate groundwater is monitored at wells R-47i and CdV-37-1(i). Regional groundwater is monitored down gradient of TA-14-23 at wells CdV-R-15-3 (monitored at three separate depth intervals), R-19 (monitored at five separate depth intervals), R-17 (monitored at two separate depth intervals), and R-27 (monitored at one depth interval).

6.2.2 Soil Sampling

Systematic composite soil samples will be collected to demonstrate that soils within and in the vicinity of the TA-14-23 OB/OD treatment units meet the closure performance standards. Six decision units will be established in the area and will consist of areas no greater than 3,600 ft^2 (see Figure 3). Approximately 30 sub-samples will be collected using a stratified random sampling design. Samples will be collected from 0-6inch depths (soil/tuff interface), from the proposed decision units shown in Figure 3. This process will result in one sample from each decision unit, resulting in a total of six composite samples (EPA 2002). Systematic composite sampling is not applicable to VOCs; therefore two discrete soil samples (0-6 inch depths) will be collected from each decision unit, from random locations, for VOC analysis. Soil samples will be analyzed to determine if hazardous constituents are present in soils at, or in the vicinity of, the units and to determine if there is an immediate threat to the environment.

Soil samples will be collected using a spade, scoop, auger, trowel or other tool as specified in approved methods for the type of analyte to be sampled (EPA 1986 or EPA 2002). 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 5.

6.2.3 Wipe Sampling

Surface wipe samples will be collected and analyzed to determine if residual hazardous constituents remain on surfaces and equipment at the units. Samples will be collected in accordance with the National Institute of Occupational Safety and Health (NIOSH) *Manual of Analytical Methods* (NIOSH 1994). The appropriate wipe sample method will consider the type of surface being sampled, the type of constituent being sampled, the solution used, and the desired constituent detection limit.

The NIOSH method includes wiping a 100 square centimeter area at each discrete location with a gauze wipe or ghost wipes, whichever is prescribed by the analytical laboratory, wetted with a liquid solution appropriate for the desired analysis (*e.g.*, deionized water for lead). For wipe sampling, guidance from the analytical laboratory will 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.

6.2.4 Cleaning of Sampling Equipment

A disposable sampler is considered clean only when directly removed from a factory-sealed wrapper. Reusable decontamination equipment, including protective clothing and tools, and sampling equipment used during closure activities will be scraped, as necessary, to remove residue, cleaned prior to each use with a wash solution, rinsed several times with tap water, and air-dried to prevent cross-contamination of samples. Sampling equipment rinsate blanks will be collected and analyzed only if reusable sampling equipment is used.

6.3 Sample Management Procedures

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

6.3.1 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).

6.3.1.1 Chain-of-Custody

Chain-of-custody forms will be maintained by sampling personnel until the samples are relinquished to the analytical laboratory. This will ensure the integrity of the samples and provide for an accurate and defensible written record of the sampling possession and handling from the time of collection until laboratory analysis. 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:

1. in a person's physical possession;
2. in view of the person in possession; or
3. 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 and chain-of-custody form. A chain-of-custody form must accompany all samples from collection through laboratory analysis. The analytical laboratory will return the completed chain-of-custody form to LANL and it will become part of the permanent sampling record documenting the sampling efforts.

6.3.1.2 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 will 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.

6.3.1.3 Sample Logbook

All pertinent information on the sampling effort will be recorded in a bound logbook. Information will be recorded in ink and any cross outs will 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
- name(s) of personnel responsible for the observations.

6.3.2 Sample Handling, Preservation, and Storage

Samples will be collected and containerized in appropriate pre-cleaned sample containers. Table 5 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 maintained at required temperatures in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE requirements, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate LANL documents establish the 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 LANL packaging and transportation organization unless the shipper is specifically authorized through formal documentation by that organization to independently tender shipments to common motor or air carriers.

6.4 Sample Analysis Requirements

Samples will be analyzed for all hazardous constituents listed in Table 2; if at closure it has been determined that other constituents listed in Appendix VIII of 40 CFR Part 261 and in Appendix IX of 40 CFR Part 264 were managed or treated at the units over their operational history, this closure plan will be amended to include those constituents for sampling and analysis. Samples will be analyzed by an independent laboratory using the methods outlined in Table 4. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table 4. If any of the information from these tables has changed at the time of closure, LANL will amend this closure plan to update all methods in this SAP.

6.4.1 Analytical Laboratory Requirements

The analytical laboratory will perform the detailed qualitative and quantitative chemical analyses specified in Section 6.4.2. 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 Table 4 is 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).

6.4.2 Quality Assurance/Quality Control

All sampling and analysis will be conducted in accordance with QA/QC procedures defined by the latest revision of SW-846 (EPA 1986) or other NMED-approved procedures. 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 the potential for sample contamination associated with the sampling and analysis process which is described in the following sections. Information on calculations necessary to evaluate the QC results is also described below.

6.4.2.1 Field Quality Control

The field QC samples that may be collected include trip blanks, field blanks, field duplicates, and equipment rinsate blanks. Table 6 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.

6.4.2.2 Analytical Laboratory Quality Control 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.

6.4.3 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.

6.4.4 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 the analysis in sufficient detail so that the data user can understand how the sample was analyzed.

7.0 WASTE MANAGEMENT

By removing any hazardous waste or hazardous waste constituents during closure, LANL may become a generator of hazardous waste. LANL will control, handle, characterize, and dispose of all wastes generated during closure activities in accordance with this Section (7.0), LANL waste management procedures, and in compliance with applicable state, federal, and local requirements (*see* 40 CFR § 265.114). These wastes include, but are not limited to:

1. demolition debris;
2. concrete;
3. containerized waste;
4. decontamination wash water; and
5. decontamination waste.
6. soil

The different types of wastes generated at closure, including the units' decontaminated structures and related equipment, and their disposition options are listed in Table 3 of this closure plan.

8.0 CLOSURE CERTIFICATION REPORT

Upon completion of the closure activities at the units, LANL will submit, by registered mail, a closure certification report (Report) for NMED review and approval. The Report will document that the units have been closed in compliance with the specifications in this closure plan. The Report will summarize all activities conducted during closure including, but not limited to:

- the results of all investigations;
- remediation waste management;
- decontamination;
- decontamination verification and soil sampling activities; and
- results of all chemical analyses and other characterization activities.

LANL will submit the Report to NMED no later than 60 days after completion of closure of the units. NMED may require interim reports that document the progress of closure. The certification will be signed by LANL and by an independent professional engineer registered in the State of New Mexico (*see* 40 CFR § 265.115).

The report will document the units' closure and contain, at a minimum, the following information:

1. a copy of the certification pursuant to 40 CFR § 265.115;
2. any variance, and the reason for the variance, from the activities approved in this closure plan;

3. documentation of the records review and structural assessment conducted;
4. a summary of all sampling results, showing:
   a. sample identification;
   b. sampling location;
   c. data reported;
   d. detection limit for each analyte;
   e. a measure of analytical precision (*e.g.*, uncertainty, range, variance);
   f. identification of analytical procedure;
   g. identification of analytical laboratory;
5. a QA/QC statement on analytical data validation and decontamination verification;
6. the location of the file of supporting documentation, including:
   a. field logbooks;
   b. laboratory sample analysis reports;
   c. QA/QC documentation; and
   d. chain-of-custody forms;
7. storage or disposal location of hazardous waste resulting from closure activities;
8. a copy of the Human Health and Ecological Risk Assessment Reports, if a site-specific risk assessment was conducted, for the units; and
9. a certification statement of the accuracy of the Closure Report.

Documentation supporting the independent registered professional engineer's certification must be furnished to NMED before LANL is released from the closure financial assurance requirements in 40 CFR § 265.143. If LANL leaves waste in place, they will submit to NMED a survey plat as required by 40 CFR § 265.116 in conjunction with the closure certification report.

9.0 REFERENCES

DOE 1995. *DOE Methods for Evaluating Environmental and Waste Management Samples,* DOE/EM-0089T, Rev. 2, Pacific Northwest Laboratory, Richland, Washington.

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

EPA 2005. Federal Facility Compliance Agreement - Administrative Order Docket No. CWA-06-205-1701 (FFCA/AO) *U.S. Environmental Protection Agency Region 6, In the Matter of United States Department of Energy and the Los Alamos National Laboratory, NPDES Nos. NMR05A735, NMR05A734, and NM0028355, Federal Facility Compliance Agreement. (February 2005),* U.S. Environmental Protection Agency, Office of Solid Waste, U.S. Government Printing Office, Washington, DC.

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, DC.

LANL 2010. "2010 Interim Facility-Wide Groundwater Monitoring Plan," Los Alamos National Laboratory document LA-UR-10-1777, Los Alamos, New Mexico. (LANL 2010, 109830).

LANL 2006. *Investigation Work Plan for Cañon De Valle Aggregate Area*, LA-UR-06-4960, Los Alamos National Laboratory, Los Alamos, New Mexico.

LANL 1994. *RFI Work Plan for Operable Unit 1085*, LA-UR-94-1033, Los Alamos National Laboratory, Los Alamos, New Mexico.

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

NMED 2010. *Los Alamos National Laboratory Hazardous Waste Facility Pernmit*, EPA No. NM0890010515, New Mexico Environment Department, Santa Fe, New Mexico.

Table 1

Schedule for Closure of the TA-14-23 OB/OD Units

Closure Activity	Schedule
Notify the Department of the initiation of closure.	Day 0
Remove all wastes including hazardous, mixed, and solid waste	No later than Day 90
Conduct records review	After initiating closure and before Structural Assessment
Conduct structural assessment	After removal of all wastes and before decontamination
Submit a request to modify the Closure Plan and the records review and structural assessment report	After conducting the records review and structural assessment and before decontamination
Complete all closure activities	No later than Day 180
Submit final Closure Report and Certification to the Department.	No later than Day 240

Note: The schedule above indicates calendar days in which the listed activities shall be completed from the day closure activities are initiated. Some activities may be conducted simultaneously.

Table 2

Hazardous Waste Constituents of Concern at the TA-14-23 OB/OD Units[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
HE and associated compounds	D001, D003	HMX, RDX, TNT, PETN, Tertyl and Other Nitrobenzenes and Nitrotoluenes
Toxic Metals	D005, D006, D007, D008, D009, D011	Barium, Cadmium, Chromium, Lead, Mercury, Silver
Semi-volatile Organic Compounds	D030, D036, F004, D038	2,4-Dinitrotoluene, Nitrobenzene, Pyridine
Volatile Organic Compounds	F001, F002, F003, F004, F005, D018, D022, D028, D029, D035; D040	Acetone, Ethanol, Benzene, MEK, Methylene Chloride, Toluene, MIBK, Xylene, Ethyl Acetate, Methanol, 1,2 dichloroethane , 1,1 dichloroethylene Trichloroethylene, chloroform
Other constituents of concern		Dioxans/Furans, Perchlorates

[a] Based on the units' operating record.
PETN = pentaerythrioltetranitrate (2,2-bis[(nitroxy)methyl]-1,3-propanediol dinitrate
HMX = cyclotetramethylenetetranitramine
RDX = cyclonite
MEK= methyl ethyl ketone
TNT = trinitrotoluene
MIBK = methyl isobutyl ketone

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	Either an authorized on-site or off-site radioactive waste disposal area.
	Mixed waste	Waste will be treated to meet 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.
	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, as appropriate.
Metal	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	Either an authorized on-site or off-site radioactive waste disposal area.
	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	Either an authorized on-site or off-site radioactive waste disposal area.

Table 3 (continued)

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Soil and tuff	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	Either an authorized on-site or off-site radioactive waste disposal area.
	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 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	Either an authorized on-site or off-site radioactive waste disposal area.
	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 sampling and decontamination 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	Either an authorized on-site or off-site radioactive waste disposal area.
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.

Table 4

Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method [a]	Test Methods/ Instrumentation	Target Detection Limit [b]	Rationale
Metal Analysis				
Barium	6010, 7010	ICP-AES,GFAA	200 ug/L	Determine the metal concentration in the samples.
Cadmium	6010, 7010	ICP-AES,GFAA	2 ug/L	
Chromium	6010, 7010	ICP-AES,GFAA	10 ug/L	
Lead	6010, 7010	ICP-AES,GFAA	5 ug/L	
Mercury	6010, 7010, 7471B	ICP-AES,GFAA, CVAA	0.2 ug/L	
Silver	6010, 7010	ICP-AES,GFAA	10 ug/L	
Organic Analysis				
Target compound list VOCs plus 10 TICs	8260B	GC/MS	10 mg/L	Determine the VOCs concentration in the samples.
Target compound list SVOCs plus 20 TICs	8270D, 8275	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.
Other Analysis				
Dioxans/Furans	8290	GC/MS	1.0 to 200 µg/L	Determine thee dioxin/furan concentration in the samples
Perchlorates	6850	HPLC-ESI/MS or MS/MS	1 µg/L	Determine concentration of perchlorate in the samples.

[a] 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.

CVAA = Cold-vapor atomic absorption spectroscopy
GC/MS = gas chromatography/mass spectrometry
GFAA = Graphite furnace atomic absorption spectroscopy
ICP-AES = Inductively coupled plasma-atomic emissionspectrometry
HPLC = high performance liquid chromatograph
ESI/MS = electrospray ionization/mass spectrometry
MS/MS = tandem mass spectrometry
SVOC = semi-volatile organic compound
TIC = tentatively identified compound
VOC = volatile organic compound
mg/L = milligrams per liter
ug/L = micrograms per liter.

Table 5

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: Barium, Cadmium, Chromium, Lead, 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), EPA, 1986, and all approved updates.

°C = degrees Celsius
L=Liter
mL = milliter
HNO_3 = nitric acid
HCL-Hydrochloric Acid
TCLP = Toxicity Characteristic Leaching Procedure

Table 6

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.

SVOC = semi-volatile organic compound
VOC = volatile organic compound

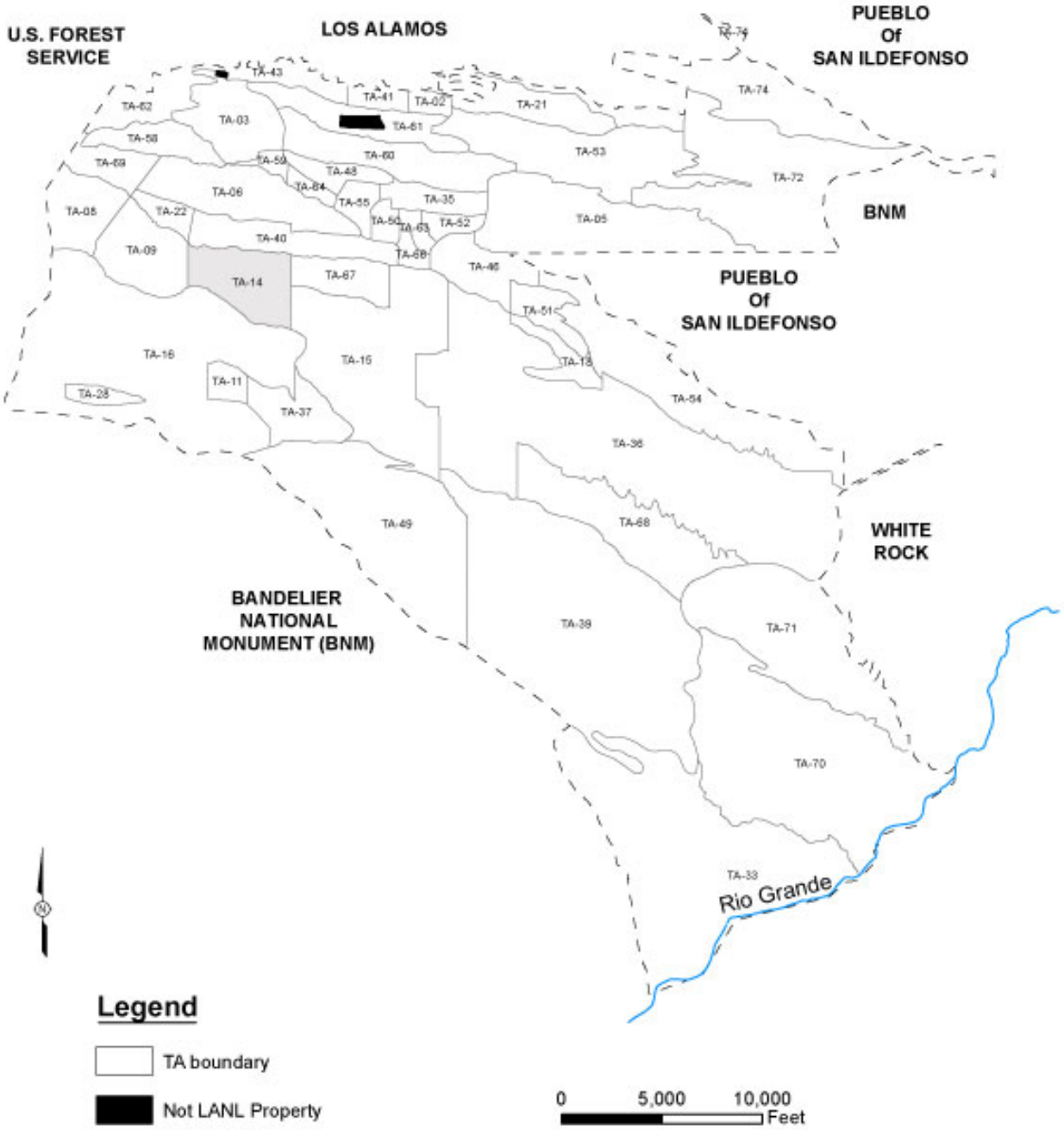

Figure 1

Location of Technical Area 14 at Los Alamos National Laboratory

Created by EP-WES-EDA GIS TEAM. Map Number 06-0108 November 13, 2006
State Plane Coordinate System New Mexico Central Zone North American Datum 1983 (ft)
This map was created for work processes associated with the Environmental Remediation Support Services. All other uses for this map should be confirmed with LANL EP-WES staff.
Boundary of Department of Energy Property I Around the Los Alamos National Laboratory; Los Alamos National Laboratory, SSMO Site Planning & Project Initiation; Infrastructure Planning Office. 04 June 2008
Boundary of Department of Energy Property is and Around the Los Alamos National Laboratory; Los Alamos National Laboratory, SSMO Site Planning & Project Initiation; 04 June 2008

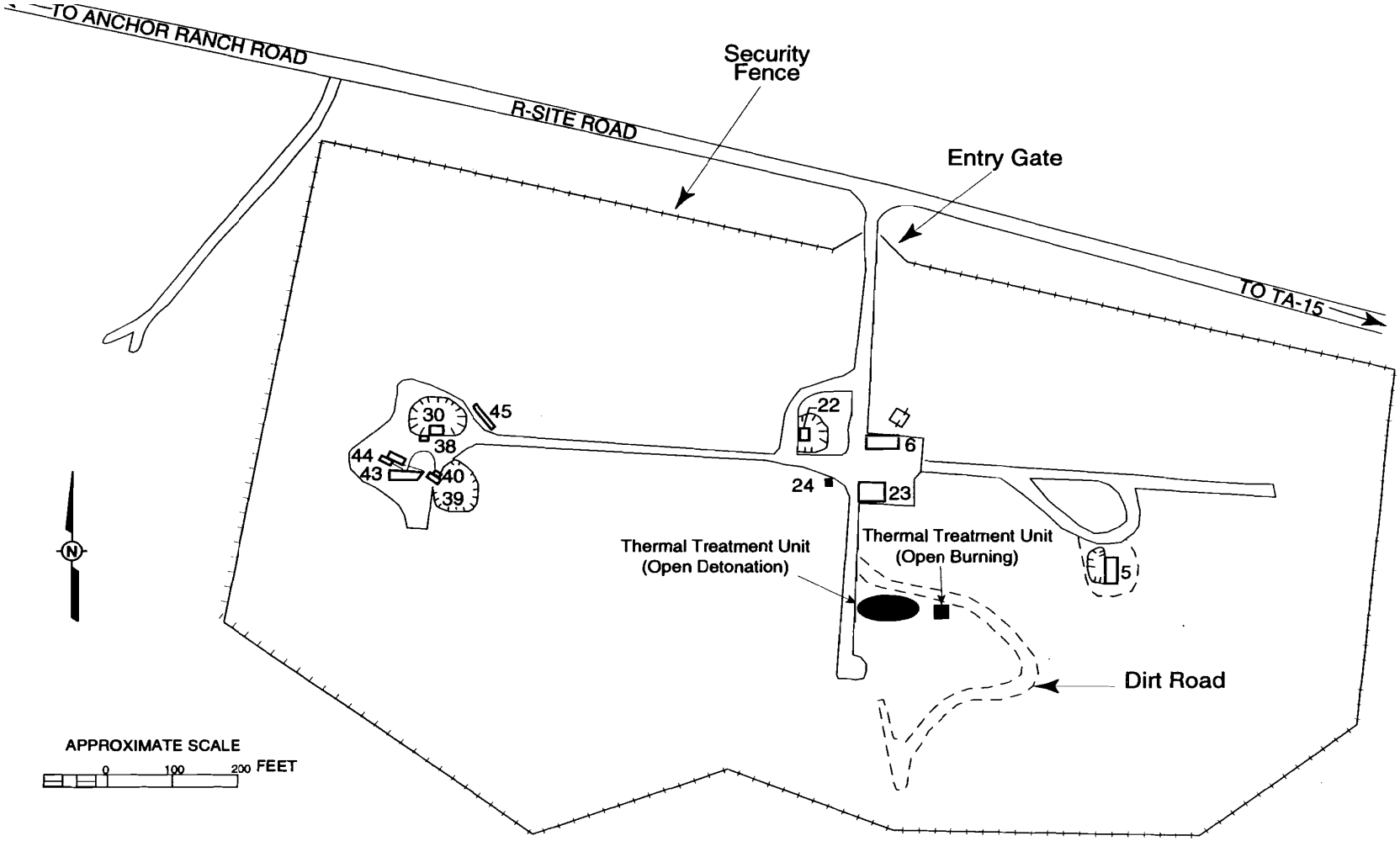

Figure 2. Location and Layout of the TA-14-23 Open Burn and Open Detonation Units

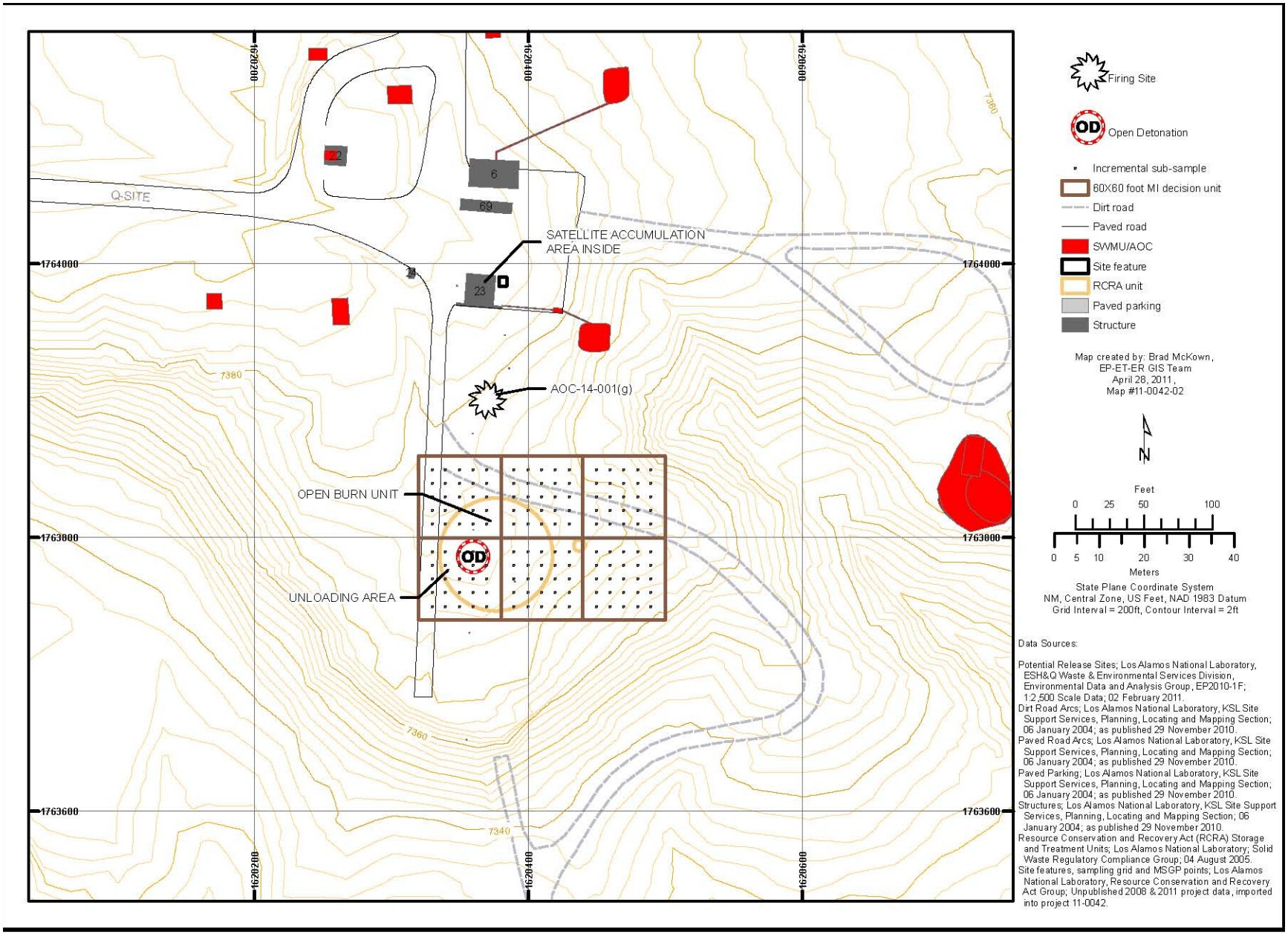

Figure 3. Sampling Locations for Closure of the TA-14-23 Open Burn and Open Detonation Units

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.

7/12/11

Dennis L. Hjeresen — **Date Signed**

Division Director
Environment Protection Division
Los Alamos National Laboratory
Operator

7/18/11

Gene E. Turner — **Date Signed**

Environmental Permitting Manager, Los Alamos Site Office
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Date: July 13, 2011
Refer To: ENV-RCRA-11-0120
LAUR: 11-03324

Mr. John E. Kieling

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Mr. John E. Kieling
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

2. Article Number (Transfer from service label) ENVRCRA 11-0120

COMPLETE THIS SECTION ON DELIVERY

A. Signature X [signature] ☑ Agent ☐ Addressee

B. Received by (Printed Name) Cynthia Seal D. C. Date of Delivery 7.19.11

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

ICAL AREA (TA) 14-23
AND BURN CAGE, LOS
NM0890010515

is required by Section 1.4.1 of the e Facility Permit (the Permit). For , Permit Section 1.4.1 requires the l Security, LLC (NNSA/LANS or a revised closure plan within 180

age) treatment units located at TA-14-23. For technical reasons explained in the closure plan, the Permittees elected to address both units in one closure plan. The Permittes are proposing not to operate either of these units, and hereby request the review and approval of this plan by the New Mexico Environment Department- Hazardous Waste Bureau (NMED-HWB). Pursuant to Permit Section 1.4.1, closure of these interim status units will be initiated in accordance with 40 CFR § 265.113(a) no later than 270 days after the effective date of the Permit.

Prior to completing closure of the units, this closure plan may be amended in accordance with Section 4.3 of the attached closure plan and 40 CFR § 265.112(c). Amendments would occur, if necessary and appropriate, to update the closure process and/or the sampling and analysis plan. An amended closure plan would then be submitted to the New Mexico Environment Department (NMED) for approval prior to completing the activities in the plan.