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LIST OF ABBREVIATIONS/ACRONYMS

20.4.1 NMAC	New Mexico Administrative Code, Title 20, Chapter 4, Part 1
°C	degrees Celsius
D&D	decontamination and decommissioning
DOE/NNSA	U.S. Department of Energy, National Nuclear Security Administration
DX	Dynamic Experimentation
EPA	U.S. Environmental Protection Agency
ER	environmental restoration
ESA	Engineering Sciences and Applications Division
ESL	Environmental Screening Level
ft	feet/foot
HE	high explosives
HEWTF	High Explosives Wastewater Treatment Facility
HMX	cyclotetramethylenetetranitramine
in.	inch(es)
LANL	Los Alamos National Laboratory
LASO	Los Alamos Site Office
lb	pound(s)
LDR	Land Disposal Restrictions
NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
OB	open burning
PCB	polychlorinated biphenyls
PETN	pentaerythrioltetranitrate
PPE	personal protective equipment
QA	quality assurance
QC	quality control
R&D	research and development
RCRA	Resource Conservation and Recovery Act
RDX	cyclotrimethylenetrinitramine
SSL	Soil Screening Level

LIST OF ABBREVIATIONS/ACRONYMS (Continued)

SOP	standard operating procedure
SVOC	semivolatile organic compound
SWRC	Solid Waste Regulatory Compliance Group
TA	Technical Area
TC	toxicity characteristic
Tetryl	2,4,6-Trinitrophenylmethylnitramin
TNT	2,4,6-trinitrotoluene
VOC	volatile organic compound
WAC	Waste acceptance criteria

1.0 INTRODUCTION

The New Mexico Environment Department (NMED), the University of California at Los Alamos National Laboratory (LANL), and the U.S. Department of Energy, National Nuclear Security Administration (DOE/NNSA) have a joint goal to reduce the number of permitted treatment units at LANL. LANL's Engineering Sciences and Applications (ESA) Division has determined that thermal treatment of wet high explosives (HE) at two structures within the Technical Area (TA) 16 Burn Ground will be performed at another treatment structure (the TA-16-388 Flash Pad) at the Burn Ground. The two structures to be closed, the TA-16-401 and TA-16-406 Sand Filters, hereinafter referred to as *the sand filters*, filter wastewater from HE operations before it is treated at the TA-16 High Explosives Wastewater Treatment Facility (HEWTF). The sand filters are included in LANL's National Pollutant Discharge Elimination System (NPDES) Permit Number NM0028355. The surface of each filter is also used as a "burn tray" to thermally treat wet HE. Therefore, the sand filters have also been included in the "Los Alamos National Laboratory General Part A Permit Application," (LANL, 1998) and subsequent revisions, as open burning (OB) units regulated under the Resource Conservation and Recovery Act (RCRA).

When OB operations are discontinued at the sand filters, the structures will not be removed because they are needed as NPDES-permitted wastewater pre-treatment units for the HEWTF. In this plan, LANL has proposed a method of closure that will meet the RCRA closure performance standards while preserving the sand filters for continued use for wastewater treatment. The activities described in this closure plan are intended to meet the closure requirements of the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20.4.1 NMAC), Subpart VI, Part 265, Subparts G and P [6-14-00].

2.0 GENERAL CLOSURE INFORMATION [20.4.1 NMAC, SUBPART VI, PART 265, SUBPART G]

This section was prepared in accordance with the requirements of 20.4.1 NMAC, Subpart IV, Part 265, Subparts G and P, as applicable. Until closure is complete and has been certified in accordance with 20.4.1 NMAC, Subpart VI, § 265.115 [6-14-00], a copy of the approved closure plan and any approved revisions will be on file at LANL's Solid Waste Regulatory Compliance Group (SWRC) and at the DOE/NNSA Los Alamos Site Office (LASO).

2.1 Closure Performance Standard [20.4.1 NMAC § 265.111]

The sand filters will be closed to meet the following performance standards:

- Minimize the need for further maintenance;
- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or atmosphere; and
- Comply with 20.4.1 NMAC § 265.381 [6-14-00] for thermal treatment structures during the closure of the sand filters.

These standards will be met by performing the closure activities (as described in Section 5.0), which include removing wastes and residues associated with thermal treatment, as well as any components associated with thermal treatment. These consist of ash (if present) on the surface of the sand filters, the firebrick lining the filters, and the blowers that dry HE prior to OB. The sand and gravel filter media will be removed temporarily so that the integrity of each steel vessel can be determined before it is placed back in service as a NPDES-permitted treatment structure. Any soil or tuff contaminated as a result of leakage from the sand filters will be characterized, removed, and properly treated and disposed of, as described in Section 5.0. All wastes generated during closure operations will be decontaminated or otherwise treated, recycled, and/or disposed of properly. Closure will be complete when the closure performance standards have been met, closure certification has been submitted to the Secretary of the NMED (see Section 2.6), and the NMED has approved the closure.

2.2 Partial and Final Closure [20.4.1 NMAC §§ 265.112(b) and 265.112(d)]

This closure plan implements partial closure (referred to as *closure* within this plan), rather than closure of the entire LANL facility. For these purposes, closure will consist of closing the RCRA-treatment portion of the sand filters while leaving other RCRA-regulated hazardous waste management units at the TA-16 Burn Ground and at LANL in service. Final closure will occur when LANL's remaining RCRA-regulated hazardous waste management units have been closed. Because of the ongoing nature of waste management operations at TA-16, security and administrative controls will be maintained by the DOE/NNSA or another authorized federal agency for as long as necessary to prohibit public access. Security and/or administrative fences in the vicinity of the sand filters will be maintained to ensure that public access is prevented.

2.3 Closure Schedule [20.4.1 NMAC §§ 265.112(b), 264.112(d)(2) and 265.113]

Once NMED approves the closure plan, closure activities will begin, according to the requirements of 20.4.1 NMAC § 265.112(d)(2) [6-14-00]. Activities will follow the estimated schedule presented in Table 1. All hazardous wastes (such as surface ash and firebrick) will be removed from the sand filters within 90 days of closure plan approval, and closure activities and reporting requirements will then be completed within 180 days of closure plan approval, as required by 20.4.1 NMAC § 265.113(a) and (b) [6-14-00]. In the event that closure is delayed, LANL will notify the Secretary of the NMED in accordance with the extension request requirements of 20.4.1 NMAC § 265.113(b) [6-14-00]. In addition, the demonstrations in 20.4.1 NMAC § 265.113(a)(1) and (b)(1) [6-14-00] will be made in accordance with 20.4.1 NMAC § 265.113(c) [6-14-00].

2.4 Amendment of the Closure Plan [20.4.1 NMAC § 265.112(c)]

In accordance with 20.4.1 NMAC § 265.112(c) [6-14-00], LANL will submit a written request to NMED for authorizing a change in the approved closure plan whenever:

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

LANL will submit the written request, along with a copy of the amended closure plan, to the Secretary of the NMED for approval. Submittal of the request will occur at least 60 days prior to the proposed change in design or operation, and no later than 60 days after an occurrence of an unexpected event that affects the closure plan. If the unexpected event occurs during the closure, the request will be submitted within 30 days of the occurrence. If the Secretary of the NMED requests a modification of the approved closure plan, a plan modification (in accordance with the request) will be submitted within 60 days of notification or within 30 days of notification if a change in facility condition occurs during the closure process.

2.5 Closure Cost Estimate, Financial Assurance, and Liability Requirements [20.4.1 NMAC §§ 265.112(b) and 265.140(c)]

In accordance with 20.4.1 NMAC § 265.140(c), LANL, as a federal facility, is exempt from the requirements of 20.4.1 NMAC, Subpart VI, Part 265, Subpart H [6-14-00], to provide a cost estimate, financial assurance mechanisms, and liability insurance for closure actions.

2.6 Closure Certification [20.4.1 NMAC § 265.115]

Within 60 days after completing RCRA closure activities for the sand filters, LANL will submit to the Secretary of the NMED, via certified mail, a certification that the sand filters have been closed in accordance with the specifications of the approved closure plan. The certification will be signed by the appropriate DOE/NNSA and LANL officials and by an independent, registered professional engineer, in accordance with 20.4.1 NMAC § 265.115 [6-14-00]. A copy of the closure report containing documentation that supports the independent, registered professional engineer's certification will also be furnished to the Secretary of the NMED. Copies of the certification and supporting documentation will be maintained by both DOE/NNSA LASO and SWRC.

2.7 Closure Report [20.4.1 NMAC § 265.115]

Upon completion of RCRA closure activities for the sand filters, a closure report will be prepared and provided to the Secretary of the NMED. The report will document the closure and contain the following items:

- The certification described in Section 2.6,
- A general summary of closure activities,
- Any significant variance from the approved closure plan and the reason for the variance,
- A summary of all sampling data associated with the closure,
- The location of the file of supporting documentation (e.g., memos, logbooks, laboratory sample analysis data),
- Storage or disposal location of any regulated hazardous wastes resulting from closure activities, and
- A certification of the report's accuracy.

2.8 Survey Plat and Post-Closure Requirements [20.4.1 NMAC § 265.116, §§ 265.117 through 265.120]

As part of closure, LANL will empty and inspect the steel vessels to determine whether these units released hazardous waste or hazardous waste constituents to the environment. If the structural integrity of the steel vessels has been compromised, the vessels will either be repaired or removed. Samples of impacted soil/tuff potentially contaminated by leaks will be collected for analysis. If the contaminant levels in soil/tuff exceed the appropriate NMED Soil Screening Levels (SSLs) (NMED, 2000) and/or the LANL Ecological Screening Levels (ESLs) (LANL, 1999), the soil/tuff will be removed. If the steel vessels are intact or repaired, the sand, gravel, and filter vessels will continue to function as pre-treatment filters for the HEWTF regulated under LANL's NPDES permit. However, the firebrick and blowers will be removed to render the structures unusable for OB. Additionally, LANL will decontaminate all the equipment used during closure activities; any equipment that remains contaminated after the decontamination process will be managed and disposed of properly. No temporary structures will be constructed at the site. Legacy contamination in the surrounding soil/tuff will be addressed as part of future TA-16 Burn Ground corrective action activities, which include investigation, characterization, assessments, and potential remediation. Therefore, the requirements for filing a survey plat and notification of restriction on post-closure care are not applicable to the RCRA closure of these sand filters.

3.0 DESCRIPTIONS OF THE TA-16 OB UNITS

3.1 Structures Description

The sand filters are located within an area referred to as the TA-16 Burn Ground. Figure 1 shows the location of TA-16 at LANL and Figure 2 shows the location of the Burn Ground and sand filters at TA-16. The sand filters are contained in ¾-inch (in.) steel funnel-shaped vessels that are 8 feet (ft), 9 in. in diameter and approximately 4 ft high. About half of each vessel is below ground level (see Figure 3). The base of each vessel is welded to underground pipes leading to the HEWTF's manhole tank. The vessels are filled with gravel at the bottom and topped with sand. The steel vessels are lined with firebrick to protect the steel during OB operations. Wastewater from HE operations is collected in sumps, and then pumped into a truck and transported to the sand filters. The flow rate through the sand filters is typically several gallons per minute, and it generally takes a day to unload a full tank truck into the filters.

Two types of wastewater are pre-treated within the sand filters. The first type is wastewater with low levels of HE, which is generated during HE processing (e.g., washing down of machining or pressing bays), from cleanup activities of HE-contaminated materials (such as steam-cleaning contaminated equipment), and other processes. The second type is HE saturated with water (e.g., filters from the HE-machining facility or HE that has been collected during environmental restoration [ER] activities and stored in water for safety reasons). As the wastewater percolates through the sand and gravel, the solids are removed and the filtered wastewater is piped to the HEWTF's manhole tank. Large particles of wet HE remain on the surface of the sand filters and must be dried before burning. When OB operations were conducted at the sand filters, a heavy steel lid was placed over the filter and the HE was dried with heated forced air for 4 or 5 days. After burning, any ash and the top layer of sand was removed, characterized, and disposed of properly.

OB operations on the surfaces of the sand filters have been conducted in accordance with 20.4.1 NMAC, Subpart VI, Part 265, Subpart P requirements. However, as stated in Section 1.0, the wastewater treatment activities and the sand filters themselves are regulated under LANL's NPDES permit (Permit Number NM0028355) and operate in accordance with the conditions prescribed in the NPDES permit. LANL will cease OB treatment on the surface of the sand

filters while leaving them in place after RCRA closure to function as NPDES-permitted units. Wet HE burning operations will be transferred to the TA-16-388 Flash Pad, where the wet HE will be simultaneously dried and burned using the propane burners at that unit. Wastewater containing small amounts of HE will continue to be filtered at the sand filters and any HE residue on the filters will be transported to TA-16-388 for drying and burning.

Current operations at the sand filters have little environmental impact. All wastewater passes first through the sand filters and then into activated carbon filters at the HEWTF. The treated wastewater must meet water quality standards before discharge into the environment. The burning of HE also has low impacts because HE burns very energetically and has low air emissions (U.S. Environmental Protection Agency [EPA], 1998). The slow transfer rates from the trucks to the sand filters ensure that they do not overflow; standing water could destroy the integrity of the filter layers. As a result, there have been no spills from the filters that have contaminated the surrounding soil. However, contamination exists around the sand filters from discontinued operations at the Basket Wash Facility, TA-16-390. The sand filters are located in an area where filter beds received HE-contaminated wash water from the Basket Wash Facility, which operated from 1951 to 1966. HE- and solvent-contaminated wash water was conveyed to filter beds in open troughs. Trough overflows contaminated areas upgradient of the sand filters. After filtering through sand in the filter beds, the water drained through pipes into a ditch that led to an adjacent outfall area southwest of the filter beds. These contaminated areas (see Figure 4) are listed in Table A of the Hazardous and Solid Waste Amendments Module of LANL's current Hazardous Waste Facility Permit. They will be investigated, characterized, assessed (including human health and ecological assessments), and remediated, as necessary, as part of future corrective action activities at the TA-16 Burn Ground.

LANL will remove the contents of the sand filters to inspect the underground portion of the steel vessels for corrosion (the aboveground portion is inspected weekly to ensure there is no leakage) as part of LANL's ongoing program under NPDES to ensure the wastewater treatment units are functioning properly. If the vessels are intact or if any detected leaks can be repaired, the sand and gravel will be returned to the vessels so that they can be used as NPDES-permitted wastewater pre-treatment filters. The underground pipes from the sand filters to the HEWTF are also part of the NPDES-permitted wastewater treatment unit. They are periodically inspected using remotely operated video cameras. Because an inspection was conducted in April 2002 and

the piping was found to be intact, another inspection of the underground pipes is not proposed as part of this plan.

3.2 Description of Waste and Estimate of Maximum Inventory of Hazardous Waste [20.4.1 NMAC § 265.112(b)]

At LANL, HE wastes and HE-contaminated wastes are generated primarily at TA-9 and TA-16 from HE research and development (R&D), HE production, and decontamination and decommissioning (D&D) activities. These waste streams include homogeneous and heterogeneous wastes. They are described in the "Waste Analysis Plan" included in LANL's "Response to Notice of Deficiency: General Part A, April 1998, Revision 0.0; General Part B, October 1998, Revision 1.0; RCRA Permit Applications, Los Alamos National Laboratory, EPA ID # NM0890010515" (LANL, 2002). The following waste streams have been treated at the sand filters:

- Non-radioactive HE-contaminated water that may contain trace solvents and/or regulated hazardous metals from laboratory analysis; HE processing; ER, R&D, and D&D activities; drilling activities; and maintenance activities.
- Non-radioactive wet HE consisting of HE-machining chips, ER and D&D wastes, sludges, spent activated carbon, filters, and filter solids that result primarily from filtration of HE wastewater; ER, R&D, and D&D activities; and HE processing.

The maximum total capacity of hazardous waste that could be treated at each sand filter is 1,000 pounds (lb) of HE per burn. This process design capacity was specified in the "Los Alamos National Laboratory General Part A Permit Application," Revision 0.0 (LANL, 1998) and subsequent revisions. An estimate of the total maximum inventory of hazardous waste treated during the active life (1980 to present) of the TA-16-401 Sand Filter is 109,600 lb. An estimate of the total maximum inventory of hazardous waste treated over the active life (1980 to present) of the TA-16-406 Sand Filter is 97,500 lb.

4.0 SAMPLING AND ANALYSIS PROCEDURES [20.4.1 NMAC § 265.112(b)]

Established sampling and analysis procedures will be followed to ensure that samples are collected and analyzed using suitable methods and that samples are handled and transported correctly. Procedures will also ensure that proper quality assurance (QA) is conducted and appropriate records are kept.

4.1 Sample Collection

The types, locations, and quantities of samples to be collected are described in Section 5.0. These samples will be collected using the LANL standard operating procedures (SOP) referenced in Table 2. The types of media that may require sampling are sand and gravel, soil and tuff, and decontamination wastewater. The referenced sampling techniques assume that HE levels are low. Should areas of high concentrations of HE be found, these methods will be modified to ensure that workers are protected from the risk of explosion. Samples will not be taken from some materials, such as the blowers. Instead, these materials will tested using the Dynamic Experimentation (DX)-2 HE Spot Test at locations where HE may have collected (e.g., joints, seams, and the bottoms of pipes). If the Spot Test is positive, the material will be flashed.

4.2 Sample Management Procedures

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

4.2.1 Chain-of-Custody

A sample chain-of-custody form will be maintained by sampling personnel until the samples are relinquished to the analytical laboratory. The sample collector will be responsible for the integrity of the samples collected until transferred to another person. The sample collector will

document all pertinent sample collection data. Individuals relinquishing or receiving custody of the samples will sign, date, and note the time on the analysis request/chain-of-custody form. A chain-of-custody form will accompany the sample containers or coolers, including transport to the analytical laboratory.

4.2.2 Sample Documentation

Sampling personnel will complete and maintain records to document sampling and analysis activities. Sample documentation will include sample identification numbers, sample container labels and custody seals, chain-of-custody forms, analysis request forms, locations of sample logbooks detailing sample collection activities, and shipping forms, as necessary.

All pertinent information on the sampling effort will be recorded in a logbook. The sample logbook will include the following types of information:

- Date and time of sample collection
- The project name
- The project location
- The collector's name
- Possible sample hazards
- Sample identification number and a sketch or description of the sample location
- Volume/mass of sample taken
- Type of analysis for each sample
- Date and time of collection
- Observations, such as weather conditions, if any
- Sample history (e.g., media such as soil).

4.2.3 Sample Handling, Preservation, Storage, and Transportation

Samples will be collected and containerized in appropriate pre-cleaned sample containers. Table 3 presents the requirements for sample containers and preservation techniques. Samples that require cooling to 4 degrees Celsius (°C) will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection and during transport. All packaging and transportation activities will meet all relevant local, state, and federal laws and internal LANL requirements.

4.3 Analytical Requirements

The analytical techniques used depend on whether the sample is taken to characterize waste or to determine whether environmental media should be removed, as described in Section 4.3.1. Analytical laboratory requirements and QA/quality control (QC) procedures are discussed in Sections 4.3.2 and 4.3.3, respectively.

4.3.1 Proposed Analytical Methods

The types of samples to be collected are described in Section 5.0. The selection of the analytical testing methods identified in Table 4 is based on whether samples are taken to characterize waste or to determine whether contaminated environmental media must be removed. If samples are taken to characterize waste, they will be analyzed for volatile organic compounds (VOC), semivolatile organic compounds (SVOC), and toxicity characteristic (TC) metals and organics by the methods listed in Table 4. If the samples are taken to determine whether environmental media must be removed, they will be analyzed for total metals and organics so that they can be compared to the SSLs and ESLs shown in Table 5. Only solids will be analyzed for the SSL/ESL comparisons, while both liquids and solids may require analysis for waste characterization purposes. The samples will also be initially analyzed using the DX-2 HE Spot Test, a method used to detect the presence of HE at low parts-per-million levels. If the Spot Test is positive (i.e., HE is present), the samples will be submitted to an off-site laboratory for HE analysis using the methods described in Table 4.

Constituents of concern that would be characteristic of leaks from the sand filters are presented with their respective SSLs and ESLs in Table 5. Except for HE and barium, which is present in legacy explosives formulations, all of the constituents are present in the incoming wastewater in very low (parts-per-million) concentrations. The predominant types of HE treated at the sand filters are 2,4,6-trinitrotoluene (TNT), cyclotetramethylenetetranitramine (HMX), and cyclotrimethylenetrinitramine (RDX). Other explosives, such as pentaerythrioltetranitrate (PETN), listed in Table 5 would be expected only in trace amounts. Nitrocellulose would be present as a constituent of HE binders. Several other chemicals (e.g., 2,4-dinitrotoluene and 2,6-dinitrotoluene) are included in Table 5 because they are associated with HE. Polychlorinated biphenyls (PCB) are included in Table 5 to cover the possibility that traces of PCB-contaminated oils may have been treated at the sand filters. Table 5 is intended to represent the most likely

constituents; however, samples will also be analyzed for the wide variety of VOCs and SVOCs in accordance with Table 4. If other chemicals are detected above soil background levels, they will also be compared to their SSLs and ESLs, as described in Section 5.5.

4.3.2 Analytical Laboratory Requirements

The analytical laboratory will perform the detailed qualitative and quantitative chemical analyses specified in Table 4, as needed. Analytical laboratories will have undergone audits by LANL to ensure that they 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.

4.3.3 Quality Assurance/Quality Control

Field sampling procedures and laboratory analyses will be evaluated through the use of QA/QC samples to assess the overall quality of the data produced. The types of field QC samples that will be collected include trip blanks, field blanks, and field duplicates, as appropriate. Table 6 presents a summary of QC sample types, analysis, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples.

Analytical data generated as a result of the activities described in this closure plan will be verified and validated by the analytical laboratory. Data reduction will involve 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. At a minimum, analytical reports will include: a listing of each analyte; the analytical result for each analyte; units; the dilution factor, if any; the detection limit; and any laboratory-assigned qualifiers or codes. The results from QC samples such as blanks, spikes, calibrations, and reference to standard methods will also be included.

5.0 CLOSURE PROCEDURES FOR THE TA-16-401 AND TA-16-406 SAND FILTERS [20.4.1 NMAC § 265.112(B)]

Closure activities will consist of:

1. Removing any ash, if present, from the sand filters and characterizing and properly disposing of the ash,;
2. Removing the firebrick and either reusing it in another TA-16 Burn Ground structure or, if it cannot be reused, properly treating, characterizing, and disposing of the firebrick;
3. Removing, decontaminating as necessary, and recycling the metal blowers;
4. Removing the sand and gravel from the steel vessels;
5. Inspecting the interiors of the steel vessels for structural integrity to determine if leaks have occurred;
6. If necessary, assessing the extent of repairs required and repairing or removing the steel vessels;
7. If leaks have occurred, assessing the extent and level of soil/tuff contamination and removing soil/tuff, if necessary;
8. Placing the sand and gravel filter media back into the steel vessels if no leaks are found or if leaks are repaired;
9. Restoring the site, if soil/tuff has been removed; and
10. Decontaminating and/or disposing of contaminated equipment, structures, and soils.

If the steel vessels have not leaked, only Steps 1-5 and 8 will be conducted and the area directly upslope of the sand filters will be bermed to prevent run-on of legacy contaminants. ESA-authorized HE personnel will follow TA-16 Burn Ground procedures to conduct Steps 1-5 and 8. Non-ESA workers needed to complete Steps 6-9, if performed, will operate under a worker protection plan to be developed as part of this project. Personnel will wear appropriate personal protective equipment (PPE), specified by an ESA-Facilities Management industrial hygienist or the Industrial Hygiene and Safety Group, and will follow good hygiene practices to protect themselves from exposure to hazards. Generally, activities at the sand filters have required PPE consisting of coveralls, steel-toed/composite-toed shoes, and safety glasses because the quantities of chemicals in the wastewater are very low. The level of PPE may change if unanticipated types or levels of chemicals are found (e.g., pieces of HE from legacy operations). Hard hats will be

worn if an overhead danger is present.. Workers will have appropriate training, including Hazardous Waste Operations and Emergency Response Training for general site workers (24-hour and 8-hour refresher) and HE Access Area site-specific training The elements of closure are presented in Sections 5.1 through 5.7.

5.1 Sand, Gravel, and Firebrick Components Removal, Segregation, Treatment, and/or Disposal

Before the interior of the steel vessels is inspected, the sand, gravel, and firebrick components of each sand filter will be removed and segregated using a combination of hand and possibly mechanized methods. After removal and segregation, the sand and gravel will be placed on bermed liners or in appropriate containers, which may include covered dumpsters or roll-off bins.

Because OB will no longer be conducted at the sand filters, the firebrick is no longer needed to protect the integrity of the filters and will be removed. If the firebrick can be reused (i.e., it is not too friable for reuse or damaged during removal), it will be used at the TA-16-388 Flash Pad and/or the TA-16-399 HE Burn Tray. This reduces the amount of waste generated during closure and helps to achieve LANL's waste minimization goals. However, if the firebrick must be disposed and is determined to have high enough levels of HE contamination to be reactive, it will be flashed at TA-16-388 or steam cleaned at TA-16-400 before shipment to an off-site treatment, storage, or disposal facility. If the firebrick must be disposed of, a sample of the firebrick will be collected in accordance with LANL-ER-SOP-6.28, "Chip Sampling of Porous Surfaces," and submitted for Toxicity Characteristic Leaching Procedure metals analysis using the methods shown in Table 4. The firebrick will be staged in a less-than-90-day storage area, pending analysis. Depending on the analytical results, LANL may request a determination that the firebricks [i.e., "debris" as defined in 20.4.1 NMAC § 268.2(g)] are no longer contaminated with hazardous waste, as allowed by the "Contained-In Rule" [see 20.4.1 NMAC § 261.3(f)(2)].

If the integrity of the steel vessels is found to be unacceptable and the decision is made to remove them, the sand and gravel will be placed in a less-than-90-day storage area pending receipt of analytical data. One grab sample of sand will be collected in accordance with LANL-ER-SOP-6.09, "Spade and Scoop Method for Collection of Soil Samples." The sample will be submitted for fixed-laboratory analyses (VOCs, SVOCs, and TC metals and organics) using the

waste analysis methods described in Table 4. One aliquot of the sample will be field-analyzed for HE (using the DX-2 HE Spot Test). If the HE Spot Test produces a positive HE result, the grab sample will be also be submitted for fixed-laboratory analysis of HE using the methods described in Table 4. The sand analysis will also be used to characterize the gravel for waste disposal because the sand layer filters the more concentrated wastewater before it comes into contact with the gravel layer (and is, therefore, more contaminated than the gravel) and because the gravel is a difficult media to analyze.

5.2 Blower Removal and Recycling

The blowers and the piping used to dry the HE on the surface of the sand filters will be removed. HE-contaminated portions, if any, will be flashed at the TA-16-388 Flash Pad or steam cleaned at TA-16-400 prior to recycling the metal.

5.3 Sand Filter Inspections

The sand, gravel, and firebrick components of the sand filters will be removed and managed as described above. LANL inspects the aboveground portion of the steel vessels weekly and have found no leaks. Therefore, the subsurface portion of the steel vessels (including any seams and connections) will be examined in this step to determine if leaks have occurred through cracks, weld breaks, and/or corroded areas. If corrosion extends half an inch or more into the ¾-in. steel of a vessel, an ultrasonic thickness inspection, magnetic flux, or other American Petroleum Institute-authorized method will be used to determine whether the vessel has been breached. These methods may also be required if small cracks are present.

5.4 Vessel Assessment, Repair, or Removal

If leaks are found during the inspections discussed in Section 5.3, the extent of any cracks, weld breaks, and/or corroded areas will be assessed to determine if repairs would be cost-effective. If minor repairs to the steel vessels are required, competent specialists that are certified to perform these activities will make the repairs. If extensive repairs are needed, a decision will be made to either make the necessary repairs or to remove the steel vessels and replace them with another filter for pre-treatment of the wastewater entering the HEWTF. If removed, the vessels will be tested for HE using the DX-2 HE Spot Test. If contaminated, they will be flashed or steam cleaned and the metal recycled. If not, they will be recycled without treatment.

5.5 Soil Sampling in the Event of Steel Vessel Leakage

If the inspections discussed in Section 5.3 indicate that leakage has occurred, samples of soil/tuff will be collected to characterize the nature and extent of contamination. Samples will be collected in accordance with the appropriate procedures referenced in Table 2.

A hand or mechanized auger will be used to collect samples in soil or soft tuff, unless the sample depth requires the use of a backhoe. If the tuff is highly indurated, a backhoe may be used to remove a ft or more of soil and then collect samples. If a steel vessel is not removed, the initial set of samples will be taken at the level of the leak and 1 ft above and below the leak (if the leak is at least 1 ft below the surface) and as close to the vessel as possible. If a steel vessel is removed, the initial sample will be collected from soil or tuff at locations where leaks have occurred and at the bottom of the excavation. Vessel removal will be conducted so that soil or tuff near the leak is not disturbed or, if disturbed, is kept segregated so that it can be sampled. The need for subsequent sampling is described in Table 7. Alternatively, if (1) the SSLs/ESLs are exceeded, (2) the contaminants are those that would be expected from the sand filters, and (3) contamination is visible, the visibly contaminated area may be excavated until it is no longer apparent. Samples would then be collected from the excavated material and the edges and bottom of the excavated area for analysis. This will avoid waiting for sampling results in the event of obvious contamination. A step-wise evaluation of the scope of soil/tuff removal activities will be evaluated based on the following criteria:

1. Soil/tuff surrounding the sand filters will not be removed if analytical results (VOCs, total metals, and HE) confirm that constituents are below their associated SSLs/ESLs.
2. If constituents are above their associated SSLs/ESLs and above soil background levels, LANL will determine whether the contamination is attributable to legacy operations (e.g., concentrations of contaminants are no different than those found upslope of the sand filters). Legacy contamination will be addressed as part of future corrective action activities. Background soil concentration values will be derived from studies developed under the LANL corrective action or other programs, or will be determined from samples taken as part of this closure project.
3. If contamination attributable to the sand filters exceeds SSLs/ESLs, soil/tuff will be removed from the area associated with that sample location. Additional sampling and soil/tuff removal, as described in Table 7, will be completed to ensure that all contaminated soil/tuff associated with leaks from the sand filters and exceeding the SSLs/ESLs has been removed. Depending on the analytical results, LANL may request a determination that the soil/tuff (i.e., “environmental media”) are no longer contaminated

with hazardous waste, as allowed by the "Contained-In Rule" in 20.4.1 NMAC § 261.3(f)(2).

5.6 Site Restoration

If a sand filter is removed and soil/tuff excavation activities are conducted, the affected area will be backfilled to the original grade with clean material (e.g., soil, crushed tuff). Clean material will be placed so as to prevent erosion. Best management practices will also be employed at the site to prevent and/or control storm water run-on and runoff.

5.7 Disposal or Decontamination of Equipment, Structures, and Soils [20.4.1 NMAC § 265.114]

All potentially hazardous waste from closure activities will be transferred to containers, placed in a less-than-90-day storage area, and sampled and analyzed for the waste characterization parameters presented in Table 4, as appropriate. Wastes generated as a result of closure will be managed as shown in Table 8. Off-site treatment, storage, or disposal facility locations are dependent on the constituents present in the waste, and will be documented in the closure report.

Equipment that becomes contaminated during closure operations and any structures and contaminated soils removed as part of closure will be decontaminated or characterized and sent off-site for further treatment, storage, or disposal. Because HE is present in all waste streams treated at the sand filters and any equipment, structures, or soils impacted by the sand filters will be HE-contaminated, it will be the indicator tested to ensure decontamination has occurred. Removal of HE will also ensure removal of other contaminants that may be present at the sand filters. HE is removed from objects either by flashing at TA-16-388 or by cleaning with water. The method used will depend on the configuration of the contaminated material. If there are cracks or interstices that cannot be effectively steam cleaned, the item will be flashed. If the item does not have to be flashed and is large (e.g., a backhoe), it will be taken to TA-16-400 to be steam cleaned. If the object is small (e.g., a hand auger), it will be cleaned with compounds such as Fantastik® or Alconox® and water at the site. The decontamination step will be repeated until the HE Certifying Agent, who performs the DX-2 HE Spot Test, determines that the item is decontaminated and can be released from the HE area. Decontamination water generated at TA-16-400 is collected in a sump connected to the building. Decontamination water generated at the TA-16 Burn Ground will be placed in appropriate containers, and characterized to determine if it

meets the waste acceptance criteria (WAC) for the HEWTF. If so, it will be transported to that facility and treated. If not, it will be sent off-site for further treatment and/or disposal.

All excavated soil/tuff will be stored in less-than-90-day storage areas pending receipt of analytical results. Waste-characterization grab samples (1 per 20 cubic yards of excavated soil/tuff) will be collected in accordance with LANL-ER-SOP-6.09, "Spade and Scoop Method for Collection of Soil Samples." The samples will be analyzed for waste characterization purposes (VOCs, SVOCs, and TC metals and organics) using the methods presented in Table 4. The samples will be field-analyzed for HE (using the DX-2 HE Spot Test). If the HE Spot Test produces a positive HE result, the grab sample(s) will also be submitted for fixed-laboratory analysis of HE using the methods presented in Table 4. Additional analyses may be required prior to disposal in order to address the WAC of the disposal facility. Soil/tuff will be treated on site, sent off site for further treatment, and/or disposed, as appropriate, based on the waste characterization analytical results and the results of the determination, if any, that soil/tuff is no longer contaminated with hazardous waste, as allowed by the "Contained-In Rule" in 20.4.1 NMAC § 261.3(f)(2).

6.0 REFERENCES

EPA, 1998, "Emission Factors for the Disposal of Energetic Materials by Open Burning and Open Detonation (OB/OD), (EPA/600/R-98/103).

LANL, 2002, "Response to Notice of Deficiency: General Part A, April 1998, Revision 0.0; General Part B, October 1998, Revision 1.0; RCRA Permit Applications, Los Alamos National Laboratory, EPA ID # NM0890010515," LA-UR-02-5013, Los Alamos National Laboratory, Los Alamos, New Mexico.

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

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

NMED, 2000, "Technical Background Document for Development of Soil Screening Levels," December 18, 2000.

Table 1
Closure Schedule

An estimated total of 180 days will be required to accomplish closure procedures and reporting requirements. The year of closure for the sand filters is 2003. Closure will proceed according to the schedule below:

Activity	Maximum Time Allowed
Notify NMED by Submitting Closure Plan	-90 Days
Procure Equipment and Subcontractors	-45 Days
Final Receipt of Wastes	-10 Days
Final Treatment of Wastes	-5 Days
NMED Approval of Closure Plan	Day 0
Begin Closure Activities	Day 0
Remove Sand, Gravel, and Firebrick Components	Day 5
Segregate Sand, Gravel, and Firebrick	Day 10
Evaluate Firebrick for Reuse or Disposal	Day 10
Remove Metal Blowers	Day 15
Treat Firebrick (if necessary)	Day 20
Sample Firebrick and Submit for Analysis (if necessary)	Day 25
Treat Blowers	Day 25
Inspect Steel Vessels	Day 25
Sample Sand and Submit for Analysis (if necessary)	Day 40
Repair or Remove Steel Vessels (if necessary)	Day 40
Collect Soil/Tuff Samples for Analysis (if necessary)	Day 45
Treat Steel Vessels (if necessary)	Day 45
Replace Sand and Gravel (if vessels intact or repaired)	Day 50
Evaluate Soil/Tuff Analytical Data (if necessary)	Day 75
Remove Contaminated Soil/Tuff (if necessary)	Day 80
Collect Additional Soil/Tuff Samples for Analysis (if necessary)	Day 115
Decontaminate Equipment (if necessary)	Day 120
Evaluate Analytical/Waste Characterization Data (if necessary)	Day 125
Send Contaminated Media to Disposal Facility (if necessary)	Day 130
Restore Site (if necessary)	Day 140
Submit Closure Certification to NMED	Day 180

NOTE: The schedule above indicates the maximum number of calendar days, relative to Day 0, within which each activity will be completed. Some activities may be conducted simultaneously.

Table 2
Sampling Procedures

Media	Sampling Procedure
Firebrick	LANL-ER-SOP-6.28, "Chip Sampling of Porous Surfaces"
Soil and Tuff	LANL-ER-SOP-6.09, "Spade and Scoop Method for Collection of Soil Samples" or LANL-ER-SOP-6.10, "Hand Auger and Thin-Wall Tube Sampler"
Wastewater	LANL-ER-SOP-6.15, "Coliwasa Sampler for Liquids and Slurries"

Table 3
Sample Containers and Preservation Techniques

Parameter	Method[a]	Matrix	Container	Preservation
Inorganic Analytes				
All metals	SW-6000, -7000, and -8000 series	Water	Plastic, 500 mL	HNO_3 to pH<2 4 °C
		Solid/Other	Glass, 250 mL	None, 4 °C
Volatile Organic Analytes				
VOCs	SW-8260	Water	Amber Glass, 2 x 40 mL	4 °C; HCl to pH<2
		Solid/Other	Amber Glass, 125 mL or ENCORE samplers (2)	4 °C
Semivolatile Organic Analytes				
SVOCs	SW-8270	Water	Amber Glass, 4 L	4 °C
		Solid/Other	Glass, 250 mL	4 °C
PCBs				
PCBs	SW-8082	Water	Amber Glass, 4 L	4 °C
		Solid/Other	Glass, 250 mL	4 °C
High Explosives				
High Explosives	DX-2 Spot Test	Solid/Liquid	None	None
High Explosives and Associated Compounds: HMX, RDX, TNT, PETN, Tetryl, and Other Nitrobenzenes and Nitrotoluenes	SW-8330	Water	Amber Glass, 4 L	4 °C
		Solid/Other	Glass, 250 mL	4 °C
Nitroglycerine	SW-8332	Water	Amber Glass, 4 L	4 °C
		Solid/Other	Glass, 250 mL	4 °C

[a] "SW" refers to EPA, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.

HCl = hydrochloric acid
HNO_3 = nitric acid
mL = milliliter
L = liter

Table 4
Analytical Methods and Use of Data

Parameter	Matrix[1]	Analytical Method[2]	Use of Data
HE and associated compounds	Solid and liquid	SW-8330 SW-8332	• Comparison to SSLs/ESLs • Waste characterization
PCBs	Solid	SW-8082	• Comparison to SSLs/ESLs
TC Metals (except mercury)	Solid	SW-1311/8270C	• Waste characterization
	Liquid	SW-8270C	
TC Metals[3] – mercury	Solid	SW-1311/7471A	• Waste characterization
	Liquid	SW-7470A	
Total Metals			• Comparison to SSLs/ESLs
Barium	Solid	SW-7080A or -7081	
Cadmium	Solid	SW-7130 or -7131A	
Chromium	Solid	SW-7190 or -7191	
Lead	Solid	SW-7420 or -7421	
Silver	Solid	SW-7760A or 7761	
Mercury	Solid	SW-7471A or 7470A	
TC Organics[3]	Solid	SW-1311/8270C	• Waste Characterization
	Liquid	SW-8270C	
VOCs	Solid and liquid	SW-8260B	• Comparison to SSLs/ESLs • Waste Characterization
SVOCs	Solid and liquid	SW-8270C	• Comparison to SSLs/ESLs • Waste characterization

[1] Only solids (soil and tuff) will be analyzed for comparison with SSLs and ESLs.
[2] "SW" refers to EPA, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*.
[3] If total metals and organics have already been analyzed and all fall below TC regulatory levels, the totals analysis may be used instead of performing the TC analysis. EPA allows the totals analyzed for solids to be divided by 20 to represent the TC regulatory limits. Totals for liquids are not adjusted.

Table 5
Potential Contaminants and Their Associated SSLs and ESLs

Parameter	SSL	ESL	Method[b] (Nominal[c] Detection Limit in mg/kg)
	(mg/kg)[a]		
Organics			
Acetone	None	3.7 E+00	SW-8260B (5 E-02)
Benzene	5.6 E+00	5.5 E+01	SW-8260B (5 E-03)
Chloroform	3.0 E-01	2.8 E+01	SW-8260B (5 E-03)
1,2-Dichloroethane	7.2 E+00	4.7 E+00	SW-8260B (5 E-03)
Methylene chloride	2.7 E+03	7.0 E+00	SW-8260B (1 E-02)
Methyl ethyl ketone	8.9 E+04	1.3 E+03	SW-8260B (2 E-02)
o-Xylene	6.3 E+01	1.1 E+00	SW-8260B (5 E-03)
m,p-Xylene	6.3 E+01	1.1 E+00	SW-8260B (1 E-02)
HE and Associated Compounds			
2,4-Dinitrotoluene	3.0 E+02	1.0 E+00	SW-8330 (5 E-02)
2,6-Dinitrotoluene	None	6.5 E-01	SW-8330 (5 E-02)
1,3-Dinitrobenzene	None	2.1 E-04	SW-8330 (5 E-02)
HMX	7.4 E+03	4.2 E+01	SW-8330 (5 E-02)
Nitrobenzene	2.1 E+01	2.2 E+00	SW-8330 (5 E-02)
Nitroglycerine	1.5 E+03	1.4 E+02	SW-8332 (5 E-02)
PETN	None	1.4 E+04	SW-8330 (2 E-01)
RDX	1.9 E+02	9.1 E+00	SW-8330 (5 E-02)
TNT	7.4 E+01	7.0 E-01	SW-8330 (5 E-02)
Tetryl	None	2.0 E+00	SW-8330 (5 E-02)
1,3,5-Trinitrobenzene (sym-TNB)	None	1.5 E+01	SW-8330 (5 E-02)
Metals			
Barium	1.5 E+04	2.4 E+00	SW-7080A or -7061A (2 E-01)
Cadmium	1.9 E+02	1.0 E-01	7130 or7131A (5 E-02)
Chromium	6.6 E+02	2.0 E-01	7190 or 7191(1 E-01)
Lead	1.0 E+03	5.6 E+01	7420 or 7421 (2 E-02)
Mercury	2.0 E+01	5.0 E-02	7471A (5 E-02)
Silver	1.2 E+03	5.0 E-02	7760 or 7761 (1 E-01)
PCBs			
Arochlor-1016	8.9 E+00	2.5 E-02	SW-8082 (1 E-02)
Arochlor-1221	9.2 E+00	None	SW-8082 (2 E-02)
Arochlor-1232	9.2 E+00	None	SW-8082 (1 E-02)
Arochlor-1242	9.2 E+00	4.1 E-02	SW-8082 (1 E-02)
Arochlor-1248	2.5 E+00	7.2 E-03	SW-8082 (1 E-02)
Arochlor-1254	2.5 E+00	2.2 E-02	SW-8082 (1 E-02)
Arochlor-1260	2.5 E+00	4.4 E-01	SW-8082 (1 E-02)

[a] mg/kg = milligrams per kilogram.
[b] "SW" refers to EPA, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methocs," *SW-846*.
[c] The actual detection limit will be dependent on the composition of the matrix and any interfering compounds. Data are not considered valid unless the detected value is twice the detection limit, although some EPA standard methods suggest that the value should be 5-10 times the detection limit.

Table 6
Recommended Quality Control Samples, 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, HE	One sample per sampling day	Not Applicable
Field Duplicate	Chemical	1 for each 10 samples of single media	Relative percent difference less than or equal to 20 percent

[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.

Table 7
Sampling and Soil/Tuff Removal Activities

Analytical Results	Action	
Contaminants are below SSLs/ESLs	• No soil/tuff removal required. • If steel vessel has been removed, backfill excavation with clean soil.	
Results of the sample analysis show that the contamination is attributable to legacy operations and is not attributable to leaks from the sand filters	• No soil/tuff removal required (will be accomplished under corrective action). • If steel vessel has been removed, backfill excavation with clean soil.	
Samples are above the SSLs/ESLs and contamination is attributable to leaks from the sand filters	Area is soil or soft tuff that can be sampled with an auger	• Sample using auger at one or more feet below and laterally from the previous sample locations. Excavate if contaminants are above SSLs/ESLs. • Continue sampling/excavating until contaminants are below SSLs/ESLs. • Backfill excavation with clean soil.
	Area is highly indurated tuff and difficult to sample using an auger	• Excavate one or more feet vertically and horizontally into the tuff and sample. • Continue excavating/sampling until contaminants are below SSLs/ESLs. • Backfill excavation with clean soil.

Table 8
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Potential Waste Type (s)	Treatment or Disposal Options
PPE	Not hazardous Hazardous	Subtitle D landfill The PPE will be treated on- or off-site to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Decontamination wash water	Meets HEWTF or sanitary waste system WAC Does not meet the HEWTF WAC	HEWTF or sanitary sewer Characterize and send off site for further treatment and/or disposal.
Firebrick, sand, and/or gravel, if not reused	Not hazardous Hazardous	Subtitle D landfill Depending on constituents present, a no-longer-contained-in determination may be requested from NMED. If granted, the waste will be disposed in a Subtitle D landfill. Otherwise, the waste will be treated on- or off-site, if necessary, to meet LDR treatment standards and disposed in a Subtitle C or D landfill, as appropriate.
Sand or tuff, if removed	Not hazardous Hazardous	Subtitle D landfill Depending on constituents present, a no-longer-contained-in determination may be requested from NMED. If granted, the waste will be disposed in a Subtitle D landfill. Otherwise, the waste will be treated on- or off-site, if necessary, to meet LDR treatment standards and disposed in a Subtitle C or D landfill, as appropriate.

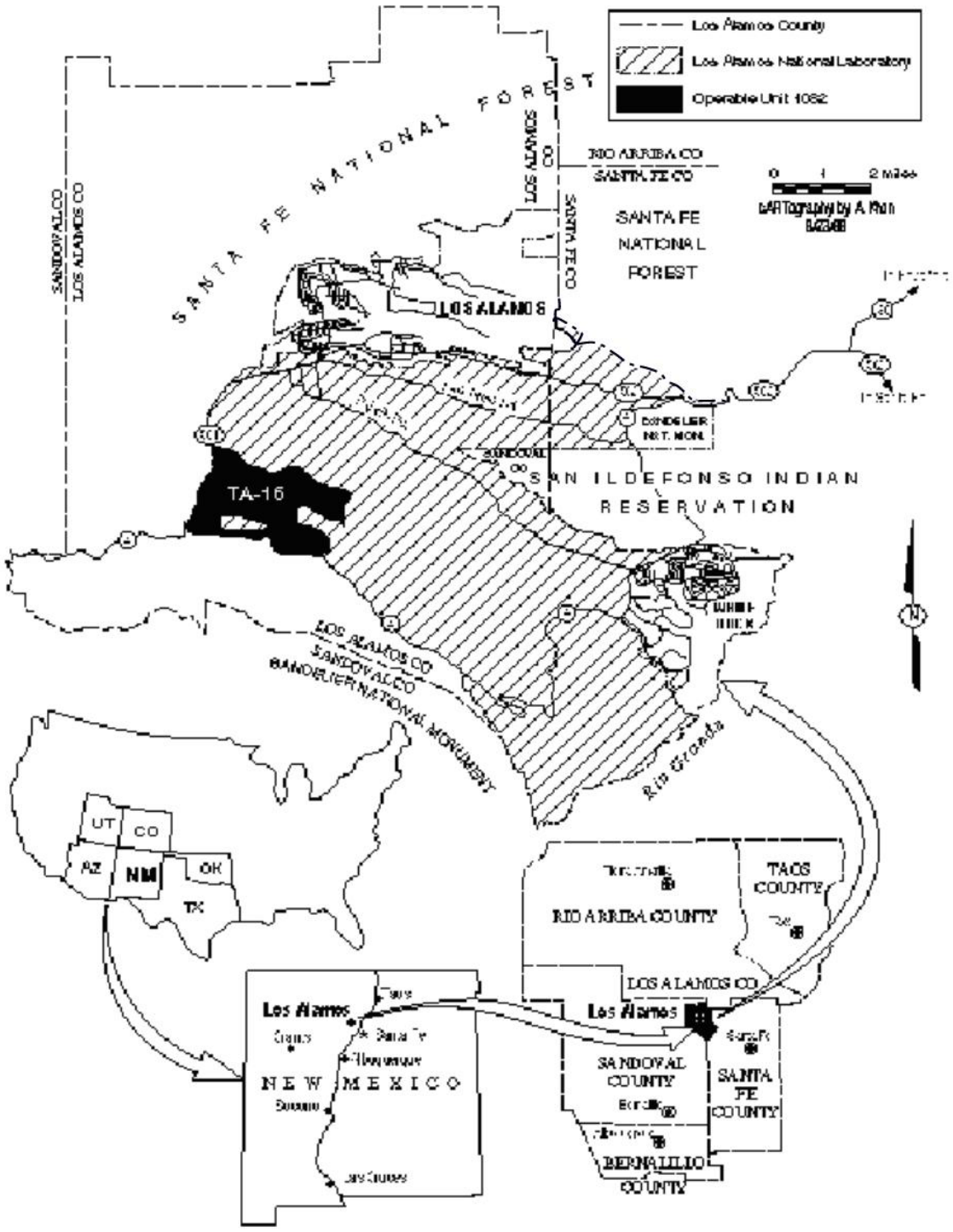

Figure 1
Location of TA-16

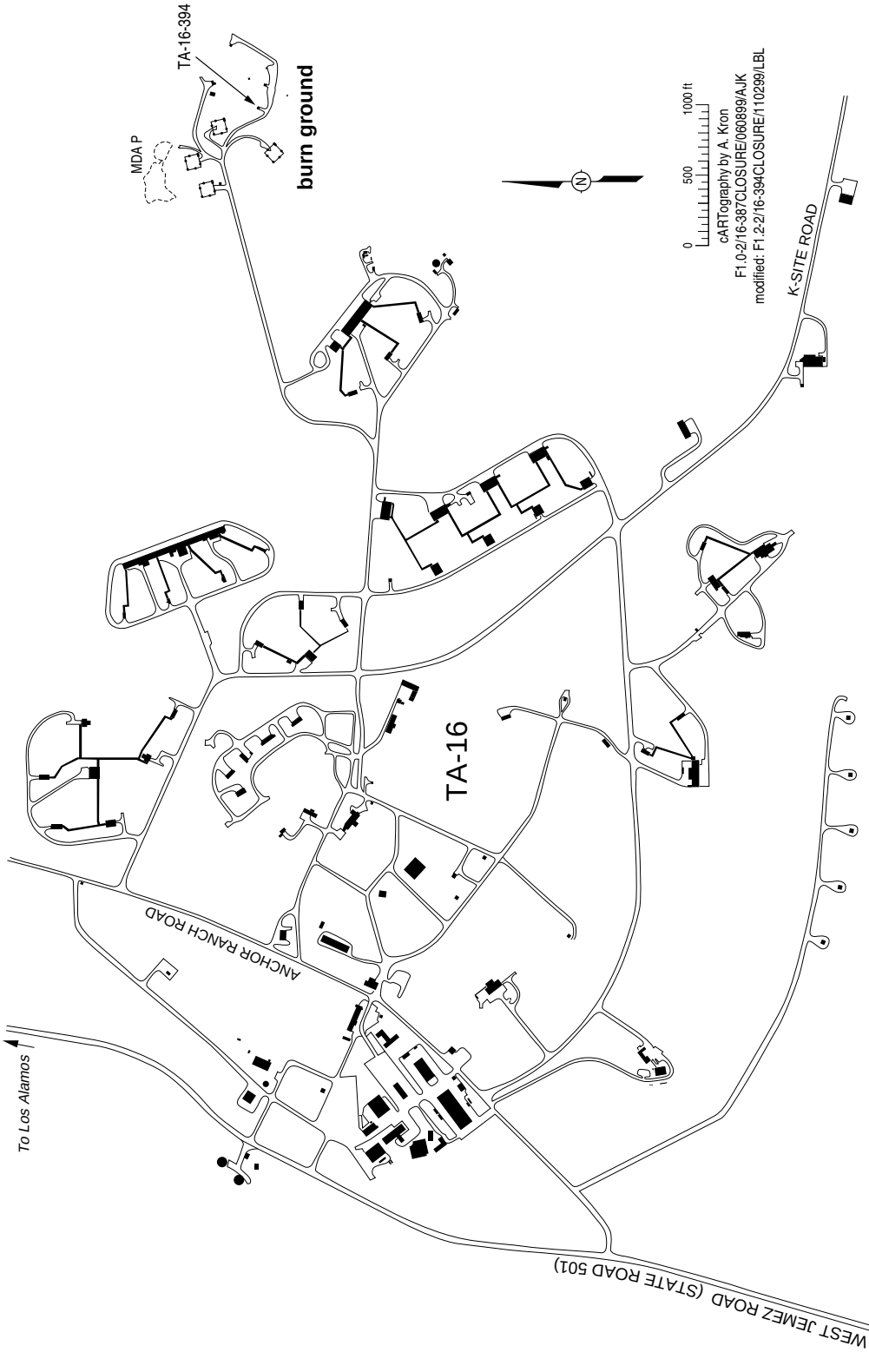

Figure 2
Site Map of TA-16 Showing the Location of the TA-16 Burn Ground and the TA-16-401 and TA-16-406 Sand Filters

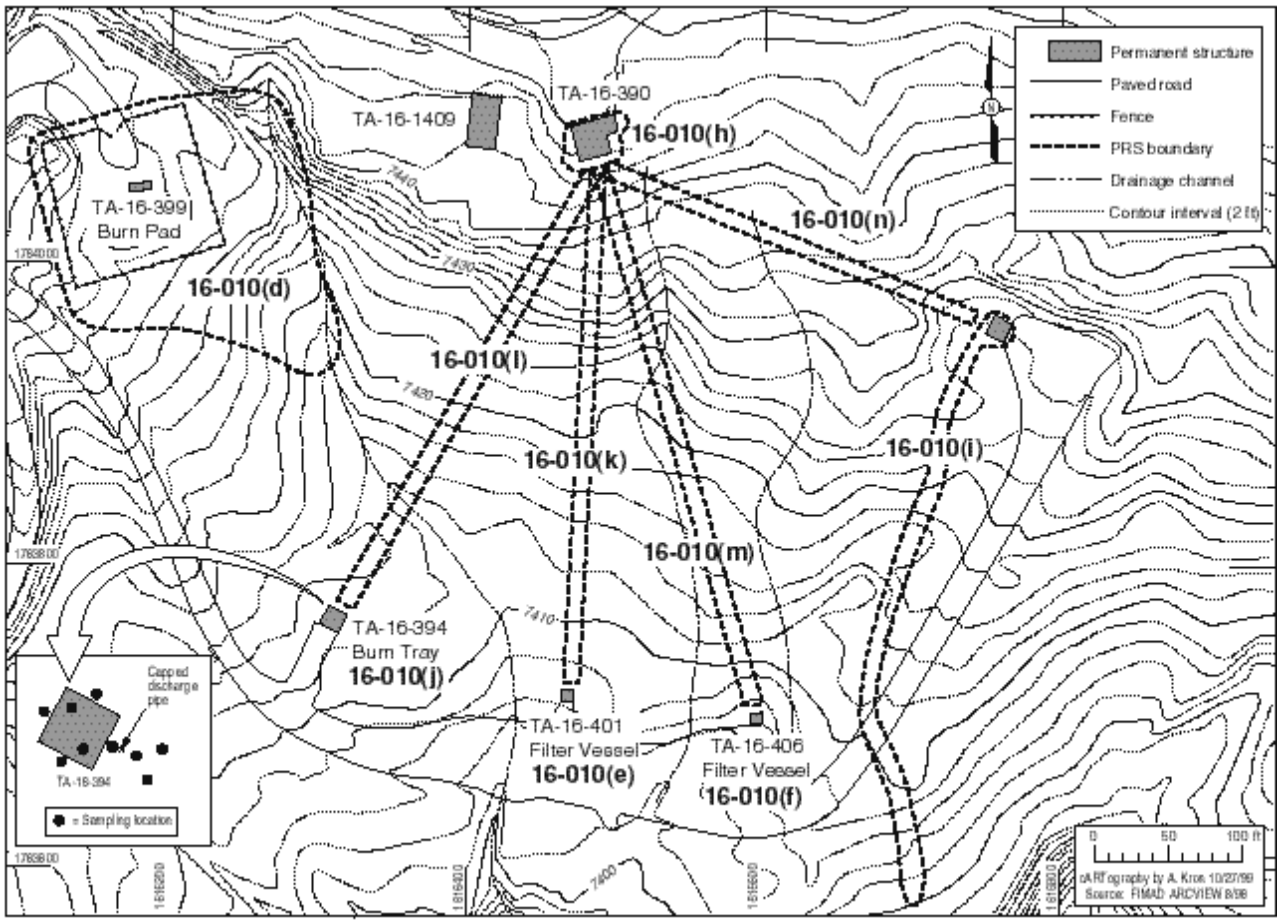

Figure 4

Location of TA-16-401 and TA-16-406 Sand Filters with Respect to Other Corrective Action Sites and Hazardous Waste Management Units at the TA-16 Burn Ground

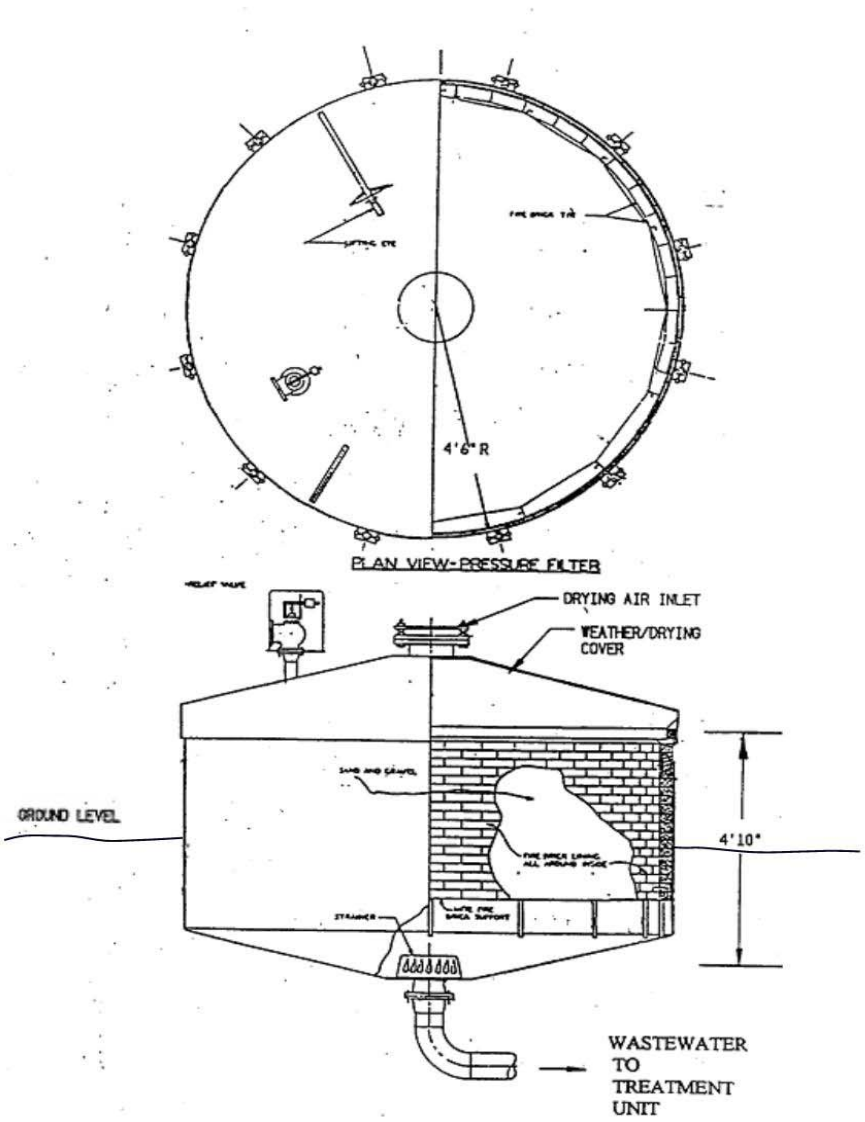

Figure 3
Schematic of the TA-16-401 and TA-16-406 Sand Filters

CERTIFICATION

I certify under penalty of law that this document was 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.

James L. Holt
Associate Director, Operations
Los Alamos National Laboratory
Operator

Date Signed

Ralph E. Erickson
Manager, Los Alamos Site Office
National Nuclear Security Administration
U.S. Department of Energy
Owner/Operator

Date Signed

CERTIFICATION

CLOSURE PLAN FOR THE TA-16-401 AND –406 SAND FILTERS

CERTIFICATION BY TECHNICAL AREA (TA) 16 REPRESENTATIVES

I certify under penalty of law that this document was reviewed and approved for consistency with the waste management operations of the Engineering Sciences and Applications (ESA) Division 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 reviewing, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete as it applies to ESA operations at TA-16. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Earle Marie Hanson Date Signed
Division Director for ESA Division
Los Alamos National Laboratory

Ricardo V. Ortiz Date Signed
Group Leader for ESA Weapon Materials
and Manufacturing Group
Los Alamos National Laboratory

CERTIFICATION

CLOSURE PLAN FOR THE TA-16-401 AND –406 SAND FILTERS

CERTIFICATION BY RISK REDUCTION AND ENVIRONMENTAL STEWARDSHIP (RRES) TECHNICAL REPRESENTATIVES

I certify under penalty of law that the information provided by RRES Division for this document was 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 and accurate. 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 Date Signed
Acting Group Leader
Solid Waste Regulatory Compliance Group
Risk Reduction and Environmental Stewardship Division
Los Alamos National Laboratory

Beverly A. Ramsey Date Signed
Division Director
Risk Reduction and Environmental Stewardship Division
Los Alamos National Laboratory