

ATTACHMENT G.11
TECHNICAL AREA 54, AREA G, PAD 10
OUTDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

DRAFT

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1.0 INTRODUCTION

This closure plan describes the activities necessary to close the outdoor hazardous waste container storage unit at Technical Area (TA)-54, Area G, Pad 10 at the Los Alamos National Laboratory (Facility), hereinafter referred to as the permitted unit. The information provided in this closure plan addresses the closure requirements specified in Permit Part 9 and the Code of Federal Regulations (CFR), Title 40, Part 264, Subparts G and I for hazardous waste management units operated at the Facility under the Resource Conservation and Recovery Act (RCRA) and the New Mexico Hazardous Waste Act.

Until closure is complete and has been certified in accordance with Permit Section 9.5, a copy of the approved closure plan or the hazardous waste facility permit containing the plan, any approved revisions to the plan, and closure activity documentation associated with the closure will be on file with hazardous waste compliance personnel at the Facility and at the U.S. Department of Energy (DOE) Los Alamos Site Office. Prior to closure of the permitted unit, this closure plan may be amended in accordance with Permit Section 9.4.8, as necessary and appropriate, to provide updated sampling and analysis plans and to incorporate updated decontamination technologies. Amended closure plans shall be submitted to the New Mexico Environment Department (Department) for approval prior to implementing closure activities.

2.0 DESCRIPTION OF UNIT TO BE CLOSED

A specific description of the permitted unit can be found in Permit Attachment A (*Technical Area Unit Descriptions*). Additional features and equipment located at the permitted unit and not discussed elsewhere within the Permit are described below.

The permitted unit, which is an asphalt pad that measures 350 feet (ft) long and 250 ft wide (approximately 89,600 square ft), is located on the eastern end of Area G. The irregular-shaped, asphalt pad (Pad 10) is 4-6 inches (in.) thick and overlies approximately six inches of underlying base course and overlies about six inches of tuff fill. The permitted unit was constructed in 2003 and covers two previously existing pads (Pads 2 and 4). It is constructed with curbing on the north and partially the east sides and is sloped from approximately 1% to 1.5% to the east and south-east for drainage.

Transuranic waste characterization trailers are situated on the permitted unit and hazardous waste containers are stored near the trailers for staging associated with the waste characterization. Large portions of the permitted unit are also used for storage of feed stock empty drums for the transuranic waste characterization activities. Storage of oversized mixed wastes in transportainers and metal boxes also occurs on the permitted unit. The current hazardous waste storage activities at the permitted unit include the following structures:

TA54-0439, FRAM - The Fixed-Energy Response Function Analysis with Multiple Efficiency (FRAM) is a single high purity germanium detector with FRAM software to evaluate the isotopic composition of waste drums from gamma measurements. Two systems were housed in trailer TA54-0439. The system was coordinated with the High Efficiency Neutron Counter (HENC) and the Mobile Tomographic Gamma System (MTGS) to quantify neutron and gamma detections into plutonium mass data. The FRAM detectors were moved to TA54-0438 in 2008 to prepare the TA54-0439 trailer for removal from Pad 10.

TA54-0497, RTR2 - The Real-Time Radiography (RTR) system #2 is designed to provide X-ray examination of the contents of a waste drum. The unit has been located on Pad 10 in support of the DOE Carlsbad Central Characterization Project (CCP) operations.

TA54-0498, LANL HENC - The High-Efficiency Neutron Counter (HENC) is designed to provide a passive neutron and gamma measurement of transuranic waste in 55-gallon containers. The HENC supported the Transuranic Waste Characterization Project and Project 2010 and subsequently CCP operations from 2004 to the present.

TA54-0506, MCS HENC - The Canberra MCS HENC is functionally identical to the TA-54-0498 HENC and provides passive neutron and gamma assays of 55-gal waste drums.

TA54-0545 and 546, Storage trailers - Heated transportainers used for waste container storage and equilibration prior to characterization.

The above structures are used for non-destructive assay (NDA) techniques associated with the radioactive characterization for the Waste Isolation Pilot Plant certification of waste containers or in support of those activities. The characterization provided by the NDA monitoring techniques does not involve opening the waste containers. The other trailers and structures provide: 1) shelter for the radioassay equipment, 2) enclosed areas to stabilize the waste containers being assayed; and 3) external containment for the waste within the structures.

The following structures are situated on the permitted unit as support structures and according to the Facility Operating Record have never stored hazardous waste:

TA54-0365, Office Building, Formerly MTGS - TA54-0365 formerly housed the MTGS. The MTGS was a gamma assay system prototype developed by the Permittees. The instrument was salvaged in 2007 and the trailer was converted to office space.

TA54-0483, Source Storage Trailer - TA54-0483 serves as a storage area for calibration sources needed by the NDA systems.

TA54-1059, Storage Trailer - TA54-1059 has been used to store miscellaneous NDA equipment, such as container turn-tables and equipment stands.

TA-54-XXX1, Shed - this shed has not been used for waste storage or characterization.

The permitted unit has been used for the storage of mixed waste in solid form with small quantities of liquid form waste since 2004. The hazardous waste stored at the permitted unit has been: solidified inorganic solids; leached process residues; salts and cement paste; ash; dewatered aqueous sludge; chemical treatment sludge; soils; combustible debris (*e.g.*, plastics, rubber, laboratory trash, building debris); and heterogeneous debris.

Permit Part 3 (*Storage in Containers*), Permit Attachment A (*Technical Area Unit Descriptions*), Permit Attachment B (*Part A Application*), and Permit Attachment C (*Waste Analysis Plan*) include additional information about waste management procedures and hazardous waste constituents stored at the permitted unit.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

Approximately 800,000 gallons of hazardous waste has been stored at the permitted unit to date. Throughout the life of this Permit, it is estimated that an additional 1,375,000 gallons of hazardous waste will be stored at the permitted unit.

4.0 GENERAL CLOSURE REQUIREMENTS

4.1 Closure Performance Standard

As required by Permit Section 9.2, the permitted unit will be closed to meet the following performance standards:

- a. remove all hazardous waste residues and hazardous constituents;
- b. ensure contaminated media do not contain concentrations of hazardous constituents greater than the clean-up levels established in accordance with Permit Sections 11.4 and 11.5. For soils the cleanup levels shall be established based on residential use. The Permittees must also demonstrate that there is no potential to contaminate groundwater;
- c. control hazardous waste residues, hazardous constituents, and, as applicable, contaminated media such that they do not exceed a total excess cancer risk of 10^{-5} for carcinogenic substances and, for non-carcinogenic substances, a target Hazard Index of 1.0 for human receptors, and meet Ecological Screening Levels established under Permit Section 11.5;
- d. minimize the need for further maintenance;
- e. control, minimize, or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground, groundwater, surface waters, or to the atmosphere; and
- f. comply with the closure requirements of Permit Part 9 (*Closure*) and 40 CFR Part 264 Subparts G and I.

Closure of the permitted unit will be deemed complete when: 1) all structures and equipment have been decontaminated, or otherwise properly disposed of; 2) closure has been certified by an independent, professional engineer licensed in the State of New Mexico; and 3) closure certification has been submitted to, and approved by, the Department.

4.2 Closure Schedule

This closure plan schedule is intended to address closure requirements for the permitted unit within the authorized timeframe of the current Hazardous Waste Facility Permit (*see* Permit Section 9.4). The following section provides the schedule of closure activities (*see also* Table G.11-1 in this closure plan).

Notification of closure will occur at least 45 days before the Permittees expect to begin closure (*see* 40 CFR § 264.112(d)(1)) and closure activities will begin according to the requirements of 40 CFR § 264.112(d)(2). However, pursuant to 40 CFR § 264.112(e), removing hazardous wastes and decontaminating or dismantling equipment in accordance with an approved closure plan may be conducted at any time before or after notification of closure. Notification of the structural assessment (assessment), as described in Section 5.2 of this closure plan, shall occur in accordance with Permit Section 9.4.6.2.

Within 90 days after the final receipt of hazardous waste, the permitted unit will be emptied of all stored waste. Within ten days of completing hazardous waste removal or within 100 days of the final receipt of

hazardous waste, the Permittees will complete the records review (review) and assessment and submit an amended closure plan, if necessary, to the Department for review and approval as a permit modification in accordance with Permit Section 9.4.8. Upon approval of the modified closure plan, if applicable, the Permittees will decontaminate structures and related equipment.

Soil sampling and decontamination verification wipe sampling activities will be conducted to demonstrate that soils, surfaces, structures, and related equipment at the permitted unit meet the closure performance standards in Permit Section 9.2.

All closure activities, including submittal of a final closure certification report to the Department for review and approval, will be completed within 180 days after the final receipt of waste. In the event that closure of the permitted unit cannot proceed according to schedule, the Permittees will notify the Department in accordance with the extension request requirements in Permit Part 9.4.1.1.

5.0 CLOSURE PROCEDURES

Closure activities at the permitted unit will include: removal of hazardous wastes; proper management and disposal of hazardous waste residues and contaminated equipment associated with the permitted unit; verification that the closure performance standards have been achieved; and submittal of a final closure certification report. The following sections describe the procedures to be used for closure of the permitted unit.

5.1 Removal of Waste

In accordance with Permit Section 9.4.2, all stored hazardous wastes will be removed from the permitted unit scheduled for closure. Depending upon their size, containers will be removed with forklifts, container dollies, air pallets, or manually. Containers will be placed on flat bed trucks, trailers, or other appropriate vehicles for transport from the permitted unit. Appropriate shipping documentation will accompany the wastes during transport. Containers holding hazardous waste will be moved to a permitted on-site storage unit or a permitted off-site treatment, storage, or disposal facility.

5.2 Records Review and Structural Assessment

After waste removal and before starting closure decontamination and sampling activities, the Facility Operating and Inspection Records for the permitted unit will be reviewed and an assessment will be conducted to determine any finding(s) or action(s) that may influence closure activities or additional sampling locations.

5.2.1 Records Review

The Facility Operating and Inspection Records shall be reviewed in accordance with Permit Section 9.4.6.1. The goals of the review will be to:

- a. confirm the specific hazardous waste constituents of concern; and
- b. confirm additional sampling locations (*e.g.*, locations of any spills or chronic conditions identified in the Operating and Inspection Records).

5.2.2 Structural Assessment

An assessment of the permitted unit's physical condition will be conducted in accordance with Permit Section 9.4.6.2. The assessment will include inspection of the floors, walls, and ceilings of the FRAM, the RTR2, the LANL HENC, the MCS HENC, the storage trailers (545 & 546), and the asphalt pad for any existing cracks or conditions that indicate a potential for, or an actual, release of constituents. If a crack, gap, or stained area is present, the Permittees will amend this closure plan in order to update the sampling and analysis plan (*see* Section 6.0 in this closure plan) to add these sampling locations and the applicable sampling methods and procedures. This inspection will be documented with photographs and drawings, as necessary.

5.3 Decontamination and Removal of Structures and Related Equipment

In accordance with the procedures in Permit Section 9.4.3, all remaining hazardous waste residues and hazardous constituents will be removed from the permitted unit. The permitted unit's structures and related equipment will be decontaminated, removed, or both and managed appropriately. All waste material will be controlled, handled, characterized, and disposed of in accordance with Permit Attachment C (*Waste Analysis Plan*), Permit Section 9.4.5, and Facility waste management procedures. Decontamination activities will ensure the removal of all hazardous waste residues and hazardous constituents from the permitted unit to meet the closure performance standards outlined in Permit Section 9.2.

5.3.1 Removal of Structures and Related Equipment

All structures and related equipment that are removed will not require decontamination, will be considered solid and potentially hazardous waste (as defined by this Permit) when removed, and will be disposed of in accordance with Permit Section 9.4.5 and Section 7.0 of this closure plan.

The asphalt pad, the materials associated with the asphalt pad (curbing and ramps), and a minimum of six inches of the base course and soil underlying the asphalt pad shall be removed after the assessment. If after the removal of the pad (and underlying soil and base course material) the remaining surface shows evidence that the removal to that point has not gathered all appropriate soils and materials associated with the pad, additional soil and materials will be removed. The Permittees shall take precautions to not remove or disturb the soil or tuff that overlies the regulated unit (covered under the March 1, 2005 Compliance Order on Consent (Order) (*see* Permit Section 9.3)) beneath the permitted unit. The option of removing small areas of asphalt at sampling locations where contamination is suspected (*i.e.*, spill or staining sites) to allow sampling without disturbing the surrounding area prior to the general removal of the pad will be assessed at the time of the assessment.

5.3.2 Decontamination of Structures and Related Equipment

All structures and related equipment that will be reused by the Facility will be decontaminated (*see* Table G.11-6) in accordance with Permit Section 9.4.3.1. This includes the FRAM, the RTR2, the LANL HENC, the MCS HENC, and the two storage trailers (545 & 546). This list of equipment requiring decontamination will be revised, as appropriate, during the review and assessment.

Equipment and operating machinery that is not sensitive to water intrusion, such as the transportainers (that are used only for the storage of hazardous waste) and the storage cabinets, will be decontaminated in their entirety by steam cleaning or pressure washing with a solution consisting of a surfactant detergent (*e.g.*, Alconox[®]) and water mixed in accordance with the manufacturer's recommendations. All other

equipment at the permitted unit that is sensitive to water intrusion (*i.e.*, hazardous waste management areas within the trailers which are used for waste characterization, portable air monitors, electronic devices or tools, and spill cleanup equipment containers) will be decontaminated by washing using a wipe-down method with a solution consisting of a surfactant detergent (*e.g.*, Alconox[®]) and water mixed in accordance with the manufacturer's recommendations.

The quantity of the wash solution will be minimized by dispensing from buckets, spray bottles, or other types of containers. Cloths, or other absorbent cleaning devices, will not be reused to wipe down the equipment after being wetted in the wash solution or after spraying solution onto the equipment. Portable berms, or other such devices (*e.g.*, absorbent socks, plastic sheeting, wading pools, existing secondary containment) will collect excess wash water and provide containment during the decontamination process.

5.4 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during decontamination activities will be cleaned with a wash water solution. Residue, disposable equipment, and equipment that cannot be decontaminated will be containerized and managed as waste as summarized in Table G.11-2 and in accordance with Permit Section 9.4.5 and Section 7.0 of this closure plan.

6.0 SAMPLING AND ANALYSIS PLAN

This SAP addresses the specific closure sampling and analysis requirements in Permit Section 9.4.7 and describes the sampling, analysis, quality assurance and quality control (QA/QC) methods that will be used to demonstrate that the Permittees have met the closure performance standards outlined in Permit Section 9.2.

6.1 Soil Sampling and Decontamination Verification Wipe Sampling Activities

Soils sampling and decontamination verification wipe sampling activities will be conducted at the permitted unit in order to verify that soils, structures, and related equipment at the permitted unit meet the closure performance standards in Permit Section 9.2. 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.

One wipe sample will be collected from each piece of decontaminated equipment at the permitted unit. In compliance with Permit Section 9.4.7.1.i, this closure plan will ensure the collection of at least one wipe sample from each wall, floor, and ceiling of the FRAM, the RTR2, the LANL HENC, the MCS HENC, and the two storage trailers (545 and 546) for a total of 36 samples. The locations of these sample collection points will be determined randomly within the area of each surface. Sample collection will be particularly biased to target areas beneath any waste management equipment such as turntables or conveyors.

In compliance with Permit Section 9.4.7.1.ii.a, this closure plan will ensure the collection of soil samples in the following locations:

- a. one sample at the loading and unloading areas (sample locations 3, 4, 5, 6, 7, 8, 9, 10, and 11 as illustrated on Figure G.11-1) of each of the aforementioned structures for a total of nine samples (*see* Permit Section 9.4.7.1.ii.a(1));

- b. one soil sample every 900 square feet of the permitted unit for a total of 100 samples (*see* Permit Section 9.4.7.1.ii.a(2));
- c. eight samples along the swale between the permitted unit and Pad 9 (*see* Permit Section 9.4.7.1.ii.a(8));
- d. one sample just off the south-east edge of the permitted unit where stormwater is directed across the pad by the south and eastward slope, is collected by trench drains southeast of the pad, and discharges from that system to a drain ('sample location 1' on Figure G.11-1). The soil sample will be collected from the point at which the water contacts soil beneath the drain (*see* permit section 9.4.7.1.ii.a(3)); and
- e. one sample at the rock check dam ('sample location 2' on Figure G.11-1) at the far south-east end of Area G where stormwater discharges (*see* Permit Section 9.4.7.1.ii.a(3)).

At the time of sampling, the precise locations of the samples will be randomly selected within each 900 square foot sampling box (*see* Figure G.11-1). These locations will be determined by applying a sub-grid of potential sampling points and randomly choosing one. If the review or assessment determines the need to obtain additional samples collected within the area of the sampling box (*e.g.*, at asphalt cracks), these sample locations will be in addition to the grid sample locations.

6.2 Sample Collection Procedures

Samples will be collected in accordance with the Permit Section 9.4.7.1 and the procedures identified in this SAP which incorporate guidance from the United States EPA (EPA, 1986 and EPA, 2002), DOE (DOE, 1995), and other Department-approved procedures.

6.2.1 Wipe Sampling

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

The NIOSH method includes wiping a 100 square centimeter area at each discrete location with a gauze wipe wetted with a liquid solution appropriate for the desired analysis (*e.g.*, deionized water for lead). For wipe sampling, guidance from the analytical laboratory must be obtained prior to wipe verification sampling to confirm that the solution chosen for each analysis is appropriate for the analysis to be conducted and that wipe sampling is a proper technique for the analysis.

6.2.2 Soil and Sediment Sampling

Soil and sediment samples will be collected and analyzed to determine if hazardous constituents are present in soils at the permitted unit. Soil samples will be collected using a spade, scoop, auger, trowel, or other equipment as specified in approved methods for the type of analytes (*i.e.*, EPA 1996 or 2002) and from the appropriate depths as directed in Permit Section 9.4.7.1.ii. Samples will be kept at their at-depth temperature or lower, protected from ultraviolet light, sealed tightly in the recommended container, and analyzed within the specific holding times listed in Table G.11-4.

6.2.3 Cleaning of Sampling Equipment

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

6.3 Sample Management Procedures

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

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

Chain-of-custody forms will be maintained by sampling personnel until the samples are relinquished to the analytical laboratory. This will ensure the integrity of the samples and provide for an accurate and defensible written record of the sampling possession and handling from the time of collection until laboratory analysis. One chain-of-custody form may be used to document all of the samples collected from a single sampling event. The sample collector will be responsible for the integrity of the samples collected until properly transferred to another person. The EPA considers a sample to be in a person's custody if it is:

- a. in a person's physical possession;
- b. in view of the person in possession; or
- c. 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 original chain-of-custody form to the Facility and it will become a part of the permanent sampling record documenting the sampling effort.

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. a unique sample identification number;

- b. name of the sample collector;
- c. date and time of collection;
- d. type of preservatives used, if any; and
- e. location from which the sample was collected.

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

6.3.1.3 Sample Logbook

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

- a. the sample location;
- b. suspected composition;
- c. sample identification number;
- d. volume/mass of sample taken;
- e. purpose of sampling;
- f. description of sample point and sampling methodology;
- g. date and time of collection;
- h. name of the sample collector;
- i. sample destination and how it will be transported;
- j. observations; and
- k. 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 G.11-4 presents the requirements in *SW-846* (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE Orders, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate Facility

documents establish these requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, waste, and defense program materials.

Off-site transportation of samples will occur via private, contract, or common motor carrier, air carrier, or freight. All off-site transportation will be processed through the 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.

6.4 Sample Analysis Requirements

Samples will be analyzed for all the hazardous constituents listed in Appendix VIII of 40 CFR Part 261 and in Appendix IX of 40 CFR Part 264 that have been stored at the permitted unit over its operational history. Samples will be analyzed by an independent laboratory using the methods outlined in Table G.11-3. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.11-3. If any of the information from these tables has changed at the time of closure, the Permittees 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. a documented comprehensive QA/ QC program;
- b. technical analytical expertise;
- c. a document control and records management plan; and
- d. the capability to perform data reduction, validation, and reporting.

The selection of the analytical testing methods identified in Table G.11-3 was based on the following considerations:

- e. the physical form of the waste;
- f. constituents of concern;
- g. required detection limits (*e.g.*, regulatory thresholds); and
- h. 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 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (*SW-846*) (EPA, 1986) or other Department-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 potential sample contamination associated with the sampling

and analysis process and is described in the following sections, along with information on calculations necessary to evaluate the QC results.

6.4.2.1 Field Quality Control

The field QC samples that will be collected are trip blanks, field blanks, field duplicates, and equipment rinsate blanks. Table G.11-5 presents a summary of QC sample types, applicable analyses, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample.

6.4.2.2 Analytical Laboratory QC Samples

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

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. a summary of analytical results for each sample
- b. the physical form of the waste;
- c. results from QC samples such as blanks, spikes, and calibrations;
- d. reference to standard methods or a detailed description of analytical procedures; and
- e. 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

All waste generated during closure will be controlled, handled, characterized, and disposed of in accordance with Permit Section 9.4.5, Permit Attachment C (*Waste Analysis Plan*), and Facility waste management procedures. Closure activities may generate different types of waste materials; these wastes are listed with potential disposal options in Table G.11-2 of this closure plan. Subsequent disposition options for the decontaminated structures and equipment include reuse, recycling, or disposal. Reusable protective clothing, tools, and equipment used during decontamination will be cleaned with a wash water

solution. Disposable equipment and other small equipment that cannot be decontaminated, as summarized in Table G.11-6, will be containerized and managed as waste.

8.0 CLOSURE CERTIFICATION REPORT

Upon completion of the closure activities at the permitted unit, a closure certification report will be prepared and submitted to the Department for review and approval in accordance with Permit Section 9.5.

9.0 REFERENCES

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Table G.11-1

Closure Schedule for the Technical Area 54, Area G, Pad 10 Outdoor Container Storage Unit

Activity	Maximum Time Required
Notify the Department of intent to close.	-45 days
Final receipt of waste.	Day 0
Complete waste removal.	Day 90
Complete records review and structural assessment.	Day 100
Complete all closure activities and submit final closure certification report to the Department.	Day 180

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Table G.11-2
Potential Waste Materials, Waste Types, and Disposal Options

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

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

Table G.11-3
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method ^a	Test Methods/ Instrumentation	Target Detection Limit ^b	Rationale
<i>Metal Analysis</i>				
Antimony	6010, 7010	ICP-AES, GFAA	20 ug/L	Determine the metal concentration in the samples.
Arsenic	6010, 7010, 7061A	ICP-AES, GFAA, CVAA	10 ug/L	
Barium	6010, 7010	ICP-AES, GFAA	200 ug/L	
Beryllium	6010, 7010	ICP-AES, GFAA	0.2 ug/L	
Cadmium	6010, 7010	ICP-AES, GFAA	2 ug/L	
Chromium	6010, 7010	ICP-AES, GFAA	10 ug/L	
Cobalt	6010, 7010	ICP-AES, GFAA	5 ug/L	
Copper	6010, 7010	ICP-AES, GFAA	5 ug/L	
Lead	6010, 7010	ICP-AES, GFAA	5 ug/L	
Mercury	6010, 7470A, 7471B	ICP-AES, CVAA	0.2 ug/L	
Selenium	6010, 7010, 7741A	ICP-AES, GFAA, CVAA	5 ug/L	
Silver	6010, 7010	ICP-AES, GFAA	10 ug/L	
Thallium	6010, 7010	ICP-AES, GFAA	30 ug/L	
Vanadium	6010, 7010	ICP-AES, GFAA	5 ug/L	
Zinc	6010, 7010	ICP-AES, GFAA	1 ug/L	
<i>Organic Analysis</i>				
Target compound list VOCs plus ten tentatively identified	8260B	GC/MS	10 mg/L	Determine the VOCs concentration in the samples.

compounds (TIC)				
Target compound list SVOCs plus 20 TICs	8270D, 8275	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.
<i>Other Parameters</i>				
Cyanide	9010, 9012	Colorimetric	20 ug/L	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 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

FLAA = Flame atomic absorption spectroscopy

GC/MS = Gas chromatography/mass spectrometry

GFAA = Graphite furnace atomic absorption spectroscopy

ICP-AES = Inductively coupled plasma-atomic emission spectrometry

mg/L = milligrams per liter

Table G.11-4
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
<i>Metals</i>			
Metals: Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, Silver	Aqueous Media: 500-mL Wide-Mouth-Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO ₃ to pH <2 Cool to 4°C	180 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4°C	
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	
<i>Volatile Organic Compounds</i>			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Solid Media: Cool to 4°C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	

<i>Semi-Volatile Organic Compounds</i>			
Target Compound Semi-volatile Organic Compounds	Aqueous Media: Four 1-L Amber Glass with Teflon-Lined Lid	Aqueous Media: Cool to 4 °C	Seven days from field collection to extraction. 40 days from extraction to determinative analysis.
	Solid Media: 250-mL Glass	Solid Media: Cool to 4°C	

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

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

°C = degrees Celsius

HNO₃ = nitric acid

HCl = hydrochloric acid

L = Liter

mL = milliliter

TCLP = Toxicity Characteristic Leaching Procedure

Table G.11-5

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.

Table G.11-6

List of Equipment at the Technical Area 54, Area G, Pad 10 Outdoor Container Storage Unit

Equipment	Decontamination	Disposal
Characterization trailer waste staging equipment (turntables, conveyors)	X	
Any storage structures on Pad 10	X	
Equipment and cabinets	X	X
Container pallets	X	X
Communication equipment	X	X
Access barriers and chains	X	X
Electrical support infrastructure		X

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