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Date: JUN 1 1 2013
Refer To: WM-DO-13-0009
LAUR: LA-UR-13-24000

Mr. John E. Kieling
Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

JUN 2013

Dear Mr. Kieling:

SUBJECT: Response to Disapproval of Revised Closure Plans for Technical Area 14-23 Open Burning and Open Detonation Units and Technical Area 39-57 Open Detonation Unit, Los Alamos National Laboratory, EPA ID# NM0890010515

The purpose of this letter is to respond to the New Mexico Environment Department-Hazardous Waste Bureau (NMED-HWB) letter (HWB-LANL-12-053 and HWB-LANL-12-054) dated March 15, 2013 sent to the United States Department of Energy (DOE) and Los Alamos National Security, LLC, collectively the Permittees. The letter disapproved and requested response to comments on the *Revised Closure Plans for Technical Area 14-23 Open Burning and Open Detonation Units and Technical Area 39-57 Open Detonation Unit* submitted to NMED-HWB on February 24, 2012.

Enclosure 1 has four attachments: 1) a response to the comments outlined in the NMED-HWB's letter in the form of a table that details where all the revisions have been made to the closure plan; 2) a copy of the March 15, 2013 disapproval letter; 3) a revised interim status closure plan for TA-39-57; and 4) a revised interim status closure plan for TA-14-23.

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Two paper copies and one electronic copy is included as part of this response. As requested a redline-strikeout version that includes all changes and edits to the closure plan has been included in the electronic copy to the NMED-HWB only.

If you have comments or questions regarding this permit modification, please contact Gene Turner at (505) 667-5794 or Mark Haagenstad, at (505) 665-2014.

Sincerely,

Jody Armijo
Acting Group Leader
Waste Management Programs
Waste Management Division

Sincerely,

Gene E. Turner
Environmental Permitting Manager
Environmental Projects Office
Los Alamos Field Office
U.S. Department of Energy

JAA:GET/TAD/ls

Enclosure: 1. Response to Disapproval of Interim Status Closure Plan, Open Burning/Open Detonation (OB/OD) Treatment Unit Technical Area (TA) 14-23 and TA-39-57 OD Unit, Revision 2.0

Cy: Laurie King, USEPA/Region 6, Dallas, TX, w/enc.
David Cobrain, NMED/HWB, Santa Fe, NM, w/enc.
Siona Briley, NMED/HWB, Santa Fe, NM, w/enc.
Carl A. Beard, PADOPS, w/o enc., A102
Michael T. Brandt, ADESH, w/o enc., (E-File)
Robert L. Dodge, WM-DO, w/enc., (E-File)
David Funk, WX-DO, w/enc., (E-File)
Amanda Smith, WX-6, w/enc., (E-File)
Mark Haagenstad, ENV-RCRA, w/enc., (E-File)
Tammy Diaz, ENC-RCRA, w/enc., (E-File)
IRM-RMMSO (U1201983), w/enc., (E-File)
ENV-RCRA Correspondence File, w/enc., K490

ENCLOSURE 1

Response to Disapproval of Interim Status Closure Plan,
Open Burning/Open Detonation (OB/OD) Treatment Unit Technical Area (TA) 14-23
and TA-39-57 OD Unit, Revision 2.0
Los Alamos National Laboratory,
EPA ID# NM0890010515

WM-DO-13-0009

LA-UR-13-24000

Date: JUN 1 1 2013

Introduction

This document responds to the March 15, 2013, New Mexico Environment Department-Hazardous Waste Bureau (NMED-HWB) *Disaproval* (sic) *Closure Plan for TA-14-23 OB/OD Unit Area and TA-39-57 OD Unit Los Alamos National Laboratory*. The disapproval letter was issued for the *Submittal of the Revised Closure Plans for Technical Area 14-23 Open Burning and Open Detonation Units and Technical Area 39-57 Open Detonation Unit* originally submitted to NMED-HWB on February 24, 2012, by the United States Department of Energy (DOE) and Los Alamos National Security, LLC, collectively the Permittees. The Permittees are seeking to close an OB/OD hazardous waste treatment unit located at Technical Area (TA) 14-23 and an OD hazardous waste treatment unit, located at TA-39-57 in accordance with the Resource Conservation and Recovery Act (RCRA) requirements. A table, as required in the March 15, 2013 disapproval, is included that details where all revisions have been made to the closure plans and cross-references the NMED-HWB's numbered comments in the disapproval letter. The table also includes the Permittees responses to comments where necessary. The disapproval letter from the NMED-HWB has been included as Attachment A to this response document, Attachment B includes the revised closure plan, *Interim Status Closure Plan Open Detonation Treatment Unit Technical Area 39-57, Revision 2.0* and Attachment C includes the revised closure plan, *Interim Status Closure Plan Open Burn / Open Detonation Treatment Unit Technical Area 14-23, Revision 2.0*.

Revisions to Interim Status Closure Plan TA-39-57 Open Detonation Treatment Unit and TA-14-23 Open Burn/Open Detonation Units

Comment Number [1]	Location of Change in Plan [2]	Description of Change\Response to Comment
Specific Comments OD TA-39-57		
1	*Section 2.2, Description of the Wastes Treated at the Unit, page 2: Provide descriptions of DU and RCT or include these terms in the List of Acronyms and Abbreviations (page v).*	Section 2.2 and the List of Acronyms and Abbreviations were revised to include a description of depleted uranium (DU) and radiological control technician (RCT).
2	*Section 2.3,Description of Treatment Conducted at the Units, page 3: Include a description of materials treated historically at the unit, (e.g., bulk high explosives (HE) consisting of RDX, C4, HMX). Include a list of detonators and volumes and describe the methods for detonation of the waste in this sub-section.*	Section 2.2, Description of the Wastes Treated at the Unit, includes a detailed discussion on the types of waste treated at the unit. Section 2.3 Description of Treatments Conducted at the Unit, includes a description of the methods (OD) used to treat the waste mentioned in Section 2.2. Detonators may have been treated as part of a waste steam and are included within the estimated volume treated at the unit. However, detonators that were used to initiate other waste streams for waste treatment operations are not necessarily included within estimated volumes. Because they are not waste when used as an initiator, they should not be included within the volume of waste treated at the unit and would not be part of the hazardous waste treatment unit operating record. The potential constituents that may be present as part of all waste treated at the unit are included in Table 2.
3	*Section 3.0 Estimated Maximum Waste Treated, page 3: An estimated average of 48 lbs were treated per year for 30 years (1973-2003) would generate 1,440 pounds of waste Provide the calculations or rationale used to approximate 1,827 pounds maximum waste reported.*	Section 3.0 was revised to correct the dates the unit was in use for the treatment of hazardous waste. The section was also revised to include the rationale used to approximate 1,827 pounds maximum waste treated at the unit.

Comment Number [1]	**Location of Change in Plan** [2]	**Description of Change\Response to Comment**
4	*Section 4.1, Closure Performance Standard, page 3: This section may be shortened to reference the permit standards previously cited (40 CFR 265.111 and Permit Sections 11.4 and 11.5. Remove the discussion of the ground water monitoring activities since detectable constituents from the units likely cannot likely be differentiated from other nearby potential sources.*	This section has been modified to correct typographical errors, update references, add the following language to be specific to the regulations "*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 to change the reference from LANL to owner/operator. The Permittees believe that the information provided within this section of the closure plan is in accordance with 40 CFR §265.11. It follows Permit Section 9.2 of the LANL Hazardous Waste Facility Permit (the Permit). The section includes the specific closure performance standards for this unit. The discussion of the Clean Water Act and groundwater monitoring activities are not referenced in this section.
5	*Section 5.0 Closure Procedures, page 5: Correct the typographical error in the sentence from "activities includes" to activities include".*	Although it is unclear where "activities includes" as stated in the NMED-HWB comment is located in this section, this section has been revised to correct the typographical error. "*Closure activities at the unit includes…*" has been revised to state "*Closure activities at the unit include…*"
6	*Section 5.1.2 Structural Assessment, page 6: The Permittees state "a visual inspection was conducted to determine that no hazardous constituents were released" this conclusion is not possible based on a visible inspection. Re-vise this statement to state that a visible inspection was conducted to evaluate the unit for visible spills and debris. Include documentation, such as photographs or satellite imagery to document surface conditions. Update the closure procedures listed in Section 4.1 accordingly. Describe the condition of the equipment and structures assessed (e.g., metal weather enclosure, wood flooring).*	This section has been revised to state "*The assessment included inspecting the unit for any staining or evidence of a release. There is no equipment associated with the unit or activities conducted at the unit. The TA-39-57 structure is not located within the unit boundary and will not be included as part of closure of this unit. This assessment has been documented and will be submitted to the NMED-HWB as part of the closure report and will include the necessary results, drawings and photographs.*" There are no related structures or equipment associated with the unit. The metal structure is used for classified experimental activities and is not part of the OD Unit and therefore is not discussed in the closure plan. Based on brief viewing of the inside of the structure the wood flooring appeared to be in good condition, there was no evidence of staining. From the exterior the metal enclosure appeared to be in good condition.

Comment Number [1]	**Location of Change in Plan** [2]	**Description of Change\Response to Comment**
7	*Section 5.2.1 Equipment Used During Decontamination Activities, page 6: Describe the "wash water solution". Describe in detail the proposed methods to decontaminate re-usable equipment, tools, and protective clothing. Describe the proposed characterization methods for to disposal of decontamination water.*	Information within this section has been clarified to describe the methods used for decontamination. Characterization and disposal of decontamination water is referenced in Section 7.0 of the closure plan.
8	*Section 6.0.3(b-d) Sampling and Analysis, page 7: Provide a subsection describing, in detail, the rationale for the number, location, and type of samples proposed for this unit.*	This Section was revised to address this comment
9	*Section 6.1 Sampling Activities, page 9:* *a. Include a subsection that describes the proposed procedures for wipe sample and solid chip sample collection on the related equipment and structures. Revise the text and Table 5 accordingly.* *b. Provide a detailed description of the proposed methods to collect soil samples for analysis. Revise the text and Table 5.0 accordingly. Remove the statement that samples will be kept at depth temperature and revise the text to state that samples will be kept at cool at 4°C or lower.*	a. Section 6.1 was revised to remove the language "*unit related equipment, surfaces*" because there is no related equipment, structures or concrete associated with the unit; therefore, wipe sampling and solid chip sampling at this unit will not be conducted. b. Section 6.2.2 Soil Sampling, includes a description of the proposed methods to collect soil samples for analysis; therefore, Section 6.1 was not revised to include these details. Table 4 includes the analytical methods. Table 5 was revised to only include solid media. Section 6.2.2 has been revised to state that samples will be kept cooled.

Comment Number [1]	**Location of Change in Plan** [2]	**Description of Change\Response to Comment**
10	*Section 6.2.1 Surface Water and Groundwater Sampling, page 8: Update this section to include the status of IP monitoring near the vicinity of TA-39-57 which began in 2011.*	This section has been revised to provide a description of the LANL storm water Individual Permit monitoring program.
11	*Section 6.2.3 Cleaning of Sampling Equipment, page 9: Revise decontamination procedures to state that sampling equipment will be decontaminated prior to each use in accordance with Permit Section 11.10.2.11 and specifically Items 4 and 5.*	Section 6.2.3 was revised to include relevant language adapted from Permit 11.10.2.11 (items 4 and 5).
12	*Section 6.2.2 Soil Sampling, page 10: Provide a detailed description of the proposed methods to collect soil samples for analysis. Describe the proposed method for homogenization of subsamples. Remove the statement that samples will be kept at-depth temperature, and revise text to state that samples will be kept at cool at temperatures of 4°C or lower.*	Section 6.2.2 was revised to provide a detailed description for the proposed sample locations. The proposed soil samples to be collected at this unit are discrete samples collected from a depth of 0-6 inches and 6-12 inches, the samples are not composite samples and therefore will not be homogenized. This section was revised to state that "Samples will be kept cooled to 4˚C or lower…"
13	*Section 6.3.1 Sample Documentation, page 9: The Permittees state that a logbook will be maintained detailing sample collection activities. Include the documentation of any deviations and justification for such deviations.*	This section has been revised to include the following statement: "Any deviations from the sampling plan will be noted in the sample logbook and reported in the TA-39-57 closure certification report."

Comment Number [1]	**Location of Change in Plan** [2]	**Description of Change\Response to Comment**
14	*Section 6.3.3 Sample Handling, Preservation and Storage, page 10:* *a. Revise this section to include the methods that will be used to demonstrate that appropriate temperatures were maintained throughout the sample collection and shipping process (e.g., temperature indicator strips, temperature blanks). Revise the text and Tables 5 and 6 accordingly.* *b.The Permittees propose that off-site transportation of samples will occur via contract, common motor carrier, air carrier or freight. Revise this section to reference Permit Section 11.10.2.9.*	a. Section 6.3.3 *Packaging and Transportation of Samples* was revised to discuss methods that can be used to demonstrate appropriate temperatures were maintained throughout the sample collection and shipping process. b. Section 6.3.3 was revised to include relevant and appropriate language adapted from Permit Section 11.
15	*Section 7.0 Waste Management, page 12: Revise this section to include a description of, and rationale for the methods that will be used to sample and characterize different types of waste prior to disposal.*	Section 7.0 includes a discussion on waste management procedures and applicable state, federal, and local requirements. Table 3 as referenced in Section 7.0 includes the material and disposal options. Section 7.0 was modified to include the following statement, “As stated in Section 1.0, waste management activities associated with this unit will undergo RCRA clean closure activities in conjunction with the corrective action processes at TA-39. Final closure of the TA-39-57 OD Unit will be in accordance with the requirements set forth In 40 CFR Part 265, Subparts G and P.”

Comment Number [1]	**Location of Change in Plan** [2]	**Description of Change\Response to Comment**
16	*Table 2, Hazardous Waste Constituents of Concern at TA-39-57 OD, page 16: Revise Table 2 to include nitrates, PCBs, dioxins, and furans under Other Constituents of Concern or provide rationale for their exclusion. NMED noted in the closure plan for TA-16-399 listed cyanide as a constituent of concern. Revise Table 2 for this unit to include cyanide or provide a justification for cyanide's exclusion. Provide the rationale for omitting VOC analysis from the analytical suite.*	Table 2 was revised to include cyanide, PCBs and dioxins/furans. Nitrates were added to Table 2 and any nitrate related constituents would be identified as a part of the high explosives constituents and included in the explosives analysis. Additionally, NMED-HWB states "*Provide the rationale for omitting VOC analysis from the analytical suite*." VOCs were not omitted from the analysis and are retained in Table 2.
17	*Table 3, Potential Waste Materials, Waste Types, and Disposal Options, page 17: Revise the table to exclude radioactive liquid waste and mixed waste from the waste type column, or provide justification for the presence of these waste types and the proposed sampling procedures.*	Table 3 was revised to remove radioactive liquid waste and mixed waste from the waste type column. The term "Non-regulated solid waste" was changed to state "Non-hazardous solid waste" for consistency and clarification purposes only.

Comment Number [1]	**Location of Change in Plan** [2]	**Description of Change\Response to Comment**
18	*Table 4, Summary of Analytical Methods, page 19: a. Revise the detection limits in Table 4 to correspond to solid media rather than liquid media.* *b. The list of analytes in Table 4 are inconsistent with the constituents listed in Table 2 (page 16) Constituents of Concern. Revise Tables 2, 4 and 5 and the text to propose analysis for high explosives, nitrates, and cyanide or provide justification for their exclusion. See comment 16 above and remove VOC analysis, if appropriate.*	Table 4 has been revised to include quantitation detection limits to correspond to solid media rather than liquid media. Tables 4 and 5 were revised to be consistent with Table 2. See Comment 16 to review other applicable revisions.
19	*Table 5, Sample Containers, Preservation Techniques and Holding Times, Page 21: Revise this section to remove references to aqueous sampling techniques from Table 5. See comments 16 and 18 above and remove VOC analysis if appropriate.*	Table 5 was revised to remove references to aqueous sampling techniques.

Comment Number [1]	**Location of Change in Plan** [2]	**Description of Change\Response to Comment**
20	*Figure 3, Sampling Locations for Closure of TA-39-57 OD Units, page 24: a. Provide the figure on larger sized paper (11X17). Remove the 100 ft contour line indicated in the legend; this is a discrepancy from the contour lines shown on the map at its current scale.* *b. Revise the map to depict the outlined locations of the open detonation unit shown in Figure 2.* *c. Provide drainage locations, land marks (e.g., Ancho Canyon, berms, rock check dams).*	**a.** Figure 3 was revised to fit 11 X 17 page. The figure did not include a "100 ft" contour **i**n the legend. b. Figure 3 was revised to depict the outlined locations of the OD unit shown in Figure 2. c. The figure was revised to include structure labels to help provide land marks.
Specific Comments OB/OD TA-14-23		
1	*Section 2.2 Description of Wastes Treated at the Units, page 3: Revise (e.g.,., ignitability, toxicity for barium) to (e.g., ignitability, toxicity for barium) to correct the typographical error.*	This section was revised to change the typographical error from (e.g.,., ignitability, toxicity for barium) to (e.g., ignitability, toxicity for barium).

Comment Number [1]	**Location of Change in Plan** [2]	**Description of Change\Response to Comment**
2	*Section 2.3 Description of Treatment Conducted at the Units, page 3:* *a.Rename or divide this section into subsections describing treatment methods, waste types, and treatment volumes. Revise this section to include the estimated volume of kerosene or other fuels used per treatment.* *b. Include a description of materials treated historically at the unit, (e.g., bulk high explosives (HE) consisting of RDX, C4, HMX). Include a list of ignition materials and volumes and describe the methods used for ignition of the waste in this subsection.*	a. Section 2.2, Description of the Wastes Treated at the Units, includes a discussion on the types of wastes treated by treatment method (OB and OD). Treatment volumes are included in Section 3.0, Estimate of Maximum Waste Treated Fuels used for treatment are discussed in Section 2.3, Description of Treatments Conducted at the Units and this section was revised to provide an approximation for the amount of fuel used to ignite the material in the burn cage. b. The description of materials treated at the units is discussed by treatment method (OB and OD) in Section 2.2 and are listed in Table 2. Section 2.3 includes the types of ignition materials and ignition methods. This section was revised to include approximate volumes of ignitions used.
3	*Section 5.1.1 Records Review, page 6: In Section 2.1 the Permittees state that the units were in operation since 1944; however, in Section 5.1.1 Permittees state that there are only records of waste being treated from 1988 to 2003. Include an explanation for the missing records, and provide a description of the suspected types and volumes of waste treated prior to1988.*	The units have been operational for research and development activities since 1944. Documentation of waste treatment activities found for years 1988 through 2003 represents the complete operating record for waste management at the site. All other activities at the site prior to 1988 and after 2003 were part of testing and are not part of the hazardous waste facility operating record. Given that other activities have been conducted at the site there is the potential for additional constituents of concern to be present, therefore, soil samples will be collected (as stated in Section 6.0) and analyzed to include all potential constituents of concern.

Comment Number [1]	**Location of Change in Plan** [2]	**Description of Change\Response to Comment**
4	*Section 5.1.2 Structural Assessment, page 7: The Permittees state "a visual inspection was conducted to determine that no hazardous constituents were released" this conclusion is not possible based on a visible inspection. Re-vise this statement to state that a visible inspection was conducted to evaluate for visible spills and debris. Include documentation, such as photographs or satellite imagery to document surface conditions. Update the closure procedures listed in Section 4.1 accordingly. Describe the condition of the structures and equipment assessed (e.g., metal weather enclosure, wood flooring).*	Section 5.1.2 was revised to state "*During the structural assessment process (September 12, 2011), a visual inspection of the OB/OD units was conducted and a determination was made that there was no visual evidence of spills or debris at the OB/OD units. Additionally, it was determined that the structures within the area are not included within the boundary of the unit. This assessment has been documented and will be submitted to the NMED-HWB as part of the closure report and will include the necessary results, drawings and photographs.*"
5	*Section 5.2.1 Equipment Used During Decontamination Activities, page 7: Describe the "wash water solution". Describe the proposed methods to decontaminate re-usable equipment, tools, and protective clothing.*	Information within this section has been clarified to describe the methods used for decontamination and to describe the wash water solution.
6	*Section 6.0.3(b-d) Sampling and Analysis, page 8: Provide a subsection describing, in detail, the rationale for the number, location, and type of samples proposed for this unit.*	Subsection 6.1 includes the locations and types of samples proposed to be collected as well as the rationale for the proposed locations. Subsection 6.2.2., includes the details for the proposed soil sampling activity at the unit.

Comment Number [1]	**Location of Change in Plan** [2]	**Description of Change\Response to Comment**
7	*Section 6.1 Sampling Activities, page 8: a. Include a subsection that describes the proposed procedures for wipe sample and solid chip sample collection on the related equipment and structures. Revise the text and Table 5 accordingly.* *b. Provide a detailed description of the proposed methods, used to collect soil samples for analysis. Revise the text and Table 5.0 accordingly. Remove the statement that samples will be kept at depth temperature and revise to state that samples will be kept cool at temperatures 4°C or lower.*	a. Sections 6.1 and Table 5 were not revised because the burn cage and concrete pad (related equipment) will be disposed of in accordance with Section 7.0, as stated in Section 5.2 of the Closure Plan. Additionally, wipe or solid chip samples will not be collected at this site. Section 6.1 was revised to remove the statement "and soils at the storm water discharge point." Because there are no storm water discharge points located near the site, given that the site is located on the top of a mesa." b. Section 6.2.2 includes details for the proposed methods to collect soil samples and has been revised to state that samples will be kept cool at 4°C or lower. Table 4 includes the analytical methods.
8	*Section 6.2 Sample Collection Procedures, page 9: Include a subsection that describes proposed procedures for wipe sample and solid chip sample collection see Comment 7 above. Revise the text and Table 5 accordingly.*	Section 6.2 was not revised because wipe samples and solid chip samples will not be collected at the unit. The burn cage and concrete pad will be characterized and disposed of as waste as stated in Section 7.0 of the Closure Plan; they will therefore, not require decontamination and wipe or chip samples are not required. The concrete will be disposed of as hazardous waste and the burn cage will be flashed and recycled off site and disposed of as stated in Table 3. Chip and wipe samples are only required if the equipment or structure is anticipated to be re-used on site after closure thereby requiring decontamination.
9	*Section 6.2.1 Surface Water and Groundwater Sampling, page 9: Update this section to include the status of IP monitoring near the vicinity of TA-14-23 which began in 2011.*	This section has been revised to provide an explanation for the LANL Storm Water Individual Permit.

Comment Number [1]	**Location of Change in Plan** [2]	**Description of Change\Response to Comment**
10	*Section 6.2.3 Cleaning of Sampling Equipment, page10: Revise decontamination procedures to state that sampling equipment will be decontaminated prior to each use in accordance with Permit Section 11.10.2.11 and specifically Items 4 and 5.*	Although Permit Section 11 requirements are applicable to corrective action processes and not to interim status units; Section 6.2.3 was revised to include relevant and appropriate language adapted from Permit Section 11.10.2.11 (items 4 and 5).
11	*Section 6.2.2 Soil Sampling, page 10: a. Provide a detailed description of the proposed methods, and to collect soil samples for analysis. Describe the method of homogenization of the subsamples. Remove the statement that samples will be kept at-depth temperature, and revise to state that samples will be kept cool at temperatures 4°C or lower.*	This section was revised to include the following language: "*Soil samples will be collected from each of the 30 sub-sample locations from within each decision unit, placed in a stainless steel mixing bowl and mixed thoroughly. The soil samples will then be placed in the proper sample analysis container*." This section was also revised to "*state samples will be kept cool at temperatures 4°C or lower…*"
12	*Section 6.3.1 Sample Documentation, page 10: The Permittee proposes to maintain a logbook detailing sample collection activities. Include the documentation of any deviations and justification for such deviations.*	This section has been revised to include the following statement: "*Any deviations from the sampling plan will be noted in the sample logbook and reported in the TA-14-23 closure certification report*."

Comment Number [1]	**Location of Change in Plan** [2]	**Description of Change\Response to Comment**
13	*Section 6.3.3 Sample Handling, Preservation and Storage, page 12: a. Revise this section to include the methods that will be used to demonstrate that appropriate temperatures were maintained throughout the sample collection and shipping process (e.g., temperature indicator strips, temperature blanks). Revise the text and Tables 5 and 6 accordingly.* *b.The Permittees propose that off-site transportation of samples will occur via contract, common motor carrier, air carrier or freight. Revise this section to reference Permit Section 11.10.2.9.*	a. Section 6.3.3 Package and Transportation of Samples, has been revised to discuss methods that can be used to demonstrate appropriate temperatures were maintained throughout the sample collection and shipping process and to discuss off-site transportation. Table 5 includes the sample container types, preservation techniques and holding times. Table 6 includes the QC sample types, applicable analyses, frequency and acceptance criteria. b. Section 6.3.3 was revised to include relevant and appropriate language adapted from Permit Section 11.
14	*Section 7.0 Waste Management, page 13: Revise this section to include a description and rationale for, the methods that will be used to sample and characterize different types of waste prior to disposal.*	Section 7.0 Waste Management, states that waste is managed using LANL waste management procedures and applicable state, federal, and local requirements. Consistent with 40 CFR §265.114, all waste generated during closure activities will be dispositioned in accordance with the applicable requirements of 40 CFR Part 262. Table 3 includes details for the potential waste material and disposal options. Section 7.0 was revised to include the following statement: "As stated in Section 1.0 waste management activities associated with this unit 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."

Comment Number [1]	**Location of Change in Plan** [2]	**Description of Change\Response to Comment**
15	*Table 2, Hazardous Waste Constituents of Concern at TA-14-23 OB/OD, page 17:* *a.List kerosene as a constituent of concern, and include diesel-range organics (DRO) as part of the analytical suite.* *b.Revise Table 2 to include nitrates, under Other Constituents of Concern. NMED notes that the closure plan for TA-16-399 listed cyanide as a constituent of concern. Revise Table 2 to include cyanide or provide a justification for cyanide being excluded from this site's analysis.* *c.Provide a rationale for omitting VOC analysis from the analytical suite.*	a. Kerosene was added to the list of other constituents of concern within Table 2. Diesel-range organics had been included in Table 4, Summary of Analytical Methods. b. Hexane and Cyanide were added to Table 2. Nitrates were not added to table 2 as any nitrate related constituents would be identified as a part of the high explosives constituents. c. Volatile organic compounds (VOCs) were included in Revision 1.0 of the TA-14-23 Closure Plan, therefore a rationale for omitting them from Table 2 was not provided.
16	*Table 3, Potential Waste Materials, Waste Types, and Disposal Options, page 17: Revise the table to exclude radioactive liquid waste and mixed waste from the waste type column, or provide justification for the presence of mixed waste and propose sampling procedures.*	Table 3 was revised to remove radioactive liquid waste and mixed waste from the waste type column. The term "Non-regulated solid waste" was changed to state "Non-hazardous solid waste" for clarification purposes only.

Comment Number [1]	**Location of Change in Plan** [2]	**Description of Change\Response to Comment**
17	*Table 4, Summary of Analytical Methods, page 20:* *a.Revise the detection limits in Table 4 to correspond to soil media rather than liquid media.* *b.The list of analytes in Table 4 are inconsistent with the constituents listed in Table 2 (page 16) Constituents of Concern. Revise Tables 2, 4 and 5 and the text to propose analysis for high explosives, nitrates, ignition sources such as kerosene, and cyanide or provide justification for their exclusion. See Comment 15, Item C above and remove VOC analysis, if appropriate.*	a. Detection limits have been verified and added to the table where necessary. b. Tables 4 and 5 have been revised to add appropriate analyses and cover all of the constituents of potential concern listed within Table 2. Nitrates were added to Table 2 and any nitrate related constituents would be identified as a part of the high explosives constituents and included in the explosives analysis.
18	*Table 5, Sample Container, Preservation Techniques and Holding Times, Page 21: Revise this section to remove references to aqueous sampling techniques from Table 5 or adjust the sample methods to include the aqueous sampling described in Table 5. See also Comment 15, Item c, above*	Table 5 was revised to remove references to aqueous sampling techniques.

Comment Number [1]	**Location of Change in Plan** [2]	**Description of Change\Response to Comment**
19	*Figure 3, Sampling Locations for Closure of TA-14-23 OB OD Units, page 25:* *a.Provide the figure on larger paper (11X17). Remove the 100 ft contour line indicated in the legend; this is a discrepancy from the contour lines shown on the map at its current scale.* *b.Revise the map to depict the outlined locations of the open burning unit and open detonation unit shown in Figure 2.* *c.Revise the polygonal road lines located in the Northwest corner near structure #2 to indicate a complete road system or provide justification for gap.* *d. Provide drainage locations, land marks (e.g., Q Site, Firing Mound 3, berms).*	a. Figure 3 was revised to fit 11 X 17 page. The figure did not include a "100 ft" contour in the legend therefore there is no discrepancy from the contour lines shown on the map. b. Figure 3 was revised to depict the outlined locations as shown in Figure 2 of the OB/OD. c. The figure was revised to make the road near Structure 22 continuous. d. The drainages are not included on the figure because the OB/OD unit is located on the mesa top and the nearest drainages are located in the canyon bottom. The drainages do not appear on the map at this scale. Q-Site road is included in Figure 3. The figure has been revised to show an approximation for the location of the berms. As stated in Section 2.1, Description of the Treatment Units, the OD area is referred to as Firing Mound 3. The OD area is shown on both Figures 2 and 3. Surface water flow from the unit runs in a southeasterly direction and is slowed by a bermed area along the mesa top. The figure has been revised to show a general surface water flow direction.

[1] Refers to the specific comment identifier in the New Mexico Environment Department – Hazardous Waste Bureau (NMED-HWB) letter titled *Disaproval* (sic) *Closure Plan for TA 14-23 OB/OD Area and TA-39-57 OD Unit Los Alamos National Laboratory, EPA ID# NM0890010515, HWB-LANL-12-053, HWB-LANL-12-054* in Attachment A.

[2] Refers to the specific location of the changes that have been made to the *Interim Status Closure Plan Open Detonation Treatment Unit Technical Area 39-57, Revision 2.0* in Attachment B and *Interim Status Closure Plan Open Burn / Open Detonation Treatment Unit Technical Area 14-23, Revision 2.0 in* Attachment C

Attachment A

Copy of the March 15, 2013 Disapproval Letter

ERID-522185

NEW MEXICO ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau

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Resource Protection Division

EP2013-5059

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

March 15, 2013

U1300806

IRM-RMS. LANL

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RE: DISAPROVAL
CLOSURE PLAN FOR TA-14-23 OB/OD UNIT AREA AND TA-39-57 OD UNIT
LOS ALAMOS NATIONAL LABORATORY
EPA ID# NM0890010515
HWB-LANL-12-053, HWB-LANL-12-054

Dear Messrs. Turner and Grieggs:

The New Mexico Environment Department has received the *Revised Closure Plans for Technical Area (TA) 39-57 Open Detonation Unit* (Enclosure 1) referenced by LA-UR-12-10332 and dated February 24, 2012. The Department has also received the *Revised Closure Plans for Technical Area (TA) 14-23 Open Burning and Open Detonation Unit* (Enclosure 2), *Revision 1.0*, referenced by LA-UR-12-10333, and dated February 24, 2012. The open burning (OB) and open detonation (OD) Closure Plans are submitted by the United States Department of Energy and the Los Alamos National Security, LLC (collectively the Permittees). The Permittees intend to close each of the TA-14-23 open burning and detonation units, and the TA-39-57 open detonation unit. The New Mexico Environment Department (the Department or NMED) hereby issues this Disapproval with the following comments.

Specific Comments OD TA-39-57:

1. **Section 2.2 Description of Wastes Treated at the Unit, page 2:**
   Provide descriptions of DU and RCT or include these terms in the List of Acronyms and Abbreviations (page v).

2. **Section 2.3 Description of Treatment Conducted at the Units, page 3:**
   Include a description of materials treated historically at the unit, (*e.g.*, bulk high explosives (HE) consisting of RDX, C4, HMX). Include a list of detonators and volumes and describe the methods for detonation of the waste in this sub-section.

3. **Section 3.0 Estimated Maximum Waste Treated, page 3**:
   An estimated average of 48 lbs were treated per year for 30 years (1973-2003) would generate 1,440 pounds of waste. Provide the calculations or rationale used to approximate 1,827 pounds maximum waste reported.

4. **Section 4.1, Closure Performance Standard, page 3:**
   This section may be shortened to reference the permit standards previously cited (40 CFR 265.111 and Permit Sections 11.4 and 11.5. Remove the discussion of the ground water monitoring activities since detectable constituents from the units likely cannot likely be differentiated from other nearby potential sources.

5. **Section 5.0 Closure Procedures, page 5:**
   Correct the typographical error in the sentence from "activities includes" to activities include".

6. **Section 5.1.2 Structural Assessment, page 6:**
   The Permittees state "a visual inspection was conducted to determine that no hazardous constituents were released" this conclusion is not possible based on a visible inspection. Re-vise this statement to state that a visible inspection was conducted to evaluate the unit for visible spills and debris. Include documentation, such as photographs or satellite imagery to document surface conditions. Update the closure procedures listed in Section 4.1 accordingly. Describe the condition of the equipment and structures assessed (*e.g.*, metal weather enclosure, wood flooring).

7. **Section 5.2.1 Equipment Used During Decontamination Activities, page 6:**
   Describe the "wash water solution". Describe in detail the proposed methods to decontaminate re-usable equipment, tools, and protective clothing. Describe the proposed characterization methods for to disposal of decontamination water.

8. **Section 6.0.3(b-d) Sampling and Analysis, page 7:**
   Provide a subsection describing, in detail, the rationale for the number, location, and type of samples proposed for this unit.

9. **Section 6.1 Sampling Activities, page 9**:

   a. Include a subsection that describes the proposed procedures for wipe sample and solid chip sample collection on the related equipment and structures. Revise the text and Table 5 accordingly.

   b. Provide a detailed description of the proposed methods to collect soil samples for analysis. Revise the text and Table 5.0 accordingly. Remove the statement that samples will be kept at depth temperature and revise the text to state that samples will be kept at cool at 4°C or lower.

10. **Section 6.2.1 Surface Water and Groundwater Sampling, page 8**:
    Update this section to include the status of IP monitoring near the vicinity of TA-39-57 which began in 2011.

11. **Section 6.2.3 Cleaning of Sampling Equipment, page 9:**
    Revise decontamination procedures to state that sampling equipment will be decontaminated prior to each use in accordance with Permit Section 11.10.2.11 and specifically Items 4 and 5.

12. **Section 6.2.2 Soil Sampling, page 10:**

    Provide a detailed description of the proposed methods to collect soil samples for analysis. Describe the proposed method for homogenization of subsamples. Remove the statement that samples will be kept at-depth temperature, and revise text to state that samples will be kept at cool at temperatures of 4°C or lower.

13. **Section 6.3.1 Sample Documentation, page 9:**
    The Permittees state that a logbook will be maintained detailing sample collection activities. Include the documentation of any deviations and justification for such deviations.

14. **Section 6.3.3 Sample Handling, Preservation and Storage, page 10:**

    a. Revise this section to include the methods that will be used to demonstrate that appropriate temperatures were maintained throughout the sample collection and shipping process (*e.g.,* temperature indicator strips, temperature blanks). Revise the text and Tables 5 and 6 accordingly.

    b. The Permittees propose that off-site transportation of samples will occur via contract, common motor carrier, air carrier or freight. Revise this section to reference Permit Section 11.10.2.9.

15. Section 7.0 Waste Management, page 12:
Revise this section to include a description of, and rationale for the methods that will be used to sample and characterize different types of waste prior to disposal.

16. Table 2, Hazardous Waste Constituents of Concern at TA-39-57 OD, page 16:

Revise Table 2 to include nitrates, PCBs, dioxans, and furans under Other Constituents of Concern or provide rationale for their exclusion. NMED noted in the closure plan for TA-16-399 listed cyanide as a constituent of concern. Revise Table 2 for this unit to include cyanide or provide a justification for cyanide's exclusion. Provide the rationale for omitting VOC analysis from the analytical suite.

17. Table 3, Potential Waste Materials, Waste Types, and Disposal Options, page 17:
Revise the table to exclude radioactive liquid waste and mixed waste from the waste type column, or provide justification for the presence of these waste types and the proposed sampling procedures.

18. Table 4, Summary of Analytical Methods, page 19:

a. Revise the detection limits in Table 4 to correspond to solid media rather than liquid media.

b. The list of analytes in Table 4 are inconsistent with the constituents listed in Table 2 (page 16) Constituents of Concern. Revise Tables 2, 4 and 5 and the text to propose analysis for high explosives, nitrates, and cyanide or provide justification for their exclusion. See comment 16 above and remove VOC analysis, if appropriate.

19. Table 5, Sample Containers, Preservation Techniques and Holding Times, Page 21:
Revise this section to remove references to aqueous sampling techniques from Table 5. See comments 16 and 18 above and remove VOC analysis if appropriate.

20. Figure 3, Sampling Locations for Closure of TA-39-57 OD Units, page 24:

a. Provide the figure on larger sized paper (11X17). Remove the 100 ft contour line indicated in the legend; this is a discrepancy from the contour lines shown on the map at its current scale.

b. Revise the map to depict the outlined locations of the open detonation unit shown in Figure 2.

c. Provide drainage locations, land marks (*e.g.,* Ancho Canyon, berms, rock check dams).

Specific Comments OB/OD TA-14-23:

1. **Section 2.2 Description of Wastes Treated at the Units, page 3:**
Revise (e.g.,., ignitability, toxicity for barium) to (e.g., ignitability, toxicity for barium) to correct the typographical error.

2. **Section 2.3 Description of Treatment Conducted at the Units, page 3:**

   a. Rename or divide this section into subsections describing treatment methods, waste types, and treatment volumes. Revise this section to include the estimated volume of kerosene or other fuels used per treatment.

   b. Include a description of materials treated historically at the unit, (*e.g.*, bulk high explosives (HE) consisting of RDX, C4, HMX). Include a list of ignition materials and volumes and describe the methods used for ignition of the waste in this subsection.

3. **Section 5.1.1 Records Review, page 6:**
In Section 2.1 the Permittees state that the units were in operation since 1944; however, in Section 5.1.1 Permittees state that there are only records of waste being treated from 1988 to 2003. Include an explanation for the missing records, and provide a description of the suspected types and volumes of waste treated prior to1988.

4. **Section 5.1.2 Structural Assessment, page 7:**
The Permittees state "a visual inspection was conducted to determine that no hazardous constituents were released" this conclusion is not possible based on a visible inspection. Re-vise this statement to state that a visible inspection was conducted to evaluate for visible spills and debris. Include documentation, such as photographs or satellite imagery to document surface conditions. Update the closure procedures listed in Section 4.1 accordingly. Describe the condition of the structures and equipment assessed (*e.g.,* metal weather enclosure, wood flooring).

5. **Section 5.2.1 Equipment Used During Decontamination Activities, page 7:**
Describe the "wash water solution". Describe the proposed methods to decontaminate re-usable equipment, tools, and protective clothing.

6. **Section 6.0.3(b-d) Sampling and Analysis, page 8:**
Provide a subsection describing, in detail, the rationale for the number, location, and type of samples proposed for this unit.

7. **Section 6.1 Sampling Activities, page 8:**

   a. Include a subsection that describes the proposed procedures for wipe sample and

solid chip sample collection on the related equipment and structures. Revise the text and Table 5 accordingly.

b. Provide a detailed description of the proposed methods, used to collect soil samples for analysis. Revise the text and Table 5.0 accordingly. Remove the statement that samples will be kept at depth temperature and revise to state that samples will be kept cool at temperatures 4°C or lower.

8. Section 6.2 Sample Collection Procedures, page 9:
Include a subsection that describes proposed procedures for wipe sample and solid chip sample collection see Comment 7 above. Revise the text and Table 5 accordingly.

9. Section 6.2.1 Surface Water and Groundwater Sampling, page 9:
Update this section to include the status of IP monitoring near the vicinity of TA-14-23 which began in 2011.

10. Section 6.2.3 Cleaning of Sampling Equipment, page10:
Revise decontamination procedures to state that sampling equipment will be decontaminated prior to each use in accordance with Permit Section 11.10.2.11 and specifically Items 4 and 5.

11. Section 6.2.2 Soil Sampling, page 10:

a. Provide a detailed description of the proposed methods, and to collect soil samples for analysis. Describe the method of homogenization of the subsamples. Remove the statement that samples will be kept at-depth temperature, and revise to state that samples will be kept cool at temperatures 4°C or lower.

12. Section 6.3.1 Sample Documentation, page 10:
The Permittee proposes to maintain a logbook detailing sample collection activities. Include the documentation of any deviations and justification for such deviations.

13. Section 6.3.3 Sample Handling, Preservation and Storage, page 12:

a. Revise this section to include the methods that will be used to demonstrate that appropriate temperatures were maintained throughout the sample collection and shipping process (*e.g.,* temperature indicator strips, temperature blanks). Revise the text and Tables 5 and 6 accordingly.

b. The Permittees propose that off-site transportation of samples will occur via contract, common motor carrier, air carrier or freight. Revise this section to reference Permit Section 11.10.2.9.

14. Section 7.0 Waste Management, page 13:
Revise this section to include a description and rationale for, the methods that will be used to sample and characterize different types of waste prior to disposal.

15. Table 2, Hazardous Waste Constituents of Concern at TA-14-23 OB/OD, page 17:

a. List kerosene as a constituent of concern, and include diesel-range organics (DRO) as part of the analytical suite.

b. Revise Table 2 to include nitrates, under Other Constituents of Concern. NMED notes that the closure plan for TA-16-399 listed cyanide as a constituent of concern. Revise Table 2 to include cyanide or provide a justification for cyanide being excluded from this site's analysis.

c. Provide a rationale for omitting VOC analysis from the analytical suite.

16. Table 3, Potential Waste Materials, Waste Types, and Disposal Options, page 17:
Revise the table to exclude radioactive liquid waste and mixed waste from the waste type column, or provide justification for the presence of mixed waste and propose sampling procedures.

17. Table 4, Summary of Analytical Methods, page 20:

a. Revise the detection limits in Table 4 to correspond to soil media rather than liquid media.

b. The list of analytes in Table 4 are inconsistent with the constituents listed in Table 2 (page 16) Constituents of Concern. Revise Tables 2, 4 and 5 and the text to propose analysis for high explosives, nitrates, ignition sources such as kerosene, and cyanide or provide justification for their exclusion. See Comment 15, Item C above and remove VOC analysis, if appropriate.

18. Table 5, Sample Container, Preservation Techniques and Holding Times, Page 21:
Revise this section to remove references to aqueous sampling techniques from Table 5 or adjust the sample methods to include the aqueous sampling described in Table 5. See also Comment 15, Item c, above.

19. Figure 3, Sampling Locations for Closure of TA-14-23 OB OD Units, page 25:

a. Provide the figure on larger paper (11X17). Remove the 100 ft contour line indicated in the legend; this is a discrepancy from the contour lines shown on the map at its current scale.

b. Revise the map to depict the outlined locations of the open burning unit and open detonation unit shown in Figure 2.

c. Revise the polygonal road lines located in the Northwest corner near structure #2 to indicate a complete road system or provide justification for gap.

d. Provide drainage locations, land marks (*e.g.,* Q Site, Firing Mound 3, berms).

The Permittees must address all comments and submit a revised Enclosure 1 and 2 by June 12, **2013.** As part of the response letter that accompanies the revised OB OD Closure Plan, the Permittees must include a table that details where all revisions have been made to the OB OD Closure Plan and that cross-references the Department's numbered comments. All submittals (including maps and tables) must be in the form of two paper copies and one electronic copy. In addition, the Permittees must submit a redline-strikeout version that includes all changes and edits to the OB OD Closure Plan (electronic copy) with the response to this disapproval.

Please contact Siona Briley of my staff at (505) 476-6049 or Siona.Briley@state.nm.us should you have any questions

Sincerely,

John E. Kieling
Acting Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
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File: LANL, TA-39-57 Closure Plan, 2012;
LANL-12-053

LANL, TA-14-23 Closure Plan, 2012
LANL-12-054

Attachment B

Interim Status Closure Plan Open Detonation Treatment Unit
Technical Area 39-57, Revision 2.0

June 2013

LA-UR-13-24000

Closure Plan
Technical Area 39 Open Detonation Unit
(TA-39-57), Revision 2.0

Prepared by:

Los Alamos National Laboratory

ENV-RCRA Group

Los Alamos, New Mexico 87545

Table of Contents

List of Tables v
List of Figures vi
List of Abbreviations and Acronyms viii
1.0 INTRODUCTION 1
2.0 DESCRIPTION OF UNIT TO BE CLOSED 1
2.1 Description of the Treatment Unit 1
2.2 Description of the Wastes Treated at the Unit 2
2.3 Description of Treatments Conducted at the Unit 3
3.0 ESTIMATE OF MAXIMUM WASTE TREATED 3
4.0 GENERAL CLOSURE INFORMATION 3
4.1 Closure Performance Standard 3
4.2 Closure Schedule 5
5.0 CLOSURE PROCEDURES 5
5.1 Records Review and Structural Assessment 5
5.1.1 Records Review 5
5.1.2 Structural Assessment 6
5.2 Decontamination and Removal of Structures and Related Equipment 6
5.2.1 Equipment Used During Decontamination Activities 6
6.0 SAMPLING AND ANALYSIS PLAN 6
6.1 Sampling Activities 7
6.2 Sample Collection Procedures 7
6.2.1 Surface Water and Groundwater Sampling 7
6.2.2 Soil Sampling 9
6.2.3 Cleaning of Sampling Equipment 9
6.3 Sample Management Procedures 9
6.3.1 Sample Documentation 10
6.3.1.1 Chain-of-Custody 10
6.3.1.2 Sample Labels and Custody Seals 10
6.3.1.3 Sample Logbook 10
6.3.2 Sample Handling, Preservation, and Storage 11
6.3.3 Packaging and Transportation of Samples 11
6.4 Sample Analysis Requirements 11
6.4.1 Analytical Laboratory Requirements 12
6.4.2 Quality Assurance/Quality Control 12
6.4.2.1 Field Quality Control 12
6.4.2.2 Analytical Laboratory Quality Control Samples 12

6.4.3 Data Reduction, Verification, Validation, and Reporting 13
6.4.4 Data Reporting Requirements 13
7.0 WASTE MANAGEMENT 13
8.0 CLOSURE CERTIFICATION REPORT 13
9.0 REFERENCES 15

List of Tables

Table 1. Schedule for Closure of the TA-39-57 OD Unit

Table 2. Hazardous Waste Constituents of Concern at the TA-39-57 OD Unit

Table 3. Potential Waste Materials, Waste Types, and Disposal Options

Table 4. Summary of Analytical Methods

Table 5. Sample Containers, Preservation Techniques, and Holding Times

Table 6. Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

List of Figures

Figure 1. Location of Technical Area 39 at Los Alamos National Laboratory

Figure 2. Location and Layout of the TA-39-57 Open Detonation Units

Figure 3. Sampling Locations for Closure of the TA-39-57 Open Detonation Units

List of Acronyms and Abbreviations

CFR	Title 40, U.S. Code of Federal Regulations
CWA	Clean Water Act
DOE	U.S. Department of Energy
DU	Depleted Uranium
EPA	U.S. Environmental Protection Agency
HE	High Explosives
FFCA/AO	Federal Facility Compliance Agreement - Administrative Order
IP	Individual Permit
IFGMP	Interim Facility Wide Ground Water Monitoring Plan
LANL	Los Alamos National Laboratory
MSGP	Multi-Sector General Permit
NPDES	National Pollutant Discharge Elimination System
NMED	New Mexico Environment Department
OD	open detonation
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RCT	Radiological Control Technician
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 39 OPEN DETONATION UNIT

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the interim status hazardous waste open detonation (OD) thermal treatment unit at Technical Area 39 (TA-39) at the Los Alamos National Laboratory (the Facility), hereinafter referred to as the TA-39-57 OD Unit. 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. Closure of the OD Unit will be completed in accordance with Section 4.1 of this closure plan.

The TA-39-57 OD Unit is collocated within and near solid waste management units not yet scheduled for corrective action; therefore, if closure performance standards listed in Section 4.1 cannot be attained, the TA-39-57 OD Unit will undergo cleanup in conjunction with the overall corrective action processes to be implemented at TA-39. Buildings associated with the TA-39-57 OD Unit will also be removed as part of decommissioning and demolition activities of TA-39. Final closure of TA-39 will be in accordance with the requirements set forth in 40 CFR 265 Subpart G and P.

2.0 DESCRIPTION OF UNIT TO BE CLOSED

This section provides an overview of past operations and waste management practices at the TA-39-57 OD Unit. It includes the location of the unit, a description of the unit, and past operational and waste management practices associated with it.

2.1 Description of the Treatment Unit

TA-39 is located in the southern portion of LANL and includes much of the mesa between Water Canyon on the north and Ancho Canyon on the south (LANL, 1993). Mesa-top elevations at TA-39 range from approximately 6,500 to 7,000 feet above mean sea level. The area was established in 1953 for testing of explosive materials and has been used continuously for that purpose. TA-39 contains a number of structures located in the north fork of Ancho Canyon (LANL, 1993). The remainder of TA-39 is unoccupied and serves as a buffer zone for open detonation operations.

The TA-39-57 OD Unit is associated with the Control Building (Building TA-39-57); however, the building is not part of the hazardous waste management unit. The location and layout of this unit is shown on Figure 2.

The TA-39-57 OD Unit is a relatively flat sand-covered area, measuring approximately 40 by 40-feet, and is located in the canyon bottom. Steep canyon walls rise to heights of 100 feet or greater in the immediate vicinity of the unit, roughly forming a semicircle around the unit. The canyon walls serve to attenuate the force of the blasts. The associated Building TA-39-57 is a reinforced concrete structure extending partially beneath the detonation area. In early 2007, a

metal weather enclosure measuring approximately 70 by 20-feet was erected at TA-39-57 for experimental activities. Clean base course was placed on the firing point and the structure was erected on top of the base course. The enclosure has a wood floor throughout.

TA-39-57 OD unit is located approximately 50 feet northeast from the closest arroyo, which serves as a tributary to Ancho Canyon. An earthen berm north of the firing pad diverts surface water run-on away from the firing pad and to the northeast into a tributary of Ancho Canyon. There is a rock check dam at the lower end of the site within the channel. The vegetated median southeast of the firing point serves as a retention area for storm water run-off from the firing site. A grassy area south of the site is a potential run-off attenuation area.

2.2 Description of the Wastes Treated at the Unit

The TA-39-57 OD Unit was used to treat hazardous explosive waste by OD. Hazardous waste treated at the TA-39-57 OD Unit included waste generated during research and development activities and processing and recovery operations at various TAs throughout LANL. Non-treatment related experimental test detonations were also performed at the TA-39-57 OD Unit.

The waste streams treated at the TA-39-57 OD Unit by open detonation would have included excess explosives, assemblies containing explosives, and explosives contaminated prep room debris. Excess explosives include bulk pieces, initiating devices (detonators/squibs), powders, developmental energetic materials, excess propellants, and explosive assemblies. High Explosives (HE) contaminated materials generated at the TA-39-57 OD Unit that were treated by open detonation included cellulosics (kim wipes, paper towels, swabs, sheets of paper, etc.); plastics (weigh boats, gloves, plastic bags, anti-static bags, vials w/ stoppers, etc.); glass vials with stoppers; and metals (wire, thin plates, small targets).

Firing site debris generated by experimental activities, or rarely, waste treatment, would not routinely contain detonable quantities of explosives, although it may have contained trace quantities of non-hazardous residual HE. Firing site debris was surveyed by a radiological control technician (RCT) and dispositioned as either low level waste with depleted uranium (DU) contamination or as non-hazardous waste for offsite disposal. Firing site debris was treated if the firing leader observed unreacted HE during his post-shot survey. If explosive debris were not rendered safe immediately, through immediate detonation, the debris was stored in the satellite accumulation area within Building TA-39-57 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 (for spent solvents on the explosives-contaminated rags and wipes). Historically, there were no significant changes in waste compositions. The wastes were treated to remove the characteristic of reactivity, although other characteristic (e.g., ignitability, toxicity for barium) and listed (solvents on the explosives-contaminated rags and wipes) hazardous waste codes may have been applied to the wastes being treated.

2.3 Description of Treatments Conducted at the Unit

Waste containers for explosives-contaminated waste and explosive material generally consisted of paper-lined cardboard boxes, wooden boxes, or small boxes. Most wastes contaminated with explosives and pieces of consolidated explosives were not packaged together. Explosives-contaminated wastes were placed within containers, sealed, and labeled appropriately. These waste containers were then stored in an accumulation area.

Wastes to be treated at the TA-39-57 OD Unit were collected from various accumulation areas at TA-39. When loading waste, the cargo compartment of the transport vehicle was visually assessed 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 a designated vehicle to the TA-39-57 OD Unit on the day of planned treatment. Only the amount of waste that could be treated in one treatment event was transported to the unit. A maximum of 1,000 pounds of waste explosives may have been detonated per treatment event at the TA-39-57 OD Unit.

The waste was unloaded from the vehicle and placed at the OD location by qualified technicians/specialists. Depending on preparation activities, the time during which waste may have remained at the unit 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. 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 the Building TA-39-57. Thermal treatment operations were conducted in accordance with the approved versions of LANL operating procedures in place at that time.

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 Site 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 according to operating procedures.

3.0 ESTIMATE OF MAXIMUM WASTE TREATED

Since 1973 through 1995, approximately 1,827 pounds of wastes have been treated at the OD unit. Based on the estimate for the amount of waste treated over a 22 year period an average of 83 pounds of waste has been treated annually at the OD unit.

4.0 GENERAL CLOSURE INFORMATION

4.1 Closure Performance Standard

The TA-39-57 OD Unit will be closed to meet the following performance standards (40 CFR §265.111):

- 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 or surface waters, or to the atmosphere; and
- comply with the closure requirements of 40 CFR Part 265 Subparts G and P.

This will be accomplished through one of two methods:

a) Ensure contaminated media do not contain concentrations of hazardous constituents that are greater than the clean-up levels established in the *New Mexico Environment Department's (NMED's) Technical Background Document for Development of Soil Screening Levels* (as updated) (NMED, 2009), and in LANL's *Screening Level Ecological Risk Assessment Methods* (LANL, 2012) (as updated and approved by the NMED). For soils, the cleanup levels shall be established based on residential use; or

b) conduct a human health and ecological risk evaluation utilizing the screening levels described above.

If owner/operator is unable to achieve any one of the risk-based clean closure standards in (a) or (b):

- Control the migration of hazardous waste residues, hazardous constituents, and, as applicable, contaminated media such that they do not pose an unacceptable risk to 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
- 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;.

The owner/operator shall demonstrate that the unit does not pose an unacceptable risk by complying with the post closure requirements in 40 CFR 265.117 as well as conduct the following to protect human health and the environment:

- Maintain the integrity and effectiveness of the unit by making repairs necessary to correct the effects of erosion, animal intrusion, or other events that compromise the unit;
- maintain surface water controls to prevent run-on and run-off from eroding or otherwise causing damage;
- conduct corrective action as necessary to protect human health and the environment;
- maintain fencing, security signs and locks;
- maintain training, operating, inspection, and monitoring, and other required records; and
- submit an annual report to the NMED providing the results of the required inspections, sampling results, and a summary of any needed repairs and whether repairs were effective.

Closure of the TA-39-57 OD Unit will be deemed complete when 1) closure has been completed in accordance with the closure plan and certified by an independent, professional engineer

licensed in the State of New Mexico; and 2) 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-39-57 OD Unit The following section provides the schedule of closure activities (see also Table 1 in this closure plan).

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 in accordance with an approved closure plan may be conducted at any time before or after notification of closure. Upon approval of the modified closure plan, soil sampling activities will be conducted to demonstrate that the soils at the permitted unit meet the closure performance standards in Section 4.1. 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 permitted unit cannot proceed according to schedule, the Facility will notify the NMED in accordance with the extension request requirements in 40 CFR § 265.113.

5.0 CLOSURE PROCEDURES

Closure activities at the unit include a physical review of the unit and a review of the unit's records; proper management and disposal of hazardous waste residues, if applicable; 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 the closure activities applicable to the TA-39-57 OD Unit.

5.1 Records Review and Structural Assessment

Prior to commencing closure decontamination and sampling activities, the TA-39-57 OD Unit Operating and Inspection Records were reviewed in November 2011 and a structural assessment was conducted on September 12, 2011 to determine if there were any previous finding(s) or action(s) that may influence closure activities or potential sampling locations.

5.1.1 Records Review

The TA-39-57 OD Unit Operating Record (including, but not limited to, inspection and contingency plan implementation records) has been reviewed with the intent of determining the following:

1. Confirmation of the specific hazardous waste constituents of concern listed in Table 2 of this closure plan;
2. updating the estimated quantity of waste treated at the unit discussed in Section 3.0; and
3. identification of additional sampling locations (*e.g.*, locations of spills or chronic conditions) identified in the TA-39-57 OD Unit Operating and Inspection Records.

A determination has been made based on the fact that there is no record of any spills or releases, defects, deterioration, damage, or hazards affecting waste containment or treatment occurred or developed during the operational life of the TA-39-57 OD Unit. Results from the records review are summarized briefly in this section and further details will be included in the closure certification report described in Section 8.0.

During the records review process, documentation was discovered that included years prior to the effective date of RCRA (from 1973-1980). These records as well as those from 1980 to the last documented treatment activity in 1995 were included in the review. These records indicate that the quantity of waste treatment was significantly lower than the originally estimated quantity. The original estimated quantity was based on the unit capacity, while the recorded quantity was approximately 1,827 pounds.

5.1.2 Structural Assessment

During the structural assessment process (September 12, 2011), a visual inspection of the unit was conducted. The assessment included inspecting the unit for any staining or evidence of a release. There is no equipment associated with the unit or activities conducted at the unit. The TA-39-57 structure is not located within the unit boundary and will not be included as part of closure of this unit. This assessment has been documented and will be submitted to the NMED-HWB as part of the closure report and will include the necessary results, drawings and photographs.

5.2 Decontamination and Removal of Structures and Related Equipment

There are no structures or related equipment at this unit that are expected to be removed or decontaminated. If equipment is encountered unexpectedly, in accordance with 40 CFR § 265.112(b)(4), the equipment will be decontaminated, or removed, or both and managed according to Section 7.0 of this closure plan. All equipment removed 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 unit to meet the closure performance standards in Section 4.1.

5.2.1 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during decontamination activities will be cleaned with a wash water solution that consists of a surfactant detergent and water mixed in accordance with the manufacturers recommendations. The tools and equipment will be wiped down with the wash water solution and rinsed. Residue and disposable equipment will be containerized, characterized, 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 this unit and 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). This Sampling and Analysis Plan (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. It includes:

1. The hazardous waste constituents of concern listed in Table 2 that will be included in the analysis for soil samples. This list includes all hazardous constituents defined as:
    a. any constituent identified in 40 CFR Part 261 Appendix VII that caused the United States 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 EPA approved analytical methods capable of detecting those constituents.
3. A site plan for soil samples. The site plan includes:
   a. Figure 3 depicting the boundaries of the unit and soil sampling locations. The locations include:
   b. Discrete soil samples collected from locations of potential spills or other releases of hazardous waste or hazardous constituents during operation of the units, topographic lows and drainages;
   c. other potential release locations; and
   d. a rationale for the number and locations of samples.
4. The type of samples to be collected (*e.g.*, 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 laboratory analytical methods that will be used to measure hazardous constituent concentrations (see Table 4).
7. 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 soils in and around the unit 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 unit; soils in the vicinity of the unit; and soils at the storm water discharge point.

- Discrete soil samples as identified in Figure 3.

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-39-57 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-39-57

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 an 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 Department of Energy (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 Individual Permit 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.

Two Sites associated with TA-39-57 are permitted to discharge stormwater runoff under the 2010 Storm Water Individual Permit, NPDES Permit No. NM0030759 (the Individual Permit). Solid Waste Management Unit (SWMU) 39-004(a) (structure 39-7) was constructed in 1953 as a remote test firing facility to test materials. SWMU 39-004(d), another remote test firing facility (structure 39-0057) near SWMU 39-004(a), was constructed in 1953 and used for explosives experiments.

Under the 2010 Individual Permit, Sites 39-004(a) and 39-004(d) are assigned to Permitted Feature No. A001, Site Monitoring Area (SMA) A-SMA-1.1. Sites 39-004(a) and 39-004(d) are both categorized as Moderate Priority Sites, and are subject to the October 31, 2015 deadline for corrective action (if required).

Installation of baseline control measures at A-SMA-1.1 was completed on November 1, 2010 and certified on December 1, 2010 (LANL 2010). The active control measures are listed in the 2012 Individual Permit Annual Report (LANL 2013b) and the 2012 update to the Site Discharge Pollution Prevention Plan (LANL 2013c). The control measures consist of established vegetation and an earthen berm that function as run-on, runoff, erosion, and/or sediment controls. The A-SMA-1.1 project map showing the control measure locations is available on LANL's public Individual Permit website (LANL 2013a).

The pollutants of concern to be monitored for each SMA are specified in Appendix B of the Permit. At a minimum, all SMAs must be initially monitored for metals, gross alpha radiation, Ra-226 + Ra-228, and cyanide (weak acid dissociable). The storm water monitoring requirement for A-SMA-1.1 also includes high explosives compounds. Baseline confirmation monitoring was initiated in 2011 following control measure certification. However, storm water discharge was not sufficient for full-volume sample collection by the October 31, 2011 deadline. The initial

confirmation monitoring period has been extended per the requirements of the Permit, and monitoring was continued during 2012. As of December 31, 2012, storm water discharge has not been sufficient for collection of a confirmation sample. Extended baseline confirmation monitoring will continue until one confirmation sample is collected at A-SMA-1.1.

Groundwater in the vicinity of TA-39-57 is monitored as part of the LANL Interim Facility-Wide Groundwater Monitoring Plan (IFGMP). Under the 2010 IFGMP (LANL, 2012), surface water is monitored down gradient of TA-39-57 at the mouth of Ancho Canyon, near the confluence with the Rio Grande. Regional groundwater is monitored in four separate depth intervals at well R-31. Additional groundwater monitoring takes place down gradient of TA-39-57 at Ancho Spring in Ancho Canyon and at Springs 6, 6A, 8A, 9, and 9B in White Rock Canyon.

6.2.2 Soil Sampling

Sampling activities shall consist of the collection of 20 soil samples from locations with a higher potential for deposition. This includes locations beneath the floor and base course (e.g. gravel) of the ”Temporary Target Structure” (See Figure 3) and from areas down gradient of the treatment unit. Soil samples will be collected from depths of 0-6 and 6-12 inches below ground surface (bgs). Two soil samples will be collected at one discrete soil sample location from one and five foot depths bgs., from the drainage located east of the TA-39-57 OD Unit, sample locations are shown in Figure 3. Soil samples will be analyzed to determine if hazardous constituents are present in soils at, or in the vicinity of, the unit and to determine if there is an immediate threat to the environment. Soil sample analysis will be completed using the methods listed in Table 4 (Summary of Analytical Methods).

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 cooled to 4˚C 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 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 with the solution (0.1 molar nitric acid to remove trace metals, if necessary or methanol to remove organic compounds if necessary), 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).

Any deviations from the sampling plan will be noted in the sample logbook and reported in the TA-39-57 closure certification report.

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 indelible 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 placed 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.

The samples are maintained at appropriate temperatures after collection and throughout the shipping process. All samples are chilled to 2 degrees Celsius before shipment occurs. Samples are then wrapped, placed in the DOT approved shipping container with ample blue ice to hold the required temperature. Temperature blanks are placed in the cooler and sealed with custody tape. Off-site transportation of samples will occur via contract, or common motor carrier, air carrier, or freight. All off-site transportation will be processed through the Facility 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. All shipments are sent overnight delivery. Once received, the analytical laboratory verifies that the custody tape is still intact and measures the temperature of the cooler. All the information is recorded and presented in the analytical data package. For all discrepancies the sender is notified for resolution.

6.4 Sample Analysis Requirements

Samples will be analyzed for all hazardous constituents listed in Table 2.These constituents have been determined to be applicable constituents listed in Appendix VIII of 40 CFR Part 261 and in Appendix IX of 40 CFR Part 264 that were managed or treated at the units over their operational history. This determination has been made through the records review and structural assessment

discussed in Section 5.1. 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;
5. decontamination waste; and
6. soil.

The different types of wastes generated at closure, including the unit's decontaminated structures and related equipment, and their disposition options are listed in Table 3 of this closure plan. As stated in Section 1.0, waste management activities associated with this unit will undergo RCRA clean closure activities in conjunction with the corrective action processes at TA-39. Final closure of the TA-39-57 OD Unit will be in accordance with the requirements set forth In 40 CFR Part 265, Subparts G and P.

8.0 CLOSURE CERTIFICATION REPORT

Upon completion of the closure activities at the units, LANL will submit, by registered mail, a closure certification report for NMED review and approval. The closure certification 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 the records review and structural assessment;

- 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 closure certification report to the NMED no later than 60 days after completion of closure of the unit. 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 unit's 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 pursuant to Section 4.1 for the unit; and
9. a certification statement of the accuracy of the closure certification 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

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Table 1
Schedule for Closure of the TA-39-57 OD Unit

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	Already conducted
Conduct structural assessment	Already conducted
Submit a request to modify the Closure Plan and the records review and structural assessment report	Already conducted
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 the closure plan is approved. Some activities may be conducted simultaneously.

Table 2

Hazardous Waste Constituents of Concern at the TA-39-57 OD Unit[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
high explosives 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 (D028), 1,1 dichloroethylene Trichloroethylene, chloroform
Other constituents of concern		Perchlorates, PCBs, dioxins/furans, cyanide, nitrates

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

Table 3
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-hazardous 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-hazardous 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.
Metal	Non-hazardous 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.
Discarded waste management equipment	Non-hazardous 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.
Soil and tuff	Non-hazardous 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.
Discarded concrete	Non-hazardous 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.
Discarded sampling and decontamination equipment	Non-hazardous 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 4
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method [a]	Analytical Technique	Estimated Quantitation Limits (mg/kg)[b]	Rationale
Metal Analysis				
Aluminum	6010B	ICP-AES	20	Determine the environmentally available metal concentration in the soil samples following strong acid digestion.
Antimony	6010B	ICP-AES	0.03	
Arsenic	6020	ICP-MS	1.5	
Barium	6010B	ICP-AES	0.5	
Beryllium	6020	ICP-MS	0.1	
Cadmium	6010B	ICP-AES	0.03	
Calcium	6010B	ICP-AES	30	
Chromium	6010B	ICP-AES	0.5	
Cobalt	6010B	ICP-AES	0.5	
Copper	6010B	ICP-AES	1	
Iron	6010B	ICP-AES	30	
Lead	6010B	ICP-AES	1	
Magnesium	6010B	ICP-AES	50	
Manganese	6010B	ICP-AES	1.0	
Mercury	7471A	CVAA	0.01	
Nickel	6020	ICP-MS	0.4	
Potassium	6010B	ICP-AES	30	
Selenium	6020	ICP-AES	1.5	
Silver	6020	ICP-MS	0.01	
Sodium	6010B	ICP-AES	20	
Thallium	6020	ICP-MS	0.2	
Vanadium	6010B	ICP-AES	0.5	
Zinc	6010B	ICP-AES	1	
Organic Analysis				
VOCs	8260B	GC/MS	0.001 to 0.005	Determine the solvent-extractable VOCs concentration in the soil samples.
SVOCs	8270C	GC/MS	0.033 to 0.33	Determine the solvent-extractable SVOCs concentration in the soil samples.
Other Analysis				
Dioxins/Furans	8290	HRGC/MS	0.00001 to 0.0003	Determine the solvent extractable dioxin/furan concentration in the soil samples.
Perchlorate [ClO_4^-]	6850	HPLC/ESI/MS	0.002	Determine the

				water-soluble [ClO_4^-] concentration in the soil samples.
High Explosives	8321A [c]	HPLC/TS/MS	0.5 to 2.0	Determine the solvent-extractable high explosives concentrations in the samples.
Polychlorinated biphenyls (PCBs)	8082A	Gas Chromotography		Determine the PCB concentrations in samples
Cyanide	9010, 9012	Titration, Colorimetric	0.1 mg/kg, 0.02 mg/kg	Determine cyanide concentration

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

b Estimated quantitation limits listed for all methods are based LANL contract-required quantitation limits for subcontractor analytical laboratory services.

c Instrumentation published in Method SW-846-8321A can be used to identify the required analytes that would not be detected using Method SW-846-8330, thus a LANL-specific modification is used for Method SW-846-8321A to analyze for explosives compounds.

CVAA = Cold-vapor atomic absorption spectroscopy

ESI/MS = Electrospray ionization/mass spectrometry

GC/MS = Gas chromatography/mass spectrometry

HPLC = High performance liquid chromatography

HRGC/MS = High resolution gas chromatography/mass spectrometry

ICP-AES = Inductively coupled plasma-atomic emission spectrometry

SVOC = Semivolatile organic compound(s)

TS/MS = Thermospray/mass spectrometry

VOC = Volatile organic compound(s)

PCBs = polychlorinated biphenyls

mg/kg = milligrams per kilogram

Table 5

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

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
Total Metals: Barium, Cadmium, Chromium, Lead, Silver	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	180 Days
TCLP/Total Mercury	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	28 Days
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	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	14 days
Semi-Volatile Organic Compounds			
Target Compound Semi-volatile Organic Compounds	Solid Media: 250-mL Glass	Solid Media: Cool to 4 °C	Seven days from field collection to preparative extraction. 40 days from preparative extraction to determinative analysis.
Other Analysis			
Dioxins/Furans	2 - 125 mL Glass	Solid Media: Cool to 4 °C	30 days
Perchlorate [ClO_4^-]	250 - mL polyethylene	Solid Media: Protect from temperature extremes	28 days
High Explosives	500 – mL Amber Glass	Solid Media: Cool to 4 °C	14 days
polychlorinated biphenyls (PCBs)	Glass	Cool, 4°C	1 year

Cyanide	Polyethylene glass	Cool, 4°C	12 days

[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.

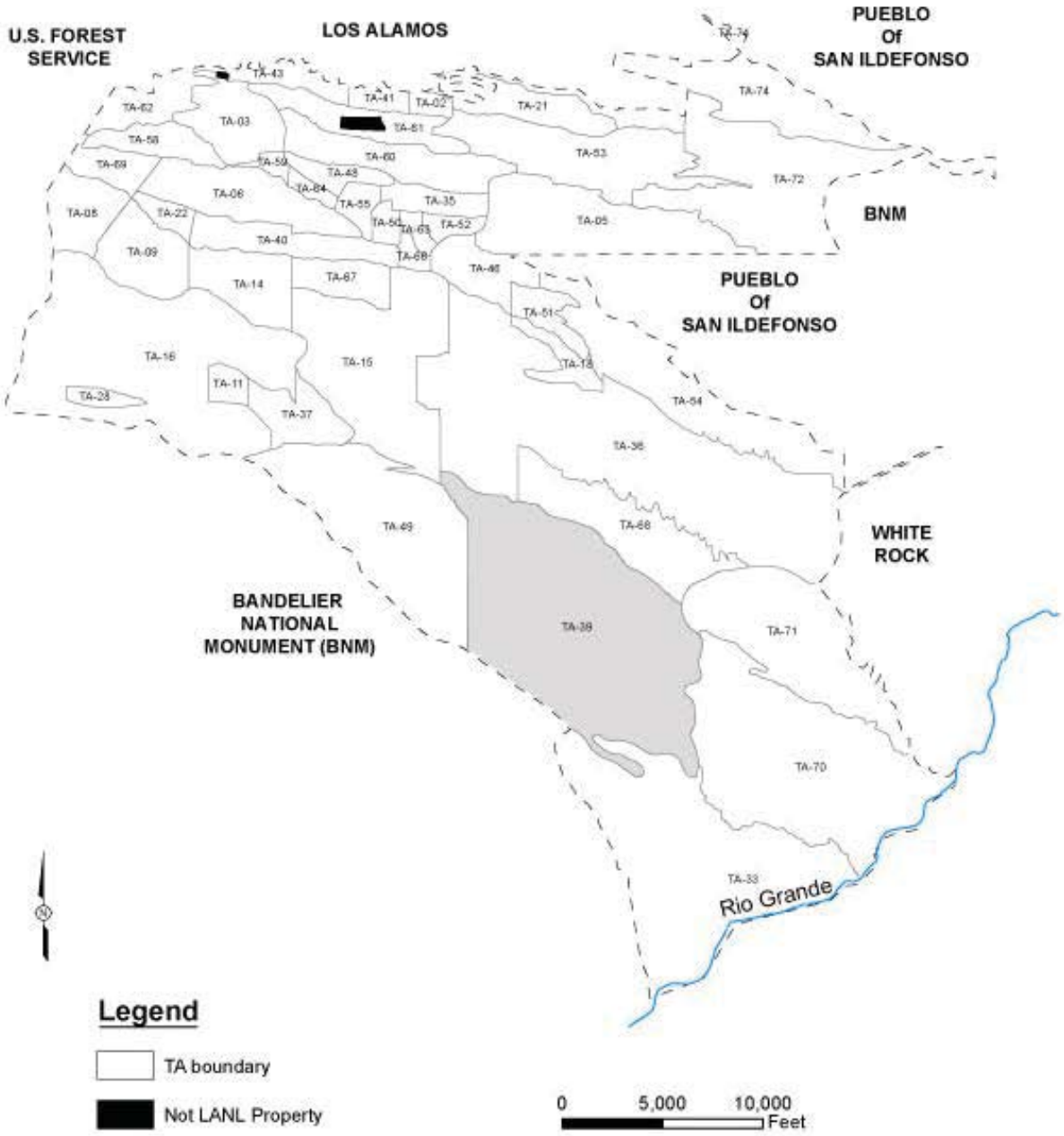

Figure 1

Location of Technical Area 39 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

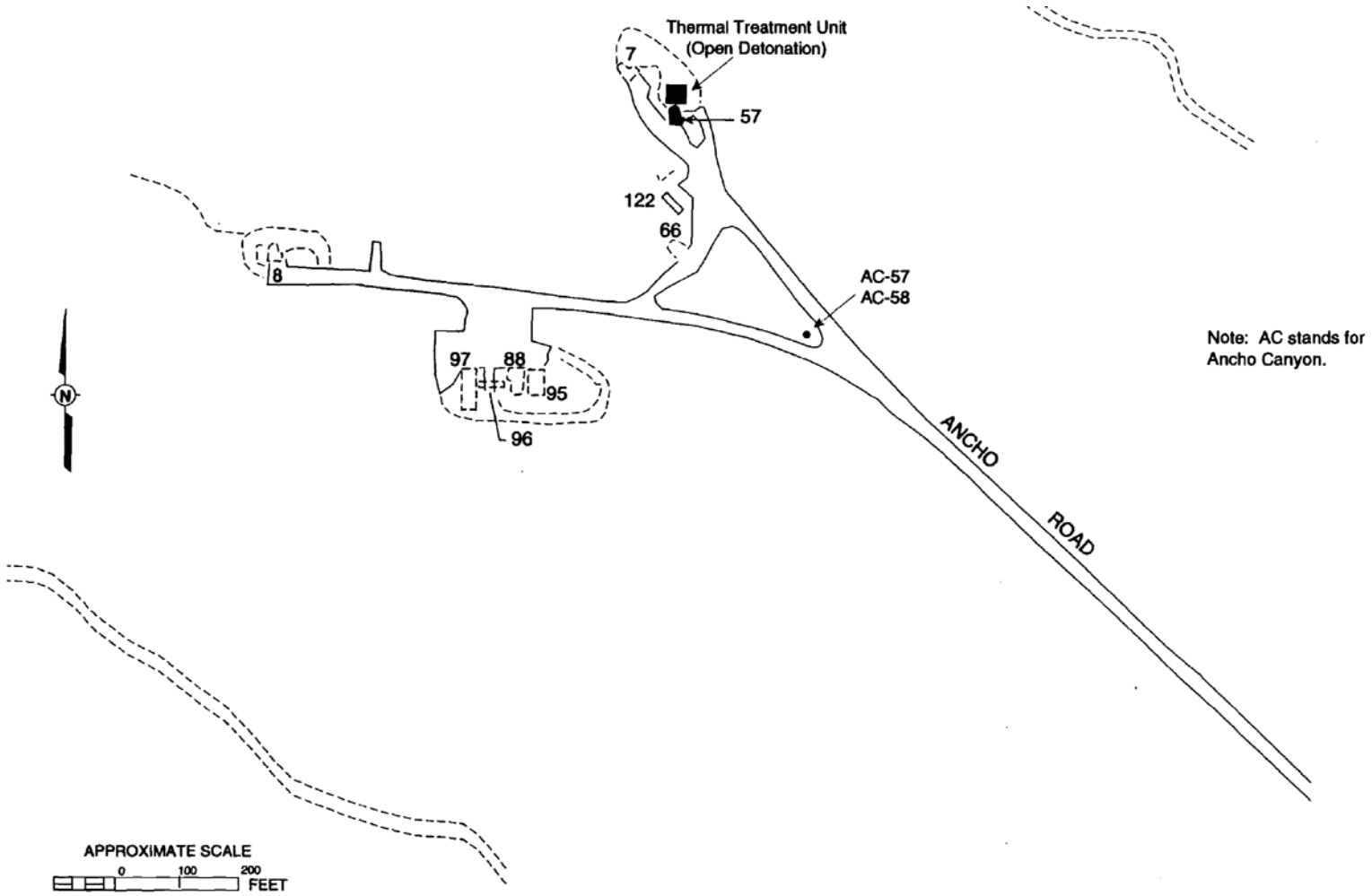

Figure 2. Location and Layout of the TA-39-57 Open Detonation Unit

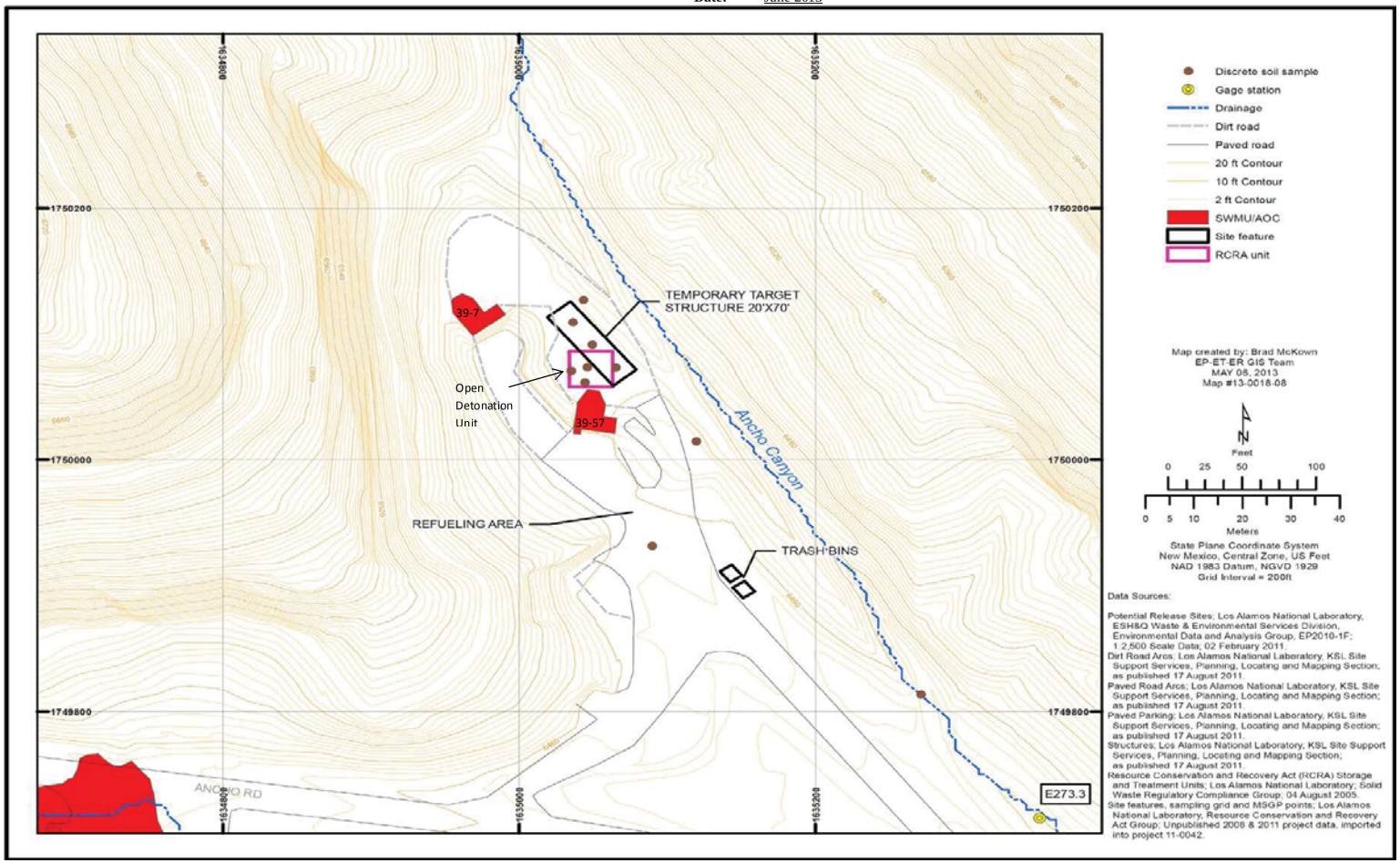

Figure 3. Sampling Locations for Closure of the TA-39-57 Open Detonation Units

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.

6/10/13

Alison M. Dorries

Date Signed

Division Leader
Environment Protection Division
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6/10/13

Gene E. Turner

Date Signed

Environmental Permitting Manager
Environmental Projects Office
Los Alamos Site Office
National Nuclear Security Administration

June 2013~~February 2012~~

LA-UR-~~12-1033~~213-24000

Closure Plan

Technical Area 39 Open Detonation Unit

(TA-39-57), Revision 2~~1~~.0

Prepared by:

Los Alamos National Laboratory

ENV-RCRA Group

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Table of Contents

List of Tables v
List of Figures vi
List of Abbreviations and Acronyms viii
1.0 INTRODUCTION 1
2.0 DESCRIPTION OF UNIT TO BE CLOSED 1
2.1 Description of the Treatment Unit 1
2.2 Description of the Wastes Treated at the Unit 2
2.3 Description of Treatments Conducted at the Unit 3
3.0 ESTIMATE OF MAXIMUM WASTE TREATED 3
4.0 GENERAL CLOSURE INFORMATION 3
4.1 Closure Performance Standard 3
4.2 Closure Schedule 5
5.0 CLOSURE PROCEDURES 5
5.1 Records Review and Structural Assessment 5
5.1.1 Records Review 5
5.1.2 Structural Assessment 6
5.2 Decontamination and Removal of Structures and Related Equipment 6
5.2.1 Equipment Used During Decontamination Activities 7
6.0 SAMPLING AND ANALYSIS PLAN 7
6.1 Sampling Activities 8
6.2 Sample Collection Procedures 8
6.2.1 Surface Water and Groundwater Sampling 8
6.2.2 Soil Sampling 9
6.2.3 Cleaning of Sampling Equipment 10
6.3 Sample Management Procedures 10
6.3.1 Sample Documentation 10
6.3.1.1 Chain-of-Custody 10
6.3.1.2 Sample Labels and Custody Seals 11
6.3.1.3 Sample Logbook 11
6.3.2 Sample Handling, Preservation, and Storage 12
6.3.3 Packaging and Transportation of Samples 12

6.4 Sample Analysis Requirements 12
6.4.1 Analytical Laboratory Requirements 13
6.4.2 Quality Assurance/Quality Control 13
6.4.2.1 Field Quality Control 13
6.4.2.2 Analytical Laboratory Quality Control Samples 13
6.4.3 Data Reduction, Verification, Validation, and Reporting 13
6.4.4 Data Reporting Requirements 14
7.0 WASTE MANAGEMENT 14
8.0 CLOSURE CERTIFICATION REPORT 14
9.0 REFERENCES 15

List of Tables

Table 1. Schedule for Closure of the TA-39-57 OD Unit

Table 2. Hazardous Waste Constituents of Concern at the TA-39-57 OD Unit

Table 3. Potential Waste Materials, Waste Types, and Disposal Options

Table 4. Summary of Analytical Methods

Table 5. Sample Containers, Preservation Techniques, and Holding Times

Table 6. Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

List of Figures

Figure 1. Location of Technical Area 39 at Los Alamos National Laboratory

Figure 2. Location and Layout of the TA-39-57 Open Detonation Units

Figure 3. Sampling Locations for Closure of the TA-39-57 Open Detonation Units

List of Acronyms and Abbreviations

CFR	Title 40, U.S. Code of Federal Regulations
CWA	Clean Water Act
DOE	U.S. Department of Energy
DU	Depleted Uranium
EPA	U.S. Environmental Protection Agency
HE	High Explosives
FFCA/AO	Federal Facility Compliance Agreement - Administrative Order
IP	Individual Permit
~~IP~~IFGMP	Interim Facility Wide Ground Water Monitoring Plan
~~IFGMP~~	~~Individual Permit~~
	~~Interim Facility Wide Ground Water Monitoring Plan~~
LANL	Los Alamos National Laboratory
MSGP	Multi-Sector General Permit
NPDES	National Pollutant Discharge Elimination System
NMED	New Mexico Environment Department
OD	open detonation
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RCT	Radiological Control Technician
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 39 OPEN DETONATION UNIT

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the interim status hazardous waste open detonation (OD) thermal treatment unit at Technical Area 39 (TA-39) at the Los Alamos National Laboratory (the Facility), hereinafter referred to as the TA-39-57 OD Unit. 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. Closure of the OD Unit will be completed in accordance with Section 4.1 of this closure plan.

The TA-39-57 OD Unit is collocated within and near solid waste management units not yet scheduled for corrective action; therefore, if closure performance standards listed in Section 4.1 cannot be attained, the TA-39-57 OD Unit will undergo cleanup in conjunction with the overall corrective action processes to be implemented at TA-39. Buildings associated with the TA-39-57 OD Unit will also be removed as part of decommissioning and demolition activities of TA-39. Final closure of TA-39 will be in accordance with the requirements set forth in 40 CFR 265 Subpart G and P.

2.0 DESCRIPTION OF UNIT TO BE CLOSED

This section provides an overview of past operations and waste management practices at the TA-39-57 OD Unit. It includes the location of the unit, a description of the unit, and past operational and waste management practices associated with it.

2.1 Description of the Treatment Unit

TA-39 is located in the southern portion of LANL and includes much of the mesa between Water Canyon on the north and Ancho Canyon on the south (LANL, 1993). Mesa-top elevations at TA-39 range from approximately 6,500 to 7,000 feet above mean sea level. The area was established ~~–~~in 1953 for testing of explosive materials and has been used continuously for that purpose. TA-39 contains a number of structures located in the north fork of Ancho Canyon (LANL, 1993). The remainder of TA-39 is unoccupied and serves as a buffer zone for open detonation operations.

The TA-39-57 OD Unit is associated with the Control Building (Building TA-39-57); however, the building is not part of the hazardous waste management unit. The location and layout of this unit is shown on Figure 2.

The TA-39-57 OD Unit is a relatively flat sand-covered area, measuring approximately 40 by 40-feet, and is located in the canyon bottom. Steep canyon walls rise to heights of 100 feet or greater in the immediate vicinity of the unit, roughly forming a semicircle around the unit. The canyon walls serve to attenuate the force of the blasts. The associated Building TA-39-57 is a reinforced concrete structure extending partially beneath the detonation area. In early 2007, a

metal weather enclosure measuring approximately 70 by 20-feet was erected at TA-39-57 for experimental activities. Clean base course was placed on the firing point and the structure was erected on top of the base course. The enclosure has a wood floor throughout.

TA-39-57 OD unit is located approximately 50 feet northeast from the closest arroyo, which serves as a tributary to Ancho Canyon. An earthen berm north of the firing pad diverts surface water run-on away from the firing pad and to the northeast into a tributary of Ancho Canyon. There is a rock check dam at the lower end of the site within the channel. The vegetated median southeast of the firing point serves as a retention area for storm water run-off from the firing site. A grassy area south of the site is a potential run-off attenuation area.

2.2 Description of the Wastes Treated at the Unit

The TA-39-57 OD Unit was used to treat hazardous explosive waste by OD. Hazardous waste treated at the TA-39-57 OD Unit included waste generated during research and development activities and processing and recovery operations at various TAs throughout LANL. Non-treatment related experimental test detonations were also performed at the TA-39-57 OD Unit.

The waste streams treated at the TA-39-57 OD Unit by open detonation would have included excess explosives, assemblies containing explosives, and explosives contaminated prep room debris. Excess explosives include bulk pieces, initiating devices (detonators/squibs), powders, developmental energetic materials, excess propellants, and explosive assemblies. High Explosives (HE) contaminated materials generated at the TA-39-57 OD Unit that were treated by open detonation included cellulosics (kim wipes, paper towels, swabs, sheets of paper, etc.); plastics (weigh boats, gloves, plastic bags, anti-static bags, vials w/ stoppers, etc.); glass vials with stoppers; and metals (wire, thin plates, small targets).

Firing site debris generated by experimental activities, or rarely, waste treatment, would not routinely contain detonable quantities of explosives, although it may have contained trace quantities of non-hazardous residual HE. Firing site debris was surveyed by a~~n~~ radiological control technician (RCT) and dispositioned as either low level waste with depleted uranium (DU) contamination or as non-hazardous waste for offsite disposal. Firing site debris was treated if the firing leader observed unreacted~~-~~ HE during his post-shot survey. If explosive debris were not rendered safe immediately, through immediate detonation, the debris was stored in the satellite accumulation area within Building TA-39-57 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 (for spent solvents on the explosives-contaminated rags and wipes). Historically, there were no significant changes in waste compositions. The wastes were treated to remove the characteristic of reactivity, although other characteristic (e.g., ignitability, toxicity for barium) and listed (solvents on the explosives-contaminated rags and wipes) hazardous waste codes may have been applied to the wastes being treated.

2.3 Description of Treatments Conducted at the Unit

Waste containers for explosives-contaminated waste and explosive material generally consisted of paper-lined cardboard boxes, wooden boxes, or small boxes. Most wastes contaminated with explosives and pieces of consolidated explosives were not packaged together. Explosives-contaminated wastes were placed within containers, sealed, and labeled appropriately. These waste containers were then stored in an accumulation area.

Wastes to be treated at the TA-39-57 OD Unit were collected from various accumulation areas at TA-39. When loading waste, the cargo compartment of the transport vehicle was visually assessed 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 a designated vehicle to the TA-39-57 OD Unit on the day of planned treatment. Only the amount of waste that could be treated in one treatment event was transported to the unit. A maximum of 1,000 pounds of waste explosives may have been detonated per treatment event at the TA-39-57 OD Unit.

The waste was unloaded from the vehicle and placed at the OD location by qualified technicians/specialists. Depending on preparation activities, the time during which waste may have remained at the unit 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. 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 the Building TA-39-57. Thermal treatment operations were conducted in accordance with the approved versions of LANL operating procedures in place at that time.

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 Site 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 according to operating procedures.

3.0 ESTIMATE OF MAXIMUM WASTE TREATED

Since 1973 through 1995, approximately 1,827 pounds of wastes have been treated at the OD unit. Based on the estimate for the amount of waste treated over a 22 year period an average of ~~48~~ 83 pounds of waste has been treated annually at the OD unit.

4.0 GENERAL CLOSURE INFORMATION

4.1 Closure Performance Standard

The TA-39-57 OD Unit will be closed to meet the following performance standards (40 CFR § 265.111):

- 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 or surface waters, or to the atmosphere; and
- comply with the closure requirements of 40 CFR Part 265 Subparts G and P.

This will be accomplished through one of two methods:

a) Ensure contaminated media do not contain concentrations of hazardous constituents that are greater than the clean-up levels established in the in the New Mexico Environment Department's (NMED's) *Technical Background Document for Development of Soil Screening Levels* (as updated) (NMED, 2009), and in LANL's *Screening Level Ecological Risk Assessment Methods* (LANL, 2012~~10a~~) (as updated and approved by the NMED). For soils, the cleanup levels shall be established based on residential use~~. The owner/operator must also demonstrate that there is not potential to contaminate groundwater~~; or

b) conduct a human health and ecological risk evaluation utilizing the screening levels described above.

If owner/operator~~LANL~~ is unable to achieve any one of the risk-based clean closure standards in (a) or (b) ~~above, LANL will~~:

- ~~coordinate cleanup closure activities for the TA-39-57 OD Unit with the corrective action cleanup processes at TA-39 in its entirety.~~
- Control the migration of hazardous waste residues, hazardous constituents, and, as applicable, contaminated media such that they do not pose an unacceptable risk to 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 Closure Requirements in 40 CFR 265.113(b)(1)(ii)(C) and (2)~~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;.

The owner/operator~~LANL~~ shall demonstrate that the unit does not pose an unacceptable risk by complying with the post closure requirements in 40 CFR 265.117 as well as conduct the following to protect human health and the environment:

- Maintain the integrity and effectiveness of the unit by making repairs necessary to correct the effects of erosion, animal intrusion, or other events that compromise the unit;
- maintain surface water controls to prevent run-on and run-off from eroding or otherwise causeing damage;
- conduct corrective action as necessary to protect human health and the environment;
- maintain fencing, security signs and locks;

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- maintain training, operating, inspection, and monitoring, and other required records; and
- submit an annual report to the NMED providing the results of the required inspections, sampling results, and a summary of any needed repairs and whether repairs were effective.

Closure of the TA-39-57 OD Unit will be deemed complete when 1) closure has been completed in accordance with the closure plan and certified by an independent, professional engineer licensed in the State of New Mexico; and 2) 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-39-57 OD Unit The following section provides the schedule of closure activities (see also Table 1 in this closure plan).

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 in accordance with an approved closure plan may be conducted at any time before or after notification of closure. Upon approval of the modified closure plan, soil sampling activities will be conducted to demonstrate that the soils at the permitted unit meet the closure performance standards in Section 4.1. 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 permitted unit cannot proceed according to schedule, the Facility will notify the NMED in accordance with the extension request requirements in 40 CFR § 265.113.

5.0 CLOSURE PROCEDURES

Closure activities at the unit include~~s~~ a physical review of the unit and a review of the unit's records; proper management and disposal of hazardous waste residues, if applicable; 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 the~~se~~ closure activities applicable to the TA-39-57 OD Unit.

5.1 Records Review and Structural Assessment

Prior to commencing closure decontamination and sampling activities, the TA-39-57 OD Unit Operating and Inspection Records were reviewed in November 2011 and a structural assessment was conducted on September 12, 2011 to determine if there were any previous finding(s) or action(s) that may influence closure activities or potential sampling locations.

5.1.1 Records Review

The TA-39-57 OD Unit Operating Record (including, but not limited to, inspection and contingency plan implementation records) has been reviewed with the intent of determining the following:

1. Confirmation of the specific hazardous waste constituents of concern listed in Table 2 of this closure plan;
2. updating the estimated quantity of waste treated at the unit discussed in Section 3.0~~.~~; and

3. identification of additional sampling locations (*e.g.*, locations of spills or chronic conditions) identified in the TA-39-57 OD Unit Operating and Inspection Records.

A determination has been made based on the fact that there is no record of any spills or releases, defects, deterioration, damage, or hazards affecting waste containment or treatment occurred or developed during the operational life of the TA-39-57 OD Unit. Results from the records review are summarized briefly in this section and further details will be included in the closure certification report described in Section 8.0.

During the records review process, documentation was discovered that included years prior to the effective date of RCRA (from 1973-1980). These records as well as those from 1980 to the last documented treatment activity in 1995 were included in the review. These records indicate that the quantity of waste treatment was significantly lower than the originally estimated quantity. The original estimated quantity was based on the unit capacity, while the recorded quantity was approximately 1,827 pounds.

5.1.2 Structural Assessment

~~The structural assessment is an evaluation of the unit's physical condition and was conducted prior to commencing closure activities. The structural assessment include an inspection of the unit for any conditions that indicate a potential for release of hazardous constituents and reveals any evidence of a release (*e.g.*, stains). Results from the assessment are summarized briefly within this section and will be discussed further in the closure certification report described in Section 8.0.~~

During the structural assessment process (September 12, 2011), a visual inspection of the unit was conducted. The assessment included inspecting the unit for any staining or evidence of a release. There is no equipment associated with the unit or activities conducted at the unit. The TA-39-57 structure is not located within the unit boundary and will not be included as part of closure of this unit. ~~and a determination was made that there was no evidence of a release of hazardous wastes or hazardous wastes constituents related to the treatment operations at the OD unit. Additionally, it was determined that the structures within the area are not included in the boundary of the unit.~~This assessment has been documented and will be submitted to the NMED-HWB as part of the closure report and will include the necessary results, drawings and photographs.

5.2 Decontamination and Removal of Structures and Related Equipment

There are no structures or related equipment at this unit that are expected to be removed or decontaminated. If equipment is encountered unexpectedly, in accordance with 40 CFR § 265.112(b)(4), the equipment will be decontaminated, or removed, or both and managed according to Section 7.0 of this closure plan. All equipment removed 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 unit to meet the closure performance standards in Section 4.1.

5.2.1 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during decontamination activities will be cleaned with a wash water solution that consists of a surfactant detergent and water mixed in accordance with the manufacturers recommendations. The tools and equipment will be wiped down with the wash water solution and rinsed. Residue and disposable equipment will be containerized, characterized, and managed as waste in accordance with Section 7.0.

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~~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 or will not 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 this unit and 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). This Sampling and Analysis Plan (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. It includes:

1. The hazardous waste constituents of concern listed in Table 2 that will be included in the analysis for soil samples. This list includes all hazardous constituents defined as:
   a. any constituent identified in 40 CFR Part 261 Appendix VII that caused the United States 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 EPA approved analytical methods capable of detecting those constituents.
3. A site plan for soil samples. The site plan includes:
   a. Figure 3 depicting the boundaries of the unit and soil sampling locations. The locations include:
   b. Discrete soil samples collected from locations of ~~known~~ potential spills or other releases of hazardous waste or hazardous constituents during operation of the units, topographic lows and drainages;
   c. other potential release locations; and
   d. a rationale for the number and locations of samples.
4. The type of samples to be collected (*e.g.*, 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 laboratory analytical methods that will be used to measure hazardous constituent concentrations (see Table 4).

7. 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 ~~unit-related equipment, surfaces, and~~ soils in and around the unit 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 unit; soils in the vicinity of the unit; and soils at the storm water discharge point.

- Discrete soil samples as identified in Figure 3.
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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-39-57 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-39-57 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 an 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 Department of Energy (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 Individual Permit 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.

Two Sites associated with TA-39-57 are permitted to discharge stormwater runoff under the 2010 Storm Water Individual Permit, NPDES Permit No. NM0030759 (the Individual Permit). Solid Waste Management Unit (SWMU) 39-004(a) (structure 39-7) was constructed in 1953 as a remote test firing facility to test materials. SWMU 39-004(d), another remote test firing facility (structure 39-0057) near SWMU 39-004(a), was constructed in 1953 and used for explosives experiments.

Under the 2010 Individual Permit, Sites 39-004(a) and 39-004(d) are assigned to Permitted Feature No. A001, Site Monitoring Area (SMA) A-SMA-1.1. Sites 39-004(a) and 39-004(d) are both categorized as Moderate Priority Sites, and are subject to the October 31, 2015 deadline for corrective action (if required).

Installation of baseline control measures at A-SMA-1.1 was completed on November 1, 2010 and certified on December 1, 2010 (LANL 2010). The active control measures are listed in the 2012 Individual Permit Annual Report (LANL 2013b) and the 2012 update to the Site Discharge Pollution Prevention Plan (LANL 2013c). The control measures consist of established vegetation and an earthen berm that function as run-on, runoff, erosion, and/or sediment controls. The A-SMA-1.1 project map showing the control measure locations is available on LANL's public Individual Permit website (LANL 2013a).

The pollutants of concern to be monitored for each SMA are specified in Appendix B of the Permit. At a minimum, all SMAs must be initially monitored for metals, gross alpha radiation, Ra-226 + Ra-228, and cyanide (weak acid dissociable). The storm water monitoring requirement for A-SMA-1.1 also includes high explosives compounds. Baseline confirmation monitoring was initiated in 2011 following control measure certification. However, storm water discharge was not sufficient for full-volume sample collection by the October 31, 2011 deadline. The initial confirmation monitoring period has been extended per the requirements of the Permit, and monitoring was continued during 2012. As of December 31, 2012, storm water discharge has not been sufficient for collection of a confirmation sample. Extended baseline confirmation monitoring will continue until one confirmation sample is collected at A-SMA-1.1.

Groundwater in the vicinity of TA-39-57 is monitored as part of the LANL Interim Facility-Wide Groundwater Monitoring Plan (IFGMP). Under the 2010 IFGMP (LANL, 2012~~0b~~), surface water is monitored down gradient of TA-39-57 at the mouth of Ancho Canyon, near the confluence with the Rio Grande. Regional groundwater is monitored in four separate depth intervals at well R-31. Additional groundwater monitoring takes place down gradient of TA-39-57 at Ancho Spring in Ancho Canyon and at Springs 6, 6A, 8A, 9, and 9B in White Rock Canyon.

6.2.2 Soil Sampling

Sampling activities shall consist of collection of the 20 ~~discrete surface and subsurface~~soil samples ~~within the treatment are~~from locations with a~~a, beneath the treatment unit~~ higher potential for deposition.~~, from nearby drainages and from the soils~~ This includes locations~~ed~~ beneath the floor and base course (e.g. gravel) of ~~-~~the ~~metal weather enclosure~~"Temporary Target Structure" (See Figure 3) and from areas down gradient of the treatment unit. Soil

samples will be collected from depths of 0-6 and 6-12 inches below ground surface (bgs). Two soil samples will be collected at one ~~One d~~discrete soil sample location from one and five foot depths bgs., ~~will be collected~~ from the drainage located east of the TA-39-57 OD Unit, ~~at one and five foot depths bgs.,~~ sample locations are shown in Figure 3. Soil samples will be analyzed to determine if hazardous constituents are present in soils at, or in the vicinity of, the unit and to determine if there is an immediate threat to the environment. Soil sample analysis will be completed using the methods listed in Table 4 (Summary of Analytical Methods).

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~~cooled to 4˚C 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 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 with the solution (0.1 molar nitric acid to remove trace metals, if necessary or methanol to remove organic compounds if necessary), 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).

Any deviations from the sampling plan will be noted in the sample logbook and reported in the TA-39-57 closure certification report.

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 indelible 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 placed 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.

The samples are maintained at appropriate temperatures after collection and throughout the shipping process. All samples are chilled to 2 degrees Celsius before shipment occurs. Samples are then wrapped, placed in the DOT approved shipping container with ample blue ice to hold the required temperature. Temperature blanks are placed in the cooler and sealed with custody tape. Off-site transportation of samples will occur via contract, or common motor carrier, air carrier, or freight. All off-site transportation will be processed through the Facility 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. All shipments are sent overnight delivery. Once received, the analytical laboratory verifies that the custody tape is still intact and measures the temperature of the cooler. All the information is recorded and presented in the analytical data package. For all discrepancies the sender is notified for resolution.

~~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.These constituents have been determined to be applicable constituents listed in Appendix VIII of 40 CFR Part 261 and in Appendix IX of 40 CFR Part 264 that were managed or treated at the units over their operational history. This determination has been made through the records review and structural assessment discussed in Section 5.1. 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;
5. decontamination waste; and
6. soil.

The different types of wastes generated at closure, including the unit's decontaminated structures and related equipment, and their disposition options are listed in Table 3 of this closure plan. As stated in Section 1.0, waste management activities associated with this unit will undergo RCRA clean closure activities in conjunction with the corrective action processes at TA-39. Final closure of the TA-39-57 OD Unit will be in accordance with the requirements set forth In 40 CFR Part 265, Subparts G and P.

8.0 CLOSURE CERTIFICATION REPORT

Upon completion of the closure activities at the units, LANL will submit, by registered mail, a closure certification report for NMED review and approval. The closure certification 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 the records review and structural assessment;
- 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 closure certification report to the NMED no later than 60 days after completion of closure of the unit. 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 unit's 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 pursuant to Section 4.1 for the unit; and
9. a certification statement of the accuracy of the closure certification 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

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NMED, 2009. *Technical Background Document for Development of Soil Screening Levels* (Revision 5.0), New Mexico Environment Department Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program.

Table 1
Schedule for Closure of the TA-39-57 OD Unit

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	Already conducted
Conduct structural assessment	Already conducted
Submit a request to modify the Closure Plan and the records review and structural assessment report	Already conducted
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 the closure plan is approved. Some activities may be conducted simultaneously.

Table 2

Hazardous Waste Constituents of Concern at the TA-39-57 OD Unit[a]

Category	EPA Hazardous Waste Numbers	Specific Constituents
high explosives 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 (D028), 1,1 dichloroethylene Trichloroethylene, chloroform
Other constituents of concern		Perchlorates, PCBs, dioxins/furans, cyanide, nitrates

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

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Table 3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-hazardous~~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.
	~~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 Plan (WIPP), as appropriate.~~
Decontamination wash water	Non-hazardous~~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 or WIPP, as appropriate.~~
Metal	Non-hazardous~~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.
	~~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-hazardous~~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.
	~~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
Soil and tuff	Non-hazardous~~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.
	~~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-hazardous~~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.
	~~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 sampling and decontamination equipment	Non-hazardous~~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.
	~~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 5 (cont'd)

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

February 2012

Table 4

Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method[a]	Analytical Technique	Estimated Quantitation Limits (mg/kg)[b]	Rationale
Metal Analysis				
Aluminum	6010B	ICP-AES	20	Determine the environmentally available metal concentration in the soil samples following strong acid digestion.
Antimony	6010B	ICP-AES	0.03	
Arsenic	6020	ICP-MS	1.5	
Barium	6010B	ICP-AES	0.5	
Beryllium	6020	ICP-MS	0.1	
Cadmium	6010B	ICP-AES	0.03	
Calcium	6010B	ICP-AES	30	
Chromium	6010B	ICP-AES	0.5	
Cobalt	6010B	ICP-AES	0.5	
Copper	6010B	ICP-AES	1	
Iron	6010B	ICP-AES	30	
Lead	6010B	ICP-AES	1	
Magnesium	6010B	ICP-AES	50	
Manganese	6010B	ICP-AES	1.0	
Mercury	7471A	CVAA	0.01	
Nickel	6020	ICP-MS	0.4	
Potassium	6010B	ICP-AES	30	
Selenium	6020	ICP-AES	1.5	
Silver	6020	ICP-MS	0.01	
Sodium	6010B	ICP-AES	20	
Thallium	6020	ICP-MS	0.2	
Vanadium	6010B	ICP-AES	0.5	
Zinc	6010B	ICP-AES	1	
Organic Analysis				
VOCs	8260B	GC/MS	0.001 to 0.005	Determine the solvent-extractable VOCs concentration in the soil samples.
SVOCs	8270C	GC/MS	0.033 to 0.33	Determine the solvent-extractable SVOCs concentration in the soil samples.
Other Analysis				
Dioxins/Furans	8290	HRGC/MS	0.00001 to 0.0003	Determine the solvent extractable dioxin/furan

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Table 5 (cont'd)

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

~~February 2012~~

				concentration in the soil samples.
Perchlorate [ClO_4^-]	6850	HPLC/ESI/MS	0.002	Determine the water-soluble [ClO_4^-] concentration in the soil samples.
High Explosives	8321A [c]	HPLC/TS/MS	0.5 to 2.0	Determine the solvent-extractable high explosives concentrations in the samples.
Polychlorinated biphenyls (PCBs)	8082A	Gas Chromotography		Determine the PCB concentrations in samples
Cyanide	9010, 9012	Titration, Colorimetric	0.1 mg/kg, 0.02 mg/kg	Determine cyanide concentration
~~**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***~~				
~~Perchlorates~~	~~6850~~	~~HPLC-ESI/MS or MS/MS~~	~~1 µg/L~~	~~Determine concentration of perchlorate 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 Estimated quantitation limits listed for all methods are based LANL contract-required quantitation limits for subcontractor analytical laboratory services.

c Instrumentation published in Method SW-846-8321A can be used to identify the required analytes that would not be detected using Method SW-846-8330, thus a LANL-specific modification is used for Method SW-846-8321A to analyze for explosives compounds.

Table 5 (cont'd)

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

~~February 2012~~

CVAA = Cold-vapor atomic absorption spectroscopy

ESI/MS = Electrospray ionization/mass spectrometry

GC/MS = Gas chromatography/mass spectrometry

HPLC = High performance liquid chromatography

HRGC/MS = High resolution gas chromatography/mass spectrometry

ICP-AES = Inductively coupled plasma-atomic emission spectrometry

SVOC = Semivolatile organic compound(s)

TS/MS = Thermospray/mass spectrometry

VOC = Volatile organic compound(s)

PCBs = polychlorinated biphenyls

mg/kg = milligrams per kilogram~~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 emission spectrometry~~
~~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.~~

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Table 5 (cont'd)

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

~~February 2012~~

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~~ Solid Media: 125-mL Glass	~~Aqueous Media: HNO_3 to pH <2 Cool to 4 °C~~ Solid Media: Cool to 4 °C	180 Days
TCLP/Total Mercury	~~Aqueous Media: 500-mL Wide Mouth-Polyethylene or Glass with Teflon Liner~~ Solid Media: 125-mL Glass	~~Aqueous Media: HNO_3 to pH <2 Cool to 4 °C~~ Solid Media: Cool to 4 °C	28 Days
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	~~Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa~~ Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon-Lined Septa	~~Aqueous Media: HCl to pH<2 Cool to 4 °C~~ Solid Media Cool to 4 °C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	14 days
Semi-Volatile Organic Compounds			
Target Compound Semi-volatile Organic Compounds	~~Aqueous Media: Four 1-L Amber Glass with Teflon-Lined Lid~~ Solid Media: 250-mL Glass	~~Aqueous Media: Cool to 4 °C~~ Solid Media: Cool to 4 °C	Seven days from field collection to preparative extraction. 40 days from preparative extraction to determinative analysis.
Other Analysis			
Dioxins/Furans	2 - 125 mL Glass	Solid Media: Cool to 4 °C	30 days

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

~~February 2012~~

Perchlorate [ClO_4^-]	250 - mL polyethylene	Solid Media: Protect from temperature extremes	28 days
High Explosives	500 – mL Amber Glass	Solid Media: Cool to 4 °C	14 days
polychlorinated biphenyls (PCBs)	Glass	Cool, 4°C	1 year
Cyanide	Polyethylene glass	Cool, 4°C	12 days

[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

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Table 5 (cont'd)

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

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.

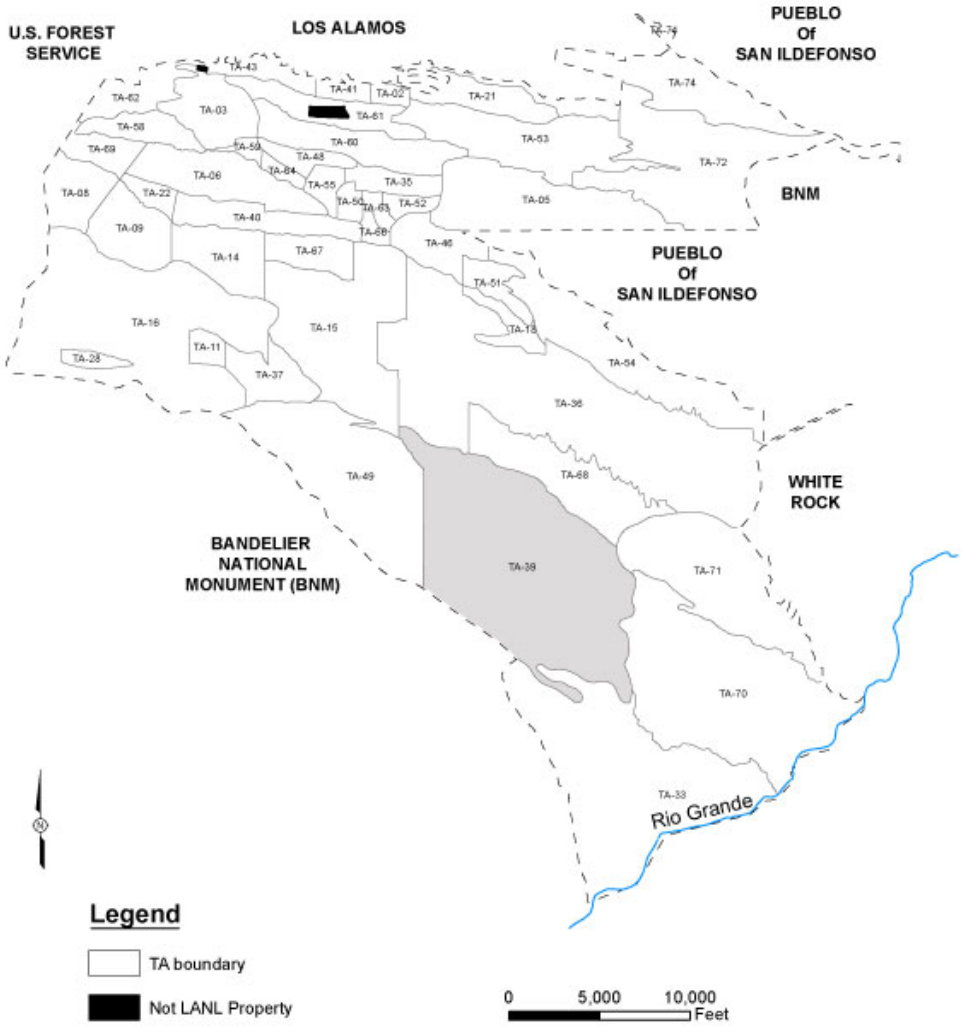


Figure 1

Location of Technical Area 39 at Los Alamos National Laboratory

Created by EP-WES-EDA GIS TEAM, Map Number 06-3108 November 13, 2008
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 In and Around the Los Alamos National Laboratory; Los Alamos National Laboratory, SSMO Site Planning & Project Initiation; 04 June 2008

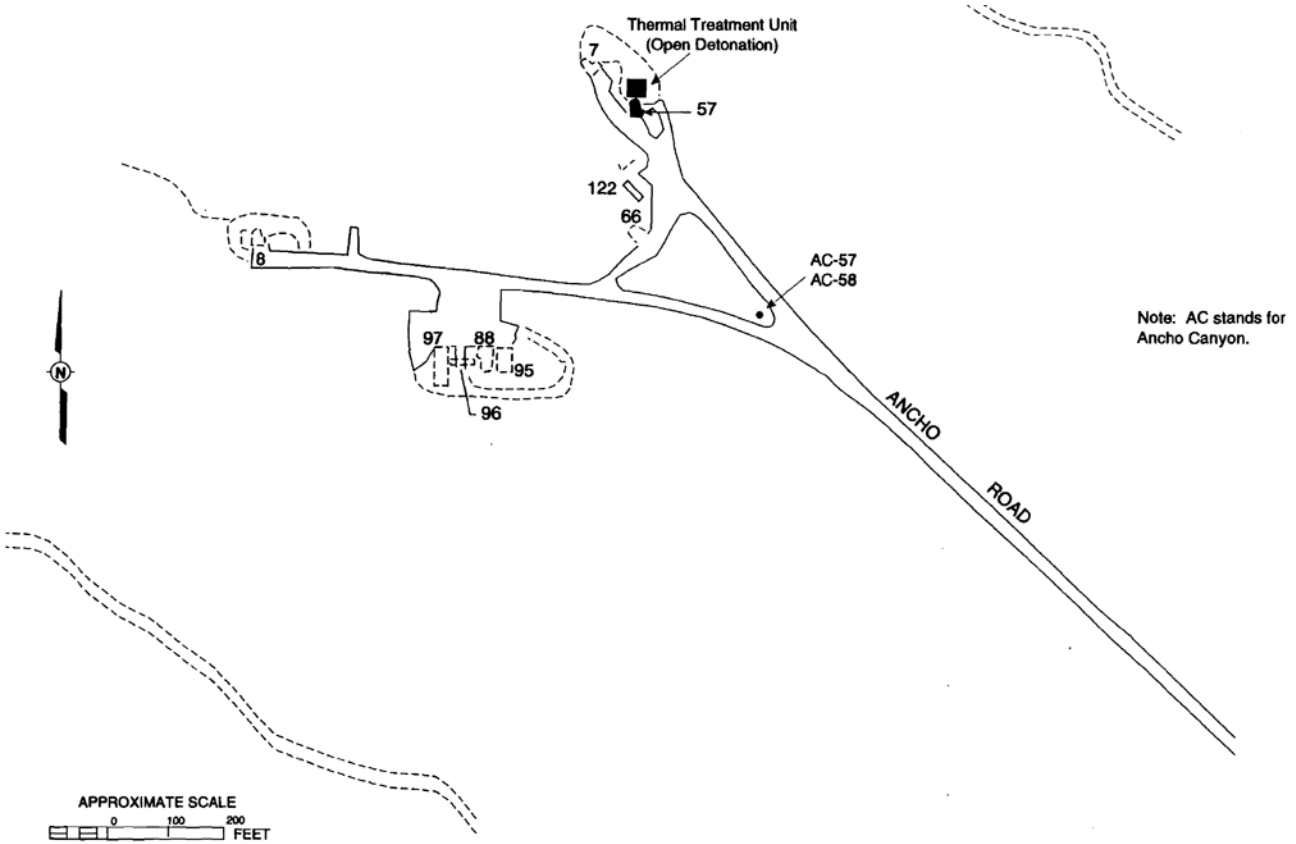
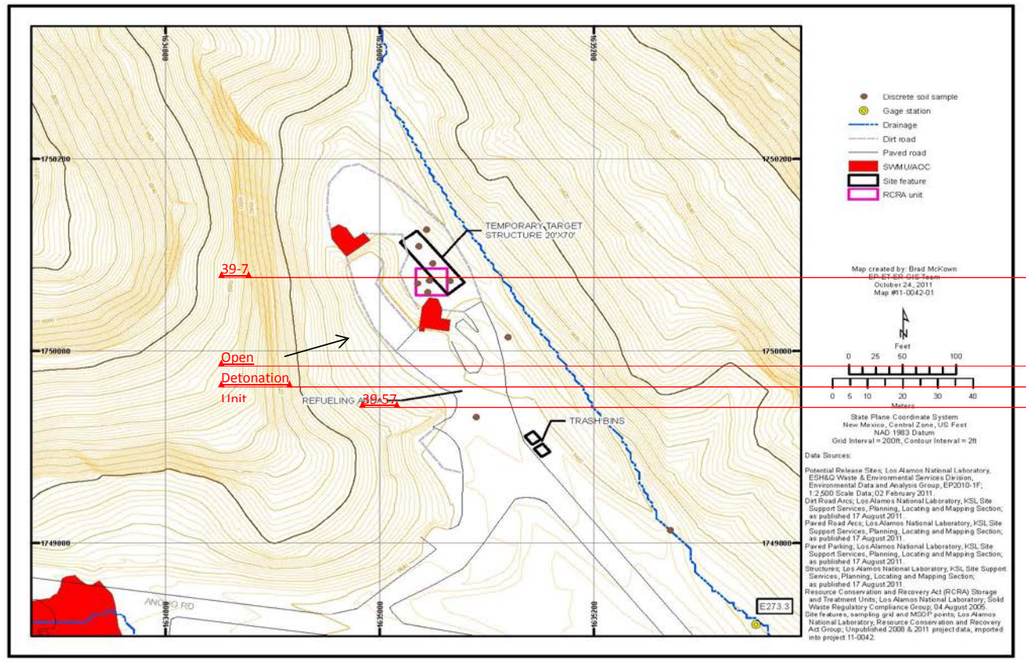


Figure 2. Location and Layout of the TA-39-57 Open Detonation Unit



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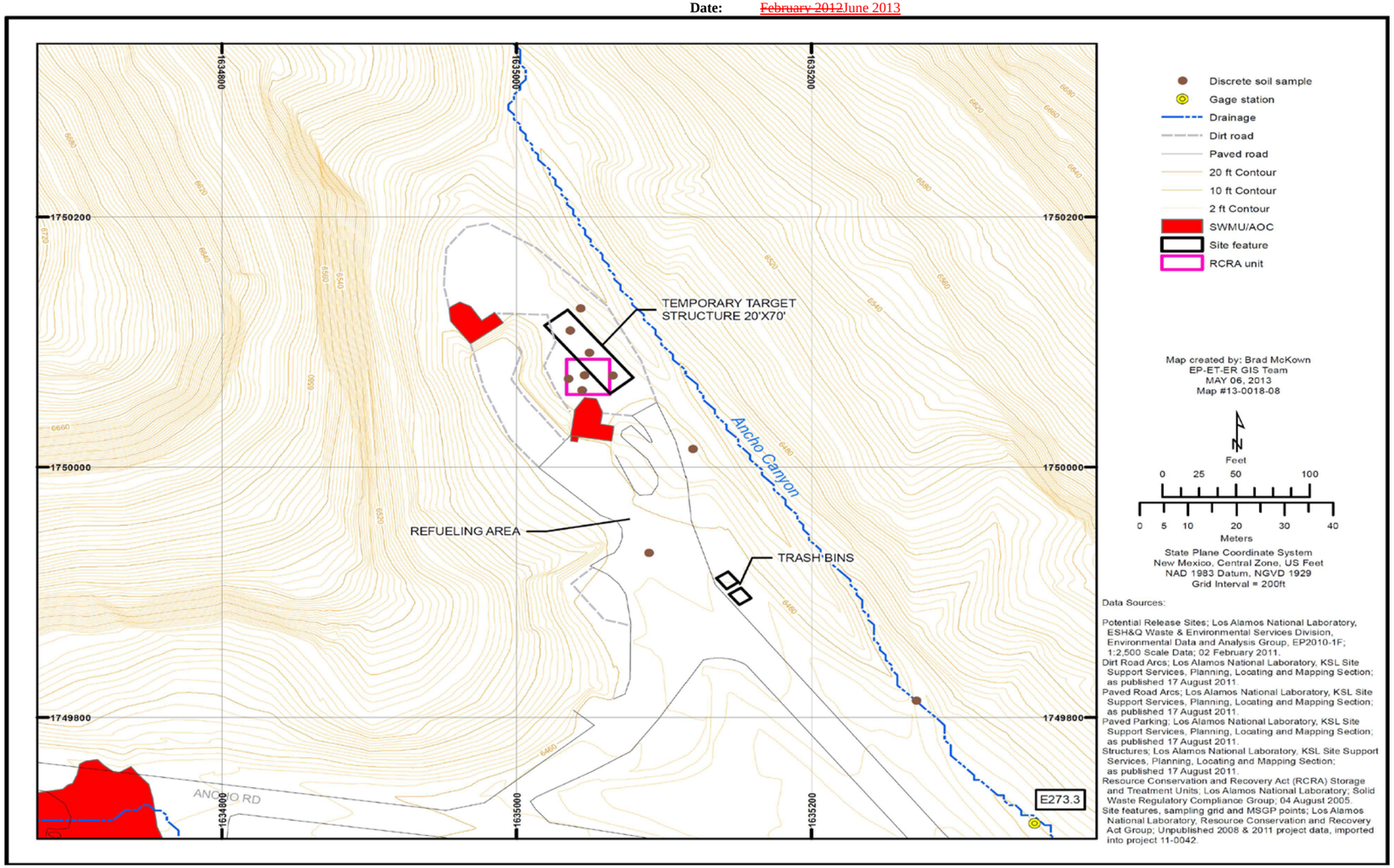

Figure 3. Sampling Locations for Closure of the TA-39-57 Open Detonation Units

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.

Alison M. Dorries **Date Signed**

Division Leader
Environment Protection Division
Los Alamos National Laboratory

Gene E. Turner **Date Signed**

Environmental Permitting Manager
Environmental Projects Office
Los Alamos Site Office
National Nuclear Security Administration

INTERNAL CERTIFICATION

WEAPONS EXPERIMENTS DIVISION

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 concerning the open detonation unit at Technical Area 39-57. 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.

Peter Dickson **Date Signed**

Group Leader
Explosive Applications and Special Projects Group
Weapons Experiments Division
Los Alamos National Laboratory

David J. Funk **Date Signed**

Division Director
Weapons Experiments Division
Los Alamos National Laboratory
Operator

INTERNAL CERTIFICATION

ENVIRONMENTAL PROTECTION DIVISION

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.

~~Anthony R. Grieggs~~Jody A. Armijo	**Date Signed**
Acting Group Leader	
~~Water Quality and RCRA Group~~Waste Management Programs	
~~Environmental Protection Division~~Waste Management Division	
Los Alamos National Laboratory	

Attachment C

Interim Status Closure Plan Open Burn / Open Detonation Treatment Unit Technical Area 14-23, Revision 2.0

June 2013

LA-UR-13-24000

Closure Plan

Technical Area 14 Open Burning and Open Detonation Units

(TA-14-23), Revision 2.0

Prepared by:

Los Alamos National Laboratory

ENV-RCRA Group

Los Alamos, New Mexico 87545

Table of Contents

List of Tables iv
List of Figures iv
List of Abbreviations and Acronyms v
1.0 INTRODUCTION 1
2.0 DESCRIPTION OF UNITS TO BE CLOSED 1
2.1 Description of the Treatment Units 1
2.2 Description of the Wastes Treated at the Units 2
2.3 Description of Treatments Conducted at the Units 3
3.0 ESTIMATE OF MAXIMUM WASTE TREATED 4
4.0 GENERAL CLOSURE INFORMATION 4
4.1 Closure Performance Standard 4
4.2 Closure Schedule 5
5.0 CLOSURE PROCEDURES 6
5.1 Records Review and Structural Assessment 6
5.1.1 Records Review 6
5.1.2 Structural Assessment 7
5.2 Decontamination and Removal of Structures and Related Equipment 7
5.2.1 Equipment Used During Decontamination Activities 7
6.0 SAMPLING AND ANALYSIS PLAN 7
6.1 Sampling Activities 8
6.2 Sample Collection Procedures 9
6.2.1 Surface Water and Groundwater Sampling 9
6.2.2 Soil Sampling 10
6.2.3 Cleaning of Sampling Equipment 11
6.3 Sample Management Procedures 11
6.3.1 Sample Documentation 11
6.3.1.1 Chain-of-Custody 11
6.3.1.2 Sample Labels and Custody Seals 12
6.3.1.3 Sample Logbook 12
6.3.2 Sample Handling, Preservation, and Storage 12
6.3.3 Packaging and Transportation of Samples 13
6.4 Sample Analysis Requirements 13
6.4.1 Analytical Laboratory Requirements 13
6.4.2 Quality Assurance/Quality Control 14
6.4.2.1 Field Quality Control 14
6.4.2.2 Analytical Laboratory Quality Control Samples 14
6.4.3 Data Reduction, Verification, Validation, and Reporting 14
6.4.4 Data Reporting Requirements 14

7.0 WASTE MANAGEMENT 14
8.0 CLOSURE CERTIFICATION REPORT 15
9.0 REFERENCES 17

List of Tables

Table 1. Schedule for Closure of the TA-14-23 OB/OD Units

Table 2. Hazardous Waste Constituents of Concern at the TA-14-23 OB/OD Units

Table 3. Potential Waste Materials, Waste Types, and Disposal Options

Table 4. Summary of Analytical Methods

Table 5. Sample Containers, Preservation Techniques, and Holding Times

Table 6. Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

List of Figures

Figure 1. Location of Technical Area 14 at Los Alamos National Laboratory

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

List of Acronyms and Abbreviations

40 CFR	Title 40, U.S. Code of Federal Regulations
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	Interim Facility-Wide Groundwater Monitoring Plan
IP	Individual Permit
LANL	Los Alamos National Laboratory
MSGP	Multi-Sector General Permit
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 (the Facility), 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. Closure of the OB/OD units will be completed in accordance with Section 4.1 of this closure plan.

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 solid waste management units (SWMUs) 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 located at the site but not included as part of the OB/OD Units are 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 was used to treat (i.e., open detonate) hazardous explosive waste. Non-treatment-related, experimental test detonations were also performed at TA-14, Q-Site East and will continue to occur at the site.

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 precipitation events, water tends to flow eastward from the site into a tributary of Cañon de Valle. Additionally, best management practices (BMPs) installed 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 TA-14 is 20 pounds of waste per detonation, so only small quantities of high explosives (HE) could have been treated at the unit. Excess explosives included small bulk pieces, initiating devices (detonators/squibs), small quantities of powders, developmental energetic materials, and, potentially, excess propellants from gas guns.

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. These wastes would not routinely contain detonable quantities of explosives, although they may have contained trace quantities of non-hazardous residual HE. Occasionally firing site debris containing reactive explosives may have been generated. If explosive debris was not rendered safe immediately through detonation, the debris was stored in the satellite accumulation area within Building TA-14-23 and was treated as soon as possible.

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. 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 contaminated with HE.

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 although, other characteristic (e.g., ignitability, toxicity for barium) and listed wastes (solvents on the explosives-contaminated rags and wipes) hazardous waste codes may have been applied to the wastes.

2.3 Description of Treatments Conducted at the Units

Waste containers for explosives-contaminated waste and explosive material generally consisted 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. When 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 TA09 and TA14 and possibly TA22 and TA40. 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 remained 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 approximately four ounces to one half gallon of volatile hydrocarbons (e.g., kerosene, acetone, fuel oil, or hexane) and igniting the waste. OD of waste was accomplished by using a predetermined amount of explosive as fuel to initiate the detonation of the waste explosive. 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 in effect at that time.

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, ash and possibly 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 and remained in place when the unit was 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 Site Leader determined when it was safe to re-enter the detonation site after treatment events.

Pieces of damaged explosives resulting from misfires, sensitivity experiments, incomplete detonations, or exposure to severe testing were packaged separately from excess explosives or were rendered safe immediately. 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

TA-14-23 OB/OD Units will be closed to meet the following performance standards (40 CFR § 265.111):

- 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 or surface waters, or to the atmosphere; and
- comply with the closure requirements of 40 CFR Part 265 Subparts G and P.

This will be accomplished through one of two methods:

- Ensure that contaminated media do not contain concentrations of hazardous constituents that are greater than the clean-up levels established in the New Mexico Environment Department's (NMED's) *Technical Background Document for Development of Soil Screening Levels* (as updated) (NMED, 2009), and in LANL's *Screening Level*

Ecological Risk Assessment Methods (LANL, 2010a) (as updated and approved by the NMED). For soils, the cleanup levels shall be established based on residential use. The owner/operator must also demonstrate that there is not potential to contaminate groundwater; or

- conduct a human health and ecological risk evaluation utilizing the screening levels described above.

If LANL is unable to achieve any one of the risk-based 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;
- control the migration of hazardous waste residues, hazardous constituents, and, as applicable, contaminated media such that they do not pose an unacceptable risk to 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 closure requirements in 40 CFR 265.113(b)(1)(ii)(C) and (2); and

LANL shall demonstrate that the unit does not pose an unacceptable risk by complying with the post closure requirements in 40 CFR 265.117 as well as conduct the following to protect human health and the environment:

- Maintain the integrity and effectiveness of the unit by making repairs necessary to correct the effects of erosion, animal intrusion, or other events that compromise the unit;
- maintain surface water controls to prevent run-on and run-off from eroding or otherwise cause damage;
- conduct corrective action as necessary to protect human health and the environment;
- maintain fencing, security signs and locks;
- maintain training, operating, inspection, and monitoring, and other required records; and
- submit an annual report to the NMED providing the results of the required inspections, sampling results, and a summary of any needed repairs and whether repairs were effective.

Closure of the TA-14-23 OB/OD Units will be deemed complete when: 1) the burn cage has been properly managed as waste; 2) closure has been completed in accordance with the closure plan and 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. The following section provides the schedule of closure activities (see also Table 1 in this closure plan).

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 in accordance with an approved

closure plan may be conducted at any time before or after notification of closure. Upon approval of the modified closure plan, soil sampling and decontamination verification sampling activities will be conducted to demonstrate that the soils at the permitted unit meet the closure performance standards in Section 4.1 of the closure plan. Submittal of the final closure report and certification will be submitted to the NMED 240 days after initiating closure. In the event that closure of the permitted unit cannot proceed according to schedule, the Facility will notify the NMED in accordance with the extension request requirements in 40 CFR § 265.113.

5.0 CLOSURE PROCEDURES

Closure activities at the units include: a physical review of the units and a review of the units' records; proper management and disposal of hazardous waste residues, if applicable; 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 were reviewed in November 2011 and a structural assessment was conducted on September 12, 2011 to determine if there were any previous finding(s) or action(s) that may influence closure activities or potential sampling locations. Results from the records review and structural assessment are generally mentioned within the following sections and will be discussed in further detail in the closure certification report.

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) has been reviewed with the purpose of determining the following:

1. Confirmation of the specific hazardous waste constituents of concern listed in Table 2;
2. updating the estimated quantity of waste treated in Section 3.0; and
3. identification of additional sampling locations (*e.g.*, locations of spills or chronic conditions) identified in the TA-14-23 OB/OD Units' Operating and Inspection Records.

Based on a thorough review of available records, a determination has been made that there have been no records of any spills or releases, defects, deterioration, damage, or hazards affecting waste containment or treatment during the operational life of the TA-14-23 OB/OD Units.

During the records review process, documentation was discovered that included years from 1988 to the last documented treatment activity in 2003. While quantities were included in the documentation, treatment by either OB or OD was not specified. These records indicate that the quantity of waste treatment was significantly lower than the originally estimated quantity. The original estimated quantity was based on the capacity of the OB/OD units, while the recorded quantity, based on the records found, was approximately 2,536 pounds.

5.1.2 Structural Assessment

The structural assessment was conducted prior to commencing closure activities and was an evaluation of the units' physical condition. The assessment included an inspection of the units for any conditions that indicated a potential for release of hazardous constituents (e.g., deterioration) and any evidence of a release (*e.g.*, stains). Results from the assessment are summarized briefly within this section and will be discussed further in the closure certification report.

During the structural assessment process (September 12, 2011), a visual inspection of the OB/OD units was conducted and a determination was made that there was no visual evidence of spills or debris at the OB/OD units. Additionally, it was determined that the structures within the area are not included within the boundary of the unit. This assessment has been documented and will be submitted to the NMED as part of the closure report and will include the necessary results, drawings and photographs.

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. 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.

5.2.1 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during decontamination activities will be cleaned with a wash water solution that consists of a surfactant detergent and water mixed in accordance with the manufacturers recommendations. The tools and equipment will be wiped down with the wash water solution and rinsed. Residue and disposable equipment will be containerized, characterized, and managed as waste in accordance with Section 7.0.

6.0 SAMPLING AND ANALYSIS PLAN

This sampling and analysis plan (SAP) identifies the specific sampling and analysis requirements for the TA-14-23 OB/OD Units and 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 Section 6.0 as well as the requirements in Part 11.10.5 and Part 9.4.7.1 of the Permit.

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 will be included in the analysis for soil 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 soil samples. The site plan includes:
   a. Figure 3 depicting the boundaries of the units 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. Three grab soil samples collected at each location identified in Figure 3;
   d. locations of known spills or other releases of hazardous waste or hazardous constituents during operation of the units;
   e. other potential release locations; and
   f. a rationale for the number and locations of samples.
4. The type of samples to be collected (*e.g.*, 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. 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 soils in and around the units 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 and soils in the vicinity of the units..

- Systematic composite samples will be collected from soils within and near the unit to include topographic lows.
    - 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 grab sample will be collected from soils near the burn pan
- Two additional grab samples will be collected from soils located southeast of the OD Unit.

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 Department of Energy (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 Department of Energy (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.

Two Sites associated with TA-14-23 are permitted to discharge stormwater runoff under 2010 IP, NPDES Permit No. NM0030759 (the Individual Permit). Solid Waste Management Unit (SWMU) 14-006 is the decommissioned HE sump (structure 14-31), associated drain line, and outfall that are located approximately 45 ft east of control building 14-23. Area of Concern (AOC) 14-001(g) is an inactive firing pad (structure 14-35) located south of control building 14-23. Under the 2010 Individual Permit, Sites 14-006 and 14-001(g) are assigned to Permitted Feature No. V012, Site Monitoring Area (SMA) CDV-SMA-6.01. Sites 14-006 and 14-001(g)

are both categorized as Moderate Priority Sites, and are subject to the October 31, 2015 deadline for corrective action (if required).

Installation of baseline control measures at CDV-SMA-6.01 was completed on January 12, 2011 and certified on February 11, 2011 (LANL 2011a). The active control measures are listed in the 2012 Individual Permit Annual Report (LANL 2013a) and the 2012 update to the Individual Permit Site Discharge Pollution Prevention Plan (LANL 2013b). The control measures include established vegetation, earthen and base course berms, straw wattles, and S-fences that function as run-on, runoff, erosion, and/or sediment controls. The CDV-SMA-6.02 project map showing the control measure locations is available on LANL's public Individual Permit website (LANL 2011b).

The pollutants of concern to be monitored for each SMA are specified in Appendix B of the Individual Permit. At a minimum, all SMAs must be initially monitored for metals, gross alpha radiation, Ra-226 + Ra-228, and cyanide (weak acid dissociable). The storm water monitoring requirement for CDV-SMA-6.01 also includes high explosives compounds. Baseline confirmation monitoring was initiated in 2011 following control measure certification. However, storm water discharge was not sufficient for full-volume sample collection by the April 30, 2012 deadline. The initial confirmation monitoring period has been extended per the requirements of the Permit, and monitoring was continued during 2012. As of December 31, 2012, storm water discharge has not been sufficient for collection of a confirmation sample. Extended baseline confirmation monitoring will continue until one confirmation sample is collected at CDV-SMA-6.01.

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 2012), 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 0-6 inch depths (soil/tuff interface), from the proposed decision units shown in Figure 3. Soil samples will be collected from each of the 30 sub-sample locations, within each of the six decision units, placed in a stainless steel mixing bowl and mixed thoroughly. The soil samples will then be placed in the proper sample analysis container. 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 for VOCs analysis; 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. Three additional grab samples will

be collected, one near the burn cage and two from locations southeast of the OB/OD treatment units. Grab soil samples will be collected from 0-6 inch depths (soil/tuff interface), from the proposed locations shown in Figure 3.

Soil samples will be collected using a spade, scoop, auger, trowel or other tool as specified in approved methods for the type of analytes to be sampled (EPA, 1986 or EPA, 2002). Samples will be kept cooled to 4˚C 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 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 with the solution (0.1 molar nitric acid to remove trace metals, if necessary or methanol to remove organic compounds if necessary), 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).

Any deviations from the sampling plan will be noted in the sample logbook and reported in the TA-14-23 closure certification report.

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.

The samples are maintained at appropriate temperatures after collection and throughout the shipping process. All samples are chilled to 2 degrees Celsius before shipment occurs. Samples are then wrapped, placed in the Department of Transportation (DOT) approved shipping container with ample blue ice to hold the required temperature. Temperature blanks are placed in the cooler and sealed with custody tape. Off-site transportation of samples will occur via contract, or common motor carrier, air carrier, or freight. All off-site transportation will be processed through the Facility 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. All shipments are sent overnight delivery. Once received, the analytical laboratory verifies that the custody tape is still intact and measures the temperature of the cooler. All the information is recorded and presented in the analytical data package. For all discrepancies the sender is notified for resolution.

6.4 Sample Analysis Requirements

Samples will be analyzed for all hazardous constituents listed in Table 2. These constituents have been determined to be applicable constituents listed in Appendix VIII of 40 CFR Part 261 and in Appendix IX of 40 CFR Part 264 that were managed or treated at the units over their operational history. This determination has been made through the records review and structural assessment discussed in Section 5.1. 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.

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;
5. decontamination waste; and
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. As stated in Section 1.0, waste management activities associated with this unit 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.

8.0 CLOSURE CERTIFICATION REPORT

Upon completion of the closure activities at the units, LANL will submit, by registered mail, a closure certification report for NMED review and approval. The closure certification 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 the records review and structural assessment;
- 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 closure certification report to the 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 pursuant to Section 4.1, for the units; and
9. a certification statement of the accuracy of the closure certification 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

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Table 1

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

Closure Activity	Schedule
Approval of the closure plan by the Department	Day 0
Remove all wastes including hazardous, mixed, and solid waste	No later than Day 90
Conduct records review	Already conducted
Conduct structural assessment	Already conducted
Submit a request to modify the Closure Plan and the records review and structural assessment report	Already conducted
Submit final closure certification report 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 the closure plan is approved. 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
high explosives 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, hexane
Other constituents of concern		Dioxans/Furans, Perchlorates, kerosene, cyanide, nitrates

[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-hazardous 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-hazardous solid 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.
Metal	Non-hazardous solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to remove explosives and recycled or treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	Non-hazardous 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.
Soil and tuff	Non-hazardous 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.
Discarded concrete	Non-hazardous 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.
Discarded sampling and decontamination equipment	Non-hazardous 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 4

Summary of Analytical Methods

Analyte	EPA *SW-846* Analytical Method [a]	Analytical Technique	Estimated Quantitation Limits [b] (mg/kg)	Rationale
Metal Analysis				
Aluminum	6010B	ICP-AES	20	Determine the environmentally available metal concentration in the soil samples following strong acid digestion.
Antimony	6010B	ICP-AES	0.03	
Arsenic	6020	ICP-MS	1.5	
Barium	6010B	ICP-AES	0.5	
Beryllium	6020	ICP-MS	0.1	
Cadmium	6010B	ICP-AES	0.03	
Calcium	6010B	ICP-AES	30	
Chromium	6010B	ICP-AES	0.5	
Cobalt	6010B	ICP-AES	0.5	
Copper	6010B	ICP-AES	1	
Iron	6010B	ICP-AES	30	
Lead	6010B	ICP-AES	1	
Magnesium	6010B	ICP-AES	50	
Manganese	6010B	ICP-AES	1.0	
Mercury	7471A	CVAA	0.01	
Nickel	6020	ICP-MS	0.4	
Potassium	6010B	ICP-AES	30	
Selenium	6020	ICP-AES	1.5	
Silver	6020	ICP-MS	0.01	
Sodium	6010B	ICP-AES	20	
Thallium	6020	ICP-MS	0.2	
Vanadium	6010B	ICP-AES	0.5	
Zinc	6010B	ICP-AES	1	
Organic Analysis				
VOCs	8260B	GC/MS	0.001 to 0.005	Determine the solvent-extractable VOCs concentration in the soil samples.
SVOCs	8270C	GC/MS	0.033 to 0.33	Determine the solvent-extractable SVOCs concentration in the soil samples.
Other Analysis				
Dioxins/Furans	8290	HRGC/MS	0.00001 to 0.0003	Determine the solvent extractable dioxin/furan concentration in the soil samples.
Perchlorate [ClO_4^-]	6850	HPLC/ESI/MS	0.002 mg/kg	Determine the water-soluble [ClO_4^-] concentration in the soil samples.

Analyte	EPA *SW-846* Analytical Method [a]	Analytical Technique	Estimated Quantitation Limits [b] (mg/kg)	Rationale
High Explosives	8321A [c]	HPLC/TS/MS	0.5 to 2.0	Determine the solvent-extractable high explosives concentrations in the samples.
Cyanide	9010, 9012	Titration, Colorimetric	0.1 mg/kg, 0.02 mg/kg	Determine cyanide concentration
Diesel range organics	8015	GC/FID	0.7 mg/kg to 6.3 mg/kg	Determine the solvent-extractable SVOCs concentration in the soil 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.

[c] Instrumentation published in Method SW-846-8321A can be used to identify the required analytes that would not be detected using Method SW-846-8330, thus a LANL-specific modification is used for Method SW-846-8321A to analyze for explosives compounds.

CVAA = Cold-vapor atomic absorption spectroscopy
GC/MS = gas chromatography/mass spectrometry
GC/FID= gas chromatography/flame ionization detector
GFAA = Graphite furnace atomic absorption spectroscopy
ICP-AES = Inductively coupled plasma-atomic emission spectrometry
HPLC = high performance liquid chromatograph
HRGC= High resolution liquid chromatography
ESI/MS = electrospray ionization/mass spectrometry
MS/MS = tandem mass spectrometry
SVOC = semi-volatile organic compound
TS/MS= Thermospray/mass spectrometry
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	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	180 Days
TCLP/Total Mercury	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	28 Days
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	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	14 days
Semi-Volatile Organic Compounds			
Target Compound Semi-volatile Organic Compounds	Solid Media: 250-mL Glass	Solid Media: Cool to 4 °C	Seven days from field collection to preparative extraction. 40 days from preparative extraction to determinative analysis.
Other Analysis			
Dioxins/Furans	2 - 125 mL Glass	Solid Media: Cool to 4 °C	30 days
Perchlorate [ClO_4^-]	250 - mL polyethylene	Solid Media: Protect from temperature extremes	28 days
High Explosives	500 – mL Amber Glass	Solid Media: Cool to 4 °C	14 days
Cyanide	Polyethylene glass	Cool, 4°C	12 days

[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

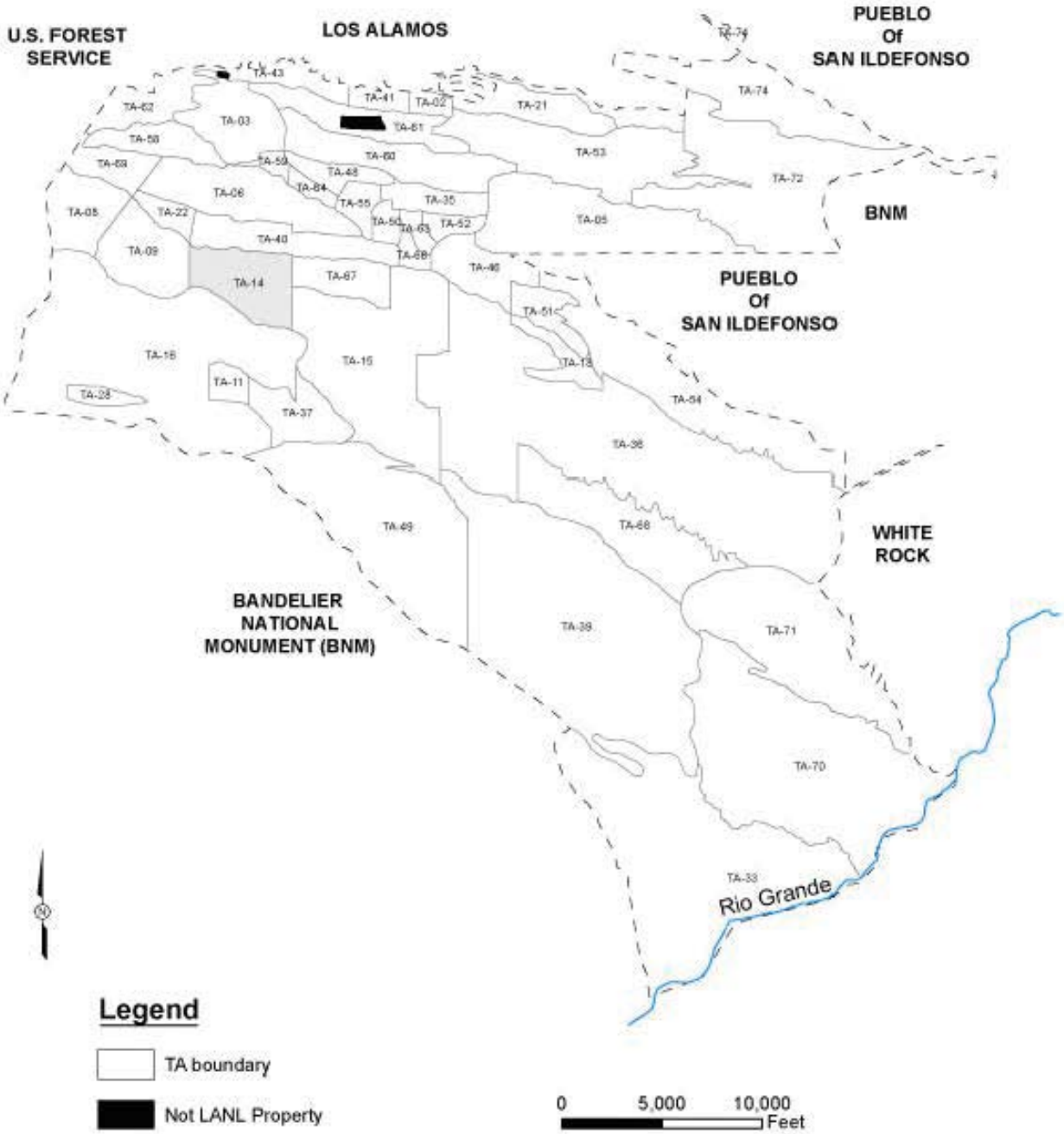

Figure 1

Location of Technical Area 14 at Los Alamos National Laboratory

Created by EP-WES-EDA GIS TEAM, Map Number 06-0108 November 13, 2008
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 in 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 in and Around the Los Alamos National Laboratory; Los Alamos National Laboratory, SSMO Site Planning & Project Initiation; 04 June 2008

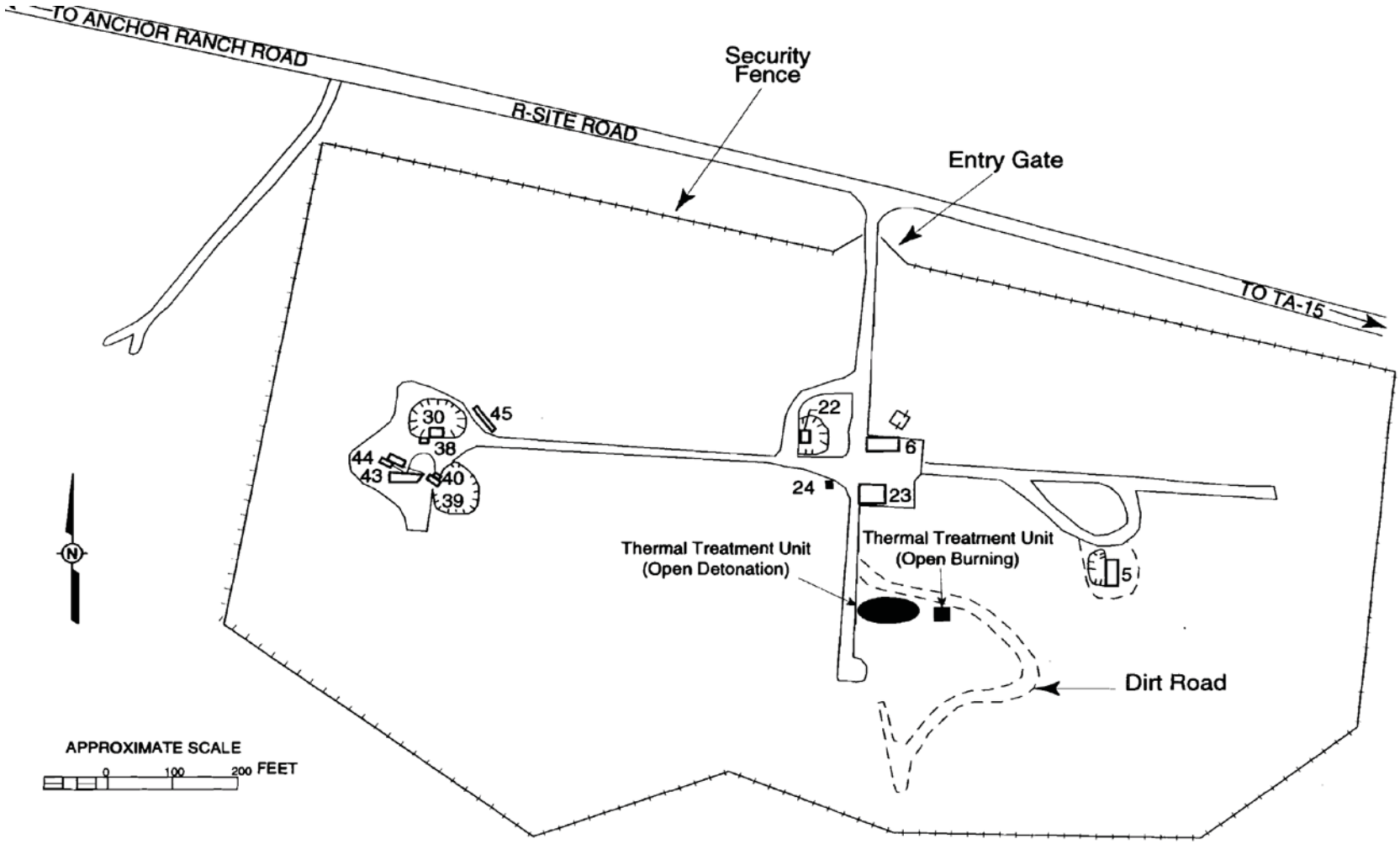

Figure 2. Location and Layout of the TA-14-23 Open Burn and Open Detonation Units

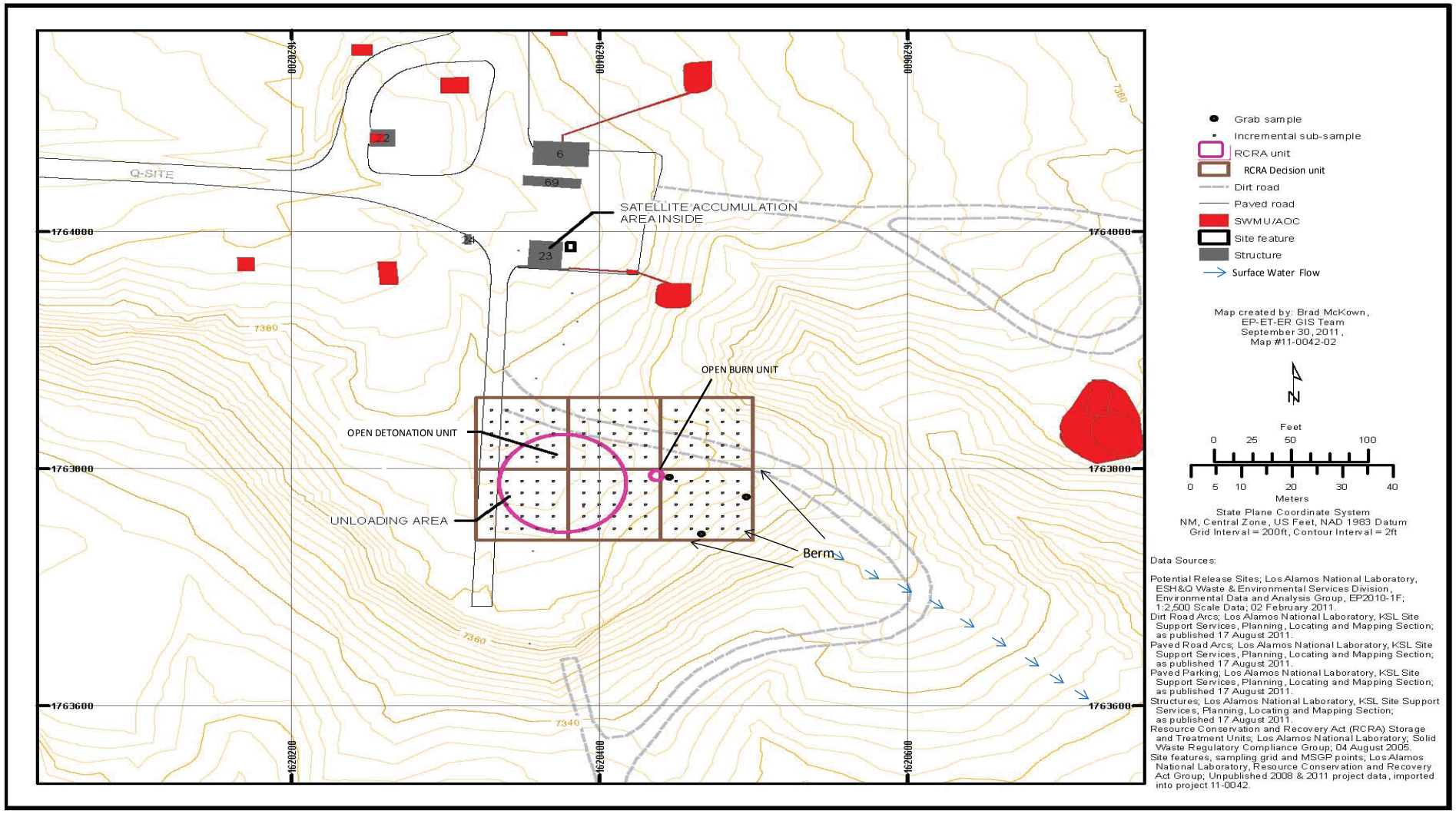

Figure 3. Sampling Locations for Closure of the TA-14-23 Open Burn and Open Detonation Units

Date: June 2013

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.

6/10/13

Alison M. Dorries

Date Signed

Division Leader
Environment Protection Division
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6/10/13

Gene E. Turner

Date Signed

Environmental Permitting Manager
Environmental Projects Office
Los Alamos Field Office
National Nuclear Security Administration

~~February 2012~~June 2013

LA-UR-13-24000~~2-10333~~

Closure Plan

Technical Area 14 Open Burning and Open Detonation Units

(TA-14-23), Revision 2~~1~~.0

Prepared by:

Los Alamos National Laboratory

Table of Contents

List of Tables iv
List of Figures iv
List of Abbreviations and Acronyms v
1.0 INTRODUCTION 1
2.0 DESCRIPTION OF UNITS TO BE CLOSED 1
2.1 Description of the Treatment Units 1
2.2 Description of the Wastes Treated at the Units 2
2.3 Description of Treatments Conducted at the Units 3
3.0 ESTIMATE OF MAXIMUM WASTE TREATED 4
4.0 GENERAL CLOSURE INFORMATION 4
4.1 Closure Performance Standard 4
4.2 Closure Schedule 6
5.0 CLOSURE PROCEDURES 6
5.1 Records Review and Structural Assessment 6
5.1.1 Records Review 6
5.1.2 Structural Assessment 7
5.2 Decontamination and Removal of Structures and Related Equipment 7
5.2.1 Equipment Used During Decontamination Activities 7
6.0 SAMPLING AND ANALYSIS PLAN 8
6.1 Sampling Activities 9
6.2 Sample Collection Procedures 9
6.2.1 Surface Water and Groundwater Sampling 9
6.2.2 Soil Sampling 11
6.2.3 Cleaning of Sampling Equipment 11
6.3 Sample Management Procedures 11
6.3.1 Sample Documentation 11
6.3.1.1 Chain-of-Custody 12
6.3.1.2 Sample Labels and Custody Seals 12
6.3.1.3 Sample Logbook 12
6.3.2 Sample Handling, Preservation, and Storage 13
6.3.3 Packaging and Transportation of Samples 13
6.4 Sample Analysis Requirements 13
6.4.1 Analytical Laboratory Requirements 14

6.4.2 Quality Assurance/Quality Control 14
6.4.2.1 Field Quality Control 14
6.4.2.2 Analytical Laboratory Quality Control Samples 14
6.4.3 Data Reduction, Verification, Validation, and Reporting 14
6.4.4 Data Reporting Requirements 15
7.0 WASTE MANAGEMENT 15
8.0 CLOSURE CERTIFICATION REPORT 15
9.0 REFERENCES 16

List of Tables

Table 1. Schedule for Closure of the TA-14-23 OB/OD Units

Table 2. Hazardous Waste Constituents of Concern at the TA-14-23 OB/OD Units

Table 3. Potential Waste Materials, Waste Types, and Disposal Options

Table 4. Summary of Analytical Methods

Table 5. Sample Containers, Preservation Techniques, and Holding Times

Table 6. Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

List of Figures

Figure 1. Location of Technical Area 14 at Los Alamos National Laboratory

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

List of Acronyms and Abbreviations

40 CFR	Title 40, U.S. Code of Federal Regulations
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	Interim Facility-Wide Groundwater Monitoring Plan
IP	Individual Permit
LANL	Los Alamos National Laboratory
MSGP	Multi-Sector General Permit
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 (the Facility), 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. Closure of the OB/OD units will be completed in accordance with Section 4.1 of this closure plan.

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 solid waste management units (SWMUs) 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 located at the site but not included as part of the OB/OD Units are 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 was used to treat (i.e., open detonate) hazardous explosive waste. Non-treatment-related, experimental test detonations were also performed at TA-14, Q-Site East and will continue to occur at the site.

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 precipitation events, water tends to flow eastward from the site into a tributary of Cañon de Valle. Additionally, best management practices (BMPs) installed 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 TA-14 is 20 pounds of waste per detonation, so only small quantities of high explosives (HE) could have been treated at the unit. Excess explosives included small bulk pieces, initiating devices (detonators/squibs), small quantities of powders, developmental energetic materials, and, potentially, excess propellants from gas guns.

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. These wastes would not routinely contain detonable quantities of explosives, although they may have contained trace quantities of non-hazardous residual HE. Occasionally firing site debris containing reactive explosives may have been generated. If explosive debris was not rendered safe immediately through detonation, the debris was stored in the satellite accumulation area within Building TA-14-23 and was treated as soon as possible.

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. 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 contaminated with HE.

~~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. These wastes would not routinely contain detonable quantities of explosives, although they may have contained trace quantities of non-hazardous residual HE. Occasionally firing site debris containing reactive explosives may have been generated. If explosive debris was not rendered safe immediately through detonation, the debris 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 although, other characteristic (e.g~~.,~~., ignitability, toxicity for barium) and listed wastes (solvents on the explosives-contaminated rags and wipes) hazardous waste codes may have been applied to the wastes.

2.3 Description of Treatments Conducted at the Units

Waste containers for explosives-contaminated waste and explosive material generally consisted 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. When 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 TA09 and TA14 and possibly TA22 and TA40. 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 remained

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 approximately four ounces to one half gallon of volatile hydrocarbons (e.g., kerosene, acetone, fuel oil, or hexane) ~~-~~and igniting the waste. OD of waste was accomplished by using a predetermined amount of explosive as fuel to initiate the detonation of the waste explosive. 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 in effect at that time.

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, ash and possibly 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 and remained in place when the unit was 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 Site Leader determined when it was safe to re-enter the detonation site after treatment events.

Pieces of damaged explosives resulting from misfires, sensitivity experiments, incomplete detonations, or exposure to severe testing were packaged separately from excess explosives or were rendered safe immediately. 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

TA-14-23 OB/OD Units will be closed to meet the following performance standards (40 CFR § 265.111):

- 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 or surface waters, or to the atmosphere; and

- comply with the closure requirements of 40 CFR Part 265 Subparts G and P.

This will be accomplished through one of two methods:

- Ensure that contaminated media do not contain concentrations of hazardous constituents that are greater than the clean-up levels established in the New Mexico Environment Department's (NMED's) *Technical Background Document for Development of Soil Screening Levels* (as updated) (NMED, 2009), and in LANL's *Screening Level Ecological Risk Assessment Methods* (LANL, 2010a) (as updated and approved by the NMED). For soils, the cleanup levels shall be established based on residential use. The owner/operator must also demonstrate that there is not potential to contaminate groundwater; or
- conduct a human health and ecological risk evaluation utilizing the screening levels described above.

If LANL is unable to achieve any one of the risk-based 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;
- control the migration of hazardous waste residues, hazardous constituents, and, as applicable, contaminated media such that they do not pose an unacceptable risk to 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 closure requirements in 40 CFR 265.113(b)(1)(ii)(C) and (2); and

LANL shall demonstrate that the unit does not pose an unacceptable risk by complying with the post closure requirements in 40 CFR 265.117 as well as conduct the following to protect human health and the environment:

- Maintain the integrity and effectiveness of the unit by making repairs necessary to correct the effects of erosion, animal intrusion, or other events that compromise the unit;
- maintain surface water controls to prevent run-on and run-off from eroding or otherwise cause damage;
- conduct corrective action as necessary to protect human health and the environment;
- maintain fencing, security signs and locks;
- maintain training, operating, inspection, and monitoring, and other required records; and
- submit an annual report to the NMED providing the results of the required inspections, sampling results, and a summary of any needed repairs and whether repairs were effective.

Closure of the TA-14-23 OB/OD Units will be deemed complete when: 1) the burn cage has been properly managed as waste; 2) closure has been completed in accordance with the closure

plan and 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. The following section provides the schedule of closure activities (see also Table 1 in this closure plan).

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 in accordance with an approved closure plan may be conducted at any time before or after notification of closure. Upon approval of the modified closure plan, soil sampling and decontamination verification sampling activities will be conducted to demonstrate that the soils at the permitted unit meet the closure performance standards in ~~Permit~~ Section 4.1 of the closure plan~~9.2~~. Submittal of the final closure report and certification will be submitted to the NMED 240 days after initiating closure. In the event that closure of the permitted unit cannot proceed according to schedule, the Facility will notify the NMED in accordance with the extension request requirements in 40 CFR § 265.113.

5.0 CLOSURE PROCEDURES

Closure activities at the units include: a physical review of the units and a review of the units' records; proper management and disposal of hazardous waste residues, if applicable; 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 were reviewed in November 2011 and a structural assessment was conducted on September 12, 2011 to determine if there were any previous finding(s) or action(s) that may influence closure activities or potential sampling locations. Results from the records review and structural assessment are generally mentioned within the following sections and will be discussed in further detail in the closure certification report.

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) has been reviewed with the purpose of determining the following:

1. Confirmation of the specific hazardous waste constituents of concern listed in Table 2;
2. updating the estimated quantity of waste treated in Section 3.0; and
3. identification of additional sampling locations (*e.g.*, locations of spills or chronic conditions) identified in the TA-14-23 OB/OD Units' Operating and Inspection Records.

Based on a thorough review of available records, a determination has been made that there have been no records of any spills or releases, defects, deterioration, damage, or hazards affecting waste containment or treatment during the operational life of the TA-14-23 OB/OD Units.

During the records review process, documentation was discovered that included years from 1988 to the last documented treatment activity in 2003. While quantities were included in the documentation, treatment by either OB or OD was not specified. These records indicate that the quantity of waste treatment was significantly lower than the originally estimated quantity. The original estimated quantity was based on the capacity of the OB/OD units, while the recorded quantity, based on the records found, was approximately 2,536 pounds.

5.1.2 Structural Assessment

The structural assessment was conducted prior to commencing closure activities and was an evaluation of the units' physical condition. The assessment included an inspection of the units for any conditions that indicated a potential for release of hazardous constituents (e.g., deterioration) and any evidence of a release (*e.g.*, stains). Results from the ~~-~~assessment are summarized briefly within this section and will be discussed further in the closure certification report.

During the structural assessment process (September 12, 2011), a visual inspection of the OB/OD units was conducted and a determination was made that there was no visual evidence of spills or debris ~~release of hazardous wastes or hazardous wastes constituents related to the treatment operations~~ at the OB/OD units. Additionally, it was determined that the structures within the area are not included within the boundary of the unit. This assessment has been documented and will be submitted to the NMED as part of the closure report and will include the necessary results, drawings and photographs.

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. 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.

5.2.1 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during decontamination activities will be cleaned with a wash water solution that consists of a surfactant detergent and water mixed in accordance with the manufacturers recommendations. The tools and equipment will be wiped down with the wash water solution and rinsed. Residue and disposable equipment will be containerized, characterized, and managed as waste in accordance with Section 7.0.

~~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 or will not be decontaminated will be containerized and managed as waste in accordance with Section 7.0.~~

6.0 SAMPLING AND ANALYSIS PLAN

This sampling and analysis plan (SAP) identifies the specific sampling and analysis requirements for the TA-14-23 OB/OD Units and 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 Section 6.0 as well as the requirements in Part 11.10.5 and Part 9.4.7.1 of the Permit.

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 will be included in the analysis for soil 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 soil samples. The site plan includes:
   a. Figure 3 depicting the boundaries of the units 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. Three grab soil samples collected at each location identified in Figure 3;
   d. locations of known spills or other releases of hazardous waste or hazardous constituents during operation of the units;
   e. other potential release locations; and
   f. a rationale for the number and locations of samples.
4. The type of samples to be collected (*e.g.*, 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. 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 soils in and around the units 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 and~~;~~ soils in the vicinity of the units.~~; and soils at the storm water discharge point~~.

- 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 grab sample will be collected from soils near the burn pan
- Two additional grab samples will be collected from soils located southeast of the OD Unit.

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 Department of Energy (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 Department of Energy (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.

Two Sites associated with TA-14-23 are permitted to discharge stormwater runoff under 2010 IP, NPDES Permit No. NM0030759 (the Individual Permit). Solid Waste Management Unit (SWMU) 14-006 is the decommissioned HE sump (structure 14-31), associated drain line, and outfall that are located approximately 45 ft east of control building 14-23. Area of Concern (AOC) 14-001(g) is an inactive firing pad (structure 14-35) located south of control building 14-23. Under the 2010 Individual Permit, Sites 14-006 and 14-001(g) are assigned to Permitted Feature No. V012, Site Monitoring Area (SMA) CDV-SMA-6.01. Sites 14-006 and 14-001(g) are both categorized as Moderate Priority Sites, and are subject to the October 31, 2015 deadline for corrective action (if required).

Installation of baseline control measures at CDV-SMA-6.01 was completed on January 12, 2011 and certified on February 11, 2011 (LANL 2011a). The active control measures are listed in the 2012 Individual Permit Annual Report (LANL 2013a) and the 2012 update to the Individual Permit Site Discharge Pollution Prevention Plan (LANL 2013b). The control measures include established vegetation, earthen and base course berms, straw wattles, and S-fences that function as run-on, runoff, erosion, and/or sediment controls. The CDV-SMA-6.02 project map showing the control measure locations is available on LANL's public Individual Permit website (LANL 2011b).

The pollutants of concern to be monitored for each SMA are specified in Appendix B of the Individual Permit. At a minimum, all SMAs must be initially monitored for metals, gross alpha radiation, Ra-226 + Ra-228, and cyanide (weak acid dissociable). The storm water monitoring requirement for CDV-SMA-6.01 also includes high explosives compounds. Baseline confirmation monitoring was initiated in 2011 following control measure certification. However, storm water discharge was not sufficient for full-volume sample collection by the April 30, 2012 deadline. The initial confirmation monitoring period has been extended per the requirements of the Permit, and monitoring was continued during 2012. As of December 31, 2012, storm water discharge has not been sufficient for collection of a confirmation sample. Extended baseline confirmation monitoring will continue until one confirmation sample is collected at CDV-SMA-6.01.

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 2012~~0b~~), 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 0-6 inch depths (soil/tuff interface), from the proposed decision units shown in Figure 3. Soil samples will be collected from each of the 30 sub-sample locations, within each of the six decision units, placed in a stainless steel mixing bowl and mixed thoroughly. The soil samples will then be placed in the proper sample analysis container. 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 for ~~to~~ VOCs analysis; 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. Three additional grab samples will be collected, one near the burn cage and two from locations southeast of the OB/OD treatment units. Grab soil samples will be collected from 0-6 inch depths (soil/tuff interface), from the proposed locations shown in Figure 3.

Soil samples will be collected using a spade, scoop, auger, trowel or other tool as specified in approved methods for the type of analytes to be sampled (EPA, 1986 or EPA, 2002). Samples will be kept ~~at~~ cooled to 4˚C ~~their at depth temperatu~~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 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 with the solution (0.1 molar nitric acid to remove trace metals, if necessary or methanol to remove organic compounds if necessary), ~~-~~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).

Any deviations from the sampling plan will be noted in the sample logbook and reported in the TA-14-23 closure certification report.

6.3.1.1 Chain-of-Custody

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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

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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

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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.

The samples are maintained at appropriate temperatures after collection and throughout the shipping process. All samples are chilled to 2 degrees Celsius before shipment occurs. Samples are then wrapped, placed in the Department of Transportation (DOT) approved shipping container with ample blue ice to hold the required temperature. Temperature blanks are placed in the cooler and sealed with custody tape. Off-site transportation of samples will occur via contract, or common motor carrier, air carrier, or freight. All off-site transportation will be processed through the Facility 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. All shipments are sent overnight delivery. Once received, the analytical laboratory verifies that the custody tape is still intact and measures the temperature of the cooler. All the information is recorded and presented in the analytical data package. For all discrepancies the sender is notified for resolution.~~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. These constituents have been determined to be applicable constituents listed in Appendix VIII of 40 CFR Part 261 and in Appendix IX of 40 CFR Part 264 that were managed or treated at the units over their operational history. This determination has been made through the records review and structural assessment

discussed in Section 5.1. 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.

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

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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

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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;
5. decontamination waste; and
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. As stated in Section 1.0, waste management activities associated with this unit 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.

8.0 CLOSURE CERTIFICATION REPORT

Upon completion of the closure activities at the units, LANL will submit, by registered mail, a closure certification report for NMED review and approval. The closure certification 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 the records review and structural assessment;
- 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 closure certification report to the 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 pursuant to Section 4.1, for the units; and
9. a certification statement of the accuracy of the closure certification 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.

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Table 1

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

Closure Activity	Schedule
Approval of the closure plan by the Department	Day 0
Remove all wastes including hazardous, mixed, and solid waste	No later than Day 90
Conduct records review	Already conducted
Conduct structural assessment	Already conducted
Submit a request to modify the Closure Plan and the records review and structural assessment report	Already conducted
Submit final closure certification report 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 the closure plan is approved. 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
high explosives 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, hexane
Other constituents of concern		Dioxans/Furans, Perchlorates, kerosene, cyanide, nitrates

[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~~ hazardous 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.
	~~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-hazardous solid waste~~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-hazardous solid waste~~Non-regulated solid waste~~	Subtitle D landfill
	Hazardous waste	Waste will be treated to remove explosives and recycled or treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~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-hazardous solid waste~~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.
	~~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-hazardous solid	Subtitle D landfill

Potential Waste Materials	Waste Types	Disposal Options
	waste~~Non-regulated solid waste~~	
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	~~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-hazardous solid waste~~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.
	~~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-hazardous solid waste~~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.
	~~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]	Analytical Technique	Estimated Quantitation Limits [b] (mg/kg)	Rationale
Metal Analysis				
Aluminum	6010B	ICP-AES	20	Determine the environmentally available metal concentration in the soil samples following strong acid digestion.
Antimony	6010B	ICP-AES	0.03	
Arsenic	6020	ICP-MS	1.5	
Barium	6010B	ICP-AES	0.5	
Beryllium	6020	ICP-MS	0.1	
Cadmium	6010B	ICP-AES	0.03	
Calcium	6010B	ICP-AES	30	
Chromium	6010B	ICP-AES	0.5	
Cobalt	6010B	ICP-AES	0.5	
Copper	6010B	ICP-AES	1	
Iron	6010B	ICP-AES	30	
Lead	6010B	ICP-AES	1	
Magnesium	6010B	ICP-AES	50	
Manganese	6010B	ICP-AES	1.0	
Mercury	7471A	CVAA	0.01	
Nickel	6020	ICP-MS	0.4	
Potassium	6010B	ICP-AES	30	
Selenium	6020	ICP-AES	1.5	
Silver	6020	ICP-MS	0.01	
Sodium	6010B	ICP-AES	20	
Thallium	6020	ICP-MS	0.2	
Vanadium	6010B	ICP-AES	0.5	
Zinc	6010B	ICP-AES	1	
Organic Analysis				
VOCs	8260B	GC/MS	0.001 to 0.005	Determine the solvent-extractable VOCs concentration in the soil samples.
SVOCs	8270C	GC/MS	0.033 to 0.33	Determine the solvent-extractable SVOCs concentration in the soil samples.
Other Analysis				
Dioxins/Furans	8290	HRGC/MS	0.00001 to 0.0003	Determine the solvent extractable dioxin/furan concentration in the soil samples.
Perchlorate [ClO_4^-]	6850	HPLC/ESI/MS	0.002 mg/kg	Determine the water-soluble [ClO_4^-] concentration in the soil samples.

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Analyte	EPA *SW-846* Analytical Method[a]	Analytical Technique	Estimated Quantitation Limits [b] (mg/kg)	Rationale
High Explosives	8321A [c]	HPLC/TS/MS	0.5 to 2.0	Determine the solvent-extractable high explosives concentrations in the samples.
Cyanide	9010, 9012	Titration, Colorimetric	0.1 mg/kg, 0.02 mg/kg	Determine cyanide concentration
Diesel range organics	8015	GC/FID	0.7 mg/kg to 6.3 mg/kg	Determine the solvent-extractable SVOCs concentration in the soil 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.

[c] Instrumentation published in Method SW-846-8321A can be used to identify the required analytes that would not be detected using Method SW-846-8330, thus a LANL-specific modification is used for Method SW-846-8321A to analyze for explosives compounds.

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

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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~~ Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon-Lined Septa	~~Aqueous Media: HCl to pH<2 Cool to 4 °C~~ Solid Media Cool to 4 °C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	14 days
Semi-Volatile Organic Compounds			
Target Compound Semi-volatile Organic Compounds	~~Aqueous Media: Four 1-L Amber Glass with Teflon-Lined Lid~~ Solid Media: 250-mL Glass	~~Aqueous Media: Cool to 4 °C~~ Solid Media: Cool to 4 °C	Seven days from field collection to preparative extraction. 40 days from preparative extraction to determinative analysis.
Other Analysis			
Dioxins/Furans	2 - 125 mL Glass	Solid Media: Cool to 4 °C	30 days
Perchlorate [ClO_4^-]	250 - mL polyethylene	Solid Media: Protect from temperature extremes	28 days

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High Explosives	500 – mL Amber Glass	Solid Media: Cool to 4 °C	14 days
Cyanide	Polyethylene glass	Cool, 4°C	12 days

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[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

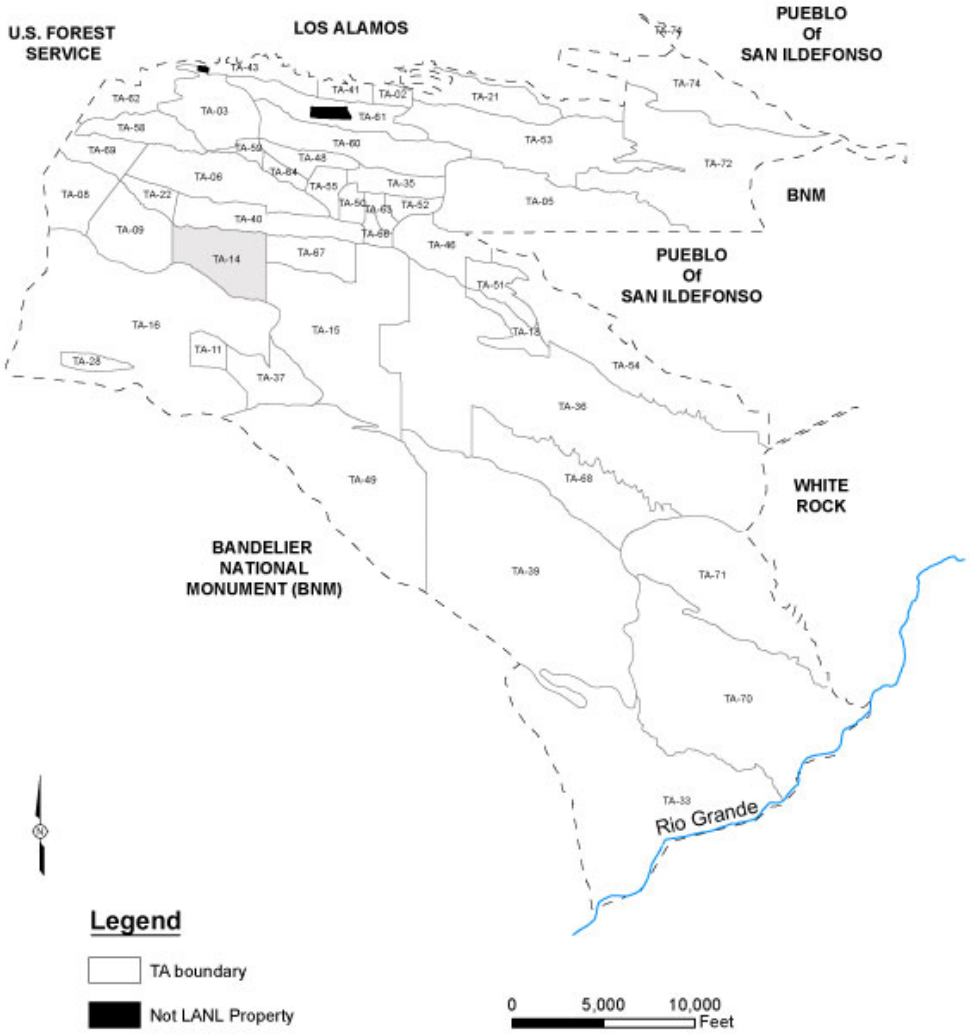

Figure 1

Location of Technical Area 14 at Los Alamos National Laboratory

Created by EP-WES-EDA GIS TEAM. Map Number 06-0108 November 13, 2008
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 | 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 In and Around the Los Alamos National Laboratory; Los Alamos National Laboratory, SSMO Site Planning & Project Initiation; 04 June 2008

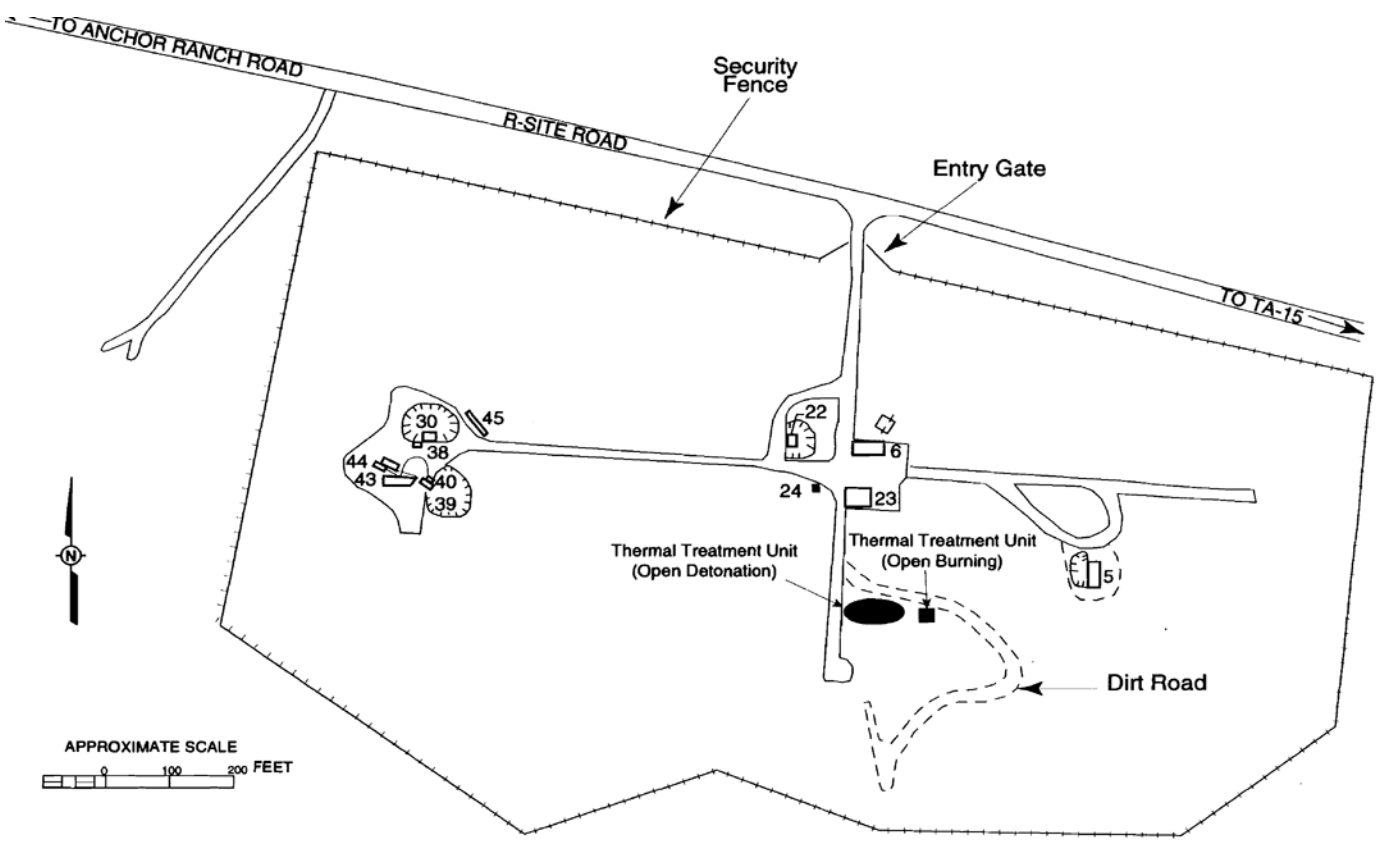

Figure 2. Location and Layout of the TA-14-23 Open Burn and Open Detonation Units

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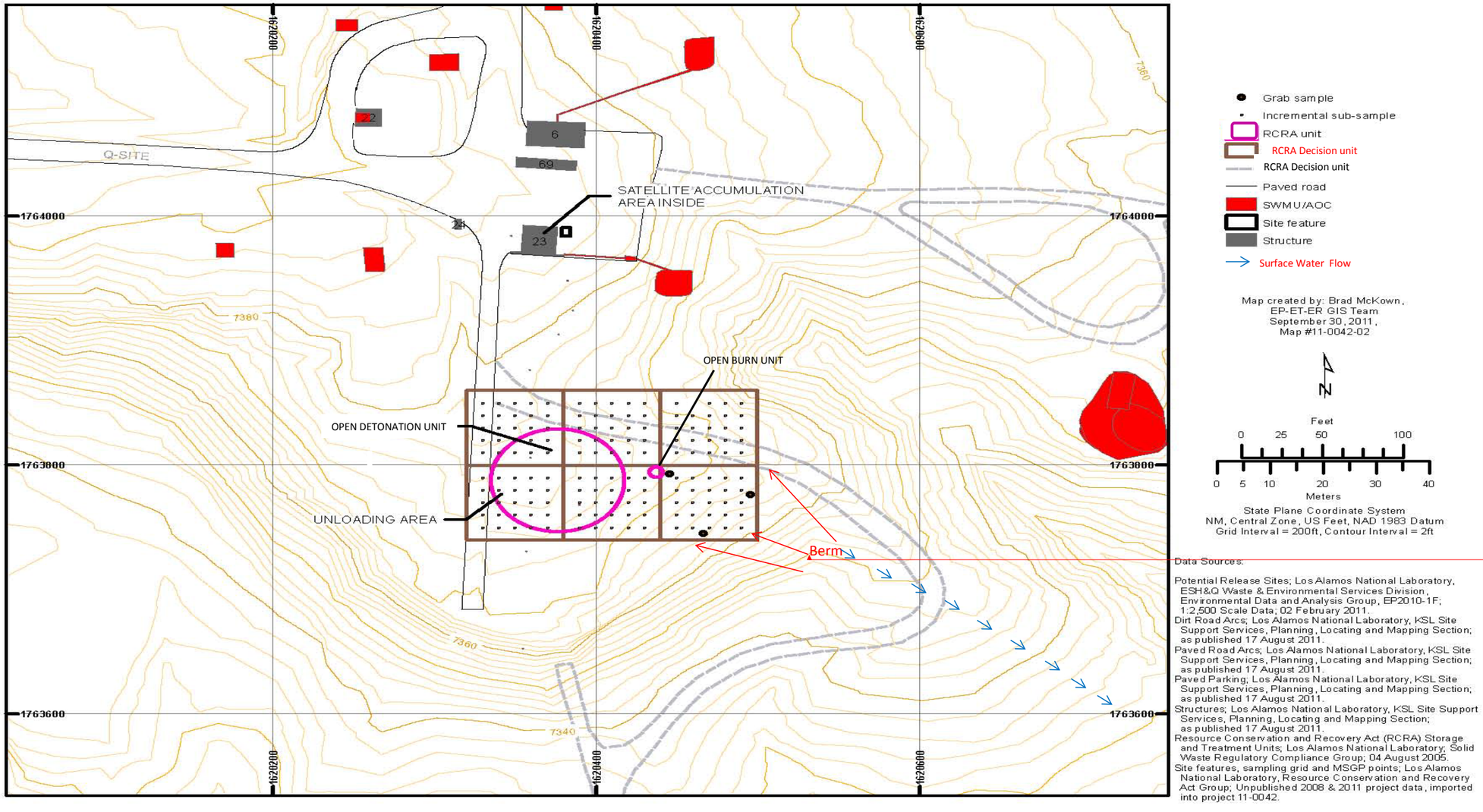

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Figure 3. Sampling Locations for Closure of the TA-14-23 Open Burn and Open Detonation Units

Date: June 2013~~February 2012~~

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.

Alison M. Dorries **Date Signed**

Division Leader
Environment Protection Division
Los Alamos National Laboratory

Gene E. Turner **Date Signed**

Environmental Permitting Manager
Environmental Projects Office
Los Alamos Field~~Site~~ Office
National Nuclear Security Administration

Date: June 2013~~February 2012~~

INTERNAL CERTIFICATION

WEAPONS EXPERIMENTS DIVISION

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 concerning the open burn/open detonation unit at Technical Area 14-23. 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.

Peter Dickson **Date Signed**

Group Leader
Explosive Applications and Special Projects Group Weapons Experiments Division
Los Alamos National Laboratory

David J. Funk **Date Signed**

Division Director
Weapons Experiments Division
Los Alamos National Laboratory
Operator

Date: June 2013~~February 2012~~

INTERNAL CERTIFICATION

ENVIRONMENTAL PROTECTION DIVISION

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.

~~Anthony R. Grieggs~~Jody A. Armijo	**Date Signed**
Acting Group Leader Waste Management Programs Waste Management Division Los Alamos National Laboratory ~~Water Quality and RCRA Group~~ ~~Environmental Protection Division~~ ~~Los Alamos National Laboratory~~	