ATTACHMENT G.15
TECHNICAL AREA 54, AREA L
OUTDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

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 L 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 consists of an approximately 110,500 square feet (ft^2) asphalt pad covered area within the fence line at Area L. The permitted unit has several structures associated with it that store hazardous and mixed waste in solid and liquid form: one dome (Dome 215); one canopy (Canopy 216); three portable waste storage buildings (Storage Sheds 68, 69, and 70); one storage shed (Shed 31); one building (Building 39 and containment pad); and four covered storage pads (Pad 32, Pad 35, Pad 36, and Pad 58).

The permitted unit consists of a four to six inch-thick asphalt pad, which overlies a base course, is sloped 1 to 1.5% to facilitate drainage, and has a 6-inch-high, 8-inch-wide asphalt berm in some areas to prevent run-on and runoff.

Storage Dome 215 is 60 ft wide, 266 ft long, and 26 ft high with an area of approximately 15,960 ft^2. The dome is an arch frame-supported, stressed-membrane structure of modular construction with an aluminum framework and an ultraviolet, stabilized, plasticized polyvinyl chloride fabric covering equipped with 14 personnel doors and two roll-up doors. The dome is anchored to the concrete ring wall with anchor bolts and the flooring is equipped with a six inch (in.) high by eight in. wide concrete ring wall that surrounds the perimeter of the dome. The dome also has a ramp at the dome's vehicle entrance which allows vehicles and container handling equipment to pass safely over the ring wall. Both the ring wall and the ramp prevent run-on into the dome. Any liquid that might accumulate within Dome 215 (*e.g.*, liquids resulting from fire-suppression activities) is contained within the ring-walled area. Liquid that may result from fire-suppression activities and that is in excess of the capacity inside the ring wall is collected in a double-walled holding tank connected to the eastern side of the dome by a double-walled pipe.

Canopy 216 is 33 ft wide by 120 ft long with an area of approximately 3,960 ft^2. The canopy consists of a rigid aluminum frame anchored to a sloped asphalt pad which supports a tensioned membrane; the membrane, on the sides of the structure, can be rolled down to provide protection from the weather. All waste containers stored in Canopy 216, including gas cylinders, are stored on pallets or are otherwise

elevated (*e.g.*, metal supports, wooden timbers, baskets) to prevent contact with accumulated liquids. All liquid wastes are stored on secondary containment pallets.

The three portable waste storage buildings (Storage Sheds 68, 69, and 70) are steel prefabricated sheds measuring 23 ft long, nine ft wide and 8.5 ft high each with an area of approximately 128 ft^2. The sheds are elevated by design to prevent run-on and are each constructed with a liquid-tight sump covered by metal grates, to ensure containment of any potential leaks or spills and to prevent runoff. Containers are placed directly on the metal grates, which prevent contact with liquids that may have accumulated in the sumps. The interior of each shed and sump is coated with chemically-resistant epoxy paint. Access to the storage compartments in each shed is obtained through three sets of double doors.

Storage Shed 31 is a prefabricated shed constructed of steel that measures approximately 14 ft long, 13 ft wide and eight ft high with an area of approximately 180 square ft. It sits on a concrete foundation that has a raised edge and is surrounded by asphalt which is sloped away from the shed to prevent run-on. The shed has three separate liquid-tight recessed sumps in the concrete foundation that are each covered with a steel grate. Containers are stored on the steel grates which prevent contact with liquids that may have accumulated in the sumps. The sumps and the concrete foundation are coated with chemically-resistant paint.

Storage Pad 32 consists of a bermed (by a 1-ft-wide, 6- to 8-inch-high concrete curb) concrete pad that is 116.5 ft long by 15.5 ft wide with an area of approximately 1800 ft^2. The bermed area, which prevents run-on of storm water, is divided into six separate containment cells to segregate wastes with different hazard classes. The containment cells are separated by metal partitions above the flooring and each consists of a recessed sump covered with grate flooring on which containers are stored; this prevents contact with liquids that may have accumulated in the sumps. The concrete sumps are treated with chemical-resistant epoxy filler-sealer and protective coating which provides an impervious seal to contain any potential leaks, spills, or accumulation of precipitation. The pad is covered by a 117.75-ft-long by 25.75-ft-wide canopy which provides protection from the weather.

Storage Pad 35 consists of a concrete pad that measures 31.5 ft long by 31.5 ft wide with an area of approximately 1050 ft^2. The pad has a six inch high concrete berm that prevents run-on and runoff of liquids. The bermed area has an elevated ramp on one side to allow access for equipment to move waste containers. The ramp also helps to prevent run-on of precipitation and runoff of any accumulated liquids. The concrete berms and the base of the concrete pad are treated with chemical-resistant epoxy filler-sealer and protective coating. The pad is covered by a 136 ft long by 48 ft wide canopy that provides protection from the weather.

Storage Pad 36 is a 33 ft long by 31.5 ft wide concrete pad with an area of approximately 1050 ft^2. The pad is surrounded by a one foot wide berm that varies from six inches to a single foot in height. The berm prevents run-on and runoff of liquids. The berm and the base of the concrete pad are treated with chemical-resistant epoxy filler-sealer and protective coating which provides an impervious seal to contain any leaks, spills, or accumulation of precipitation. The pad also contains a Perma-Con® structure which is constructed of a four ft wide by eight or four ft long 22-gauge stainless-steel panels that interlock in a self-supporting structural steel framework. The Perma-Con® is 28 ft wide by 28 ft long by 12 ft high and is equipped with a 20 ft long observation room that attaches to the main enclosure. The main enclosure has two personnel doors and an eight ft wide roll-up door. The floor in the main enclosure consists of the concrete pad covered with multiple layers of heavy duty plastic sheeting taped together and extended approximately a foot up the sides of the Perma-Con®. The Perma-Con® has a tarp covering its roof to provide additional protection from the elements and preventing the influx of precipitation including snow melt. The pad is covered by a 136 ft long by 48 ft wide canopy that provides protection from the weather.

Storage Pad 58 measures 33 ft long by 31.5 ft wide with an area of approximately 1050 ft^2. The pad has a foot wide berm that varies from six inches to a foot in height. The bermed area has an elevated ramp on one side to allow access for equipment to move waste containers; both the berm and the ramp provide protection from run-on and run-off of precipitation and any accumulated liquids. The berm and the base of the concrete pad are treated with chemical-resistant epoxy filler-sealer and protective coating. This provides an impervious seal that will contain any leaks, spills, or accumulation of precipitation. Stored waste containers are elevated on pallets to prevent contact with any potential accumulated liquids. Storage Pad 58 is covered by a 136-ft-long, 48-ft-wide canopy that provides protection from the weather.

Building 39, which measures 40 ft long by 40 ft wide, is a metal panel building set on a concrete foundation with a metal canopy attached to the south side of the building. The rectangular metal canopy measures 83 ft long by 46 ft wide and covers the concrete pad on which it sits. The combined unit has a surface area of approximately 3,450 ft^2. There are two areas associated with Building 39 that provide secondary containment: Room 101 (located inside Building 39); and a containment pad (located at the south end of Building 39). The 878 ft^2 Room 101 has a six in. high concrete curb that surrounds the room. The curb and floor are treated with chemical-resistant epoxy filler-sealer and protective coating which provides an impervious seal to contain any potential leaks, spills, or accumulation of precipitation. The containment pad, which consists of two sections, is covered by a metal canopy that provides protection from the weather. The eastern section of the containment pad is constructed of asphalt and measures 83 ft long by 23 ft wide; the western section is approximately 58 ft long by 16 ft wide and is surrounded by a one foot high concrete curb that prevents run-on and runoff of liquids. The concrete floor and curb are treated with chemical-resistant epoxy filler-sealer and protective coating.

Area L has stored the following waste types: spent solvents; paints and related wastes; photographic and photocopier wastes; corrosive liquids; solid metals and metallic compounds; off-specification commercial chemical products; gas cylinders; solidified inorganic solids; leached process residues; chemical 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 information about waste management procedures and hazardous waste constituents stored at the permitted unit.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

The estimated volume for the maximum inventory of waste managed over the active life of the permitted unit to date is 1,958,000 gallons. Approximately 2,216,000 gallons of waste is expected to be stored at the permitted unit over the active life of this Permit.

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 unit will be deemed complete when: 1) all structures, surfaces, 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.15-1 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 unit surfaces and related equipment.

Soil sampling and decontamination verification wipe sampling will be conducted to demonstrate that soils, surfaces, 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 can not proceed according to schedule, the Permittees will notify the Department in accordance with the extension requirements in Permit Section 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 closure activities applicable to 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 of the unit 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 as outlined in 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 inspecting the floors, walls, and ceilings of storage buildings 68, 69, and 70, Storage Shed 31, and Building 39, the floors in Dome 215, Canopy 216, and covered storage pads 32, 35, 36, and 58, and the floor of the permitted unit for any existing cracks or conditions that indicate a potential for 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 (SAP) (*see* Section 6.0 of 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 Equipment and Structures

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 following structures and equipment will be removed before the structural assessment: Dome 215 and Canopy 216; equipment related to the dome and canopy (*e.g.*, tensioned-fabric membranes, aluminum beams, trusses, ancillary equipment); and Building 39. The following structures and equipment will be removed after the structural assessment: the permitted unit (the asphalt pad at Area L within the fence line and its related materials (*e.g.*, asphalt, concrete ringwall, foundations, minimum of six inches of the base course, soil underlying the asphalt)); concrete storage pads 32, 35, 36, and 58; all the materials associated with the four concrete storage pads; and the double-walled holding tank.

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 permitted unit, additional soil and materials will be removed. If it is determined to be appropriate at the time of the assessment, soil samples may be collected through the asphalt (before the pad and its materials have been removed) from areas where contamination is suspected (*i.e.*, locations of stains or known spills).

In the event that alternative closure requirements, in accordance Permit Section 9.2.2.2, are applied to the closure of this permitted unit, 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.

5.3.2 Decontamination of Equipment

All structures and related equipment that will be reused by the Facility will be decontaminated (*see* Table G.15-6 of this closure plan) in accordance with Permit Section 9.4.3.1. This includes: the storage sheds (68, 69, 70, and 31); the PermaCon®; the equipment cabinets; the portable air monitors; all the electronic devices and tools; and the spill cleanup equipment containers. This list of equipment requiring decontamination will be revised during the review and assessment.

Equipment and operating machinery that is not sensitive to water intrusion, such as the storage sheds, the PermaCon®, and the equipment cabinets, will be decontaminated 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.*, portable air monitors, electronic devices or tools, and spill cleanup equipment containers in

the dome and canopy) 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. The fire suppression water drain in Domes 215 will be plugged before decontamination activities begin.

5.4 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during closure activities will be cleaned with a wash water solution. The solution will be characterized and managed as a hazardous waste if appropriate. Residue, disposable equipment, and equipment that cannot be decontaminated will be containerized and managed as waste as summarized in Table G.15-2 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 and 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

Soil sampling and decontamination verification wipe sampling activities will be conducted 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. 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 of the storage sheds (68, 69, 70, and 31), Building 39, and the Perma-Con®, one from each ceiling, one from each floor, and one from the 12 sumps in these structures for a minimum of 48 wipe samples. The locations for these samples will be determined randomly within the area of each surface.

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

a. one soil sample in front of each storage shed (68, 69, 70, and 31) associated with the permitted unit for a total of four 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 123 samples (*see* Permit Section 9.4.7.1.ii.a(2));

c. one sample to address stormwater runoff identified as 'sample location 1' (*see* Permit Section 9.4.7.1.ii.a(3) and discussion below for rationale of sample locations);

d. one sample at the discharge point of the underground piping from the double-walled fire water collection holding tank identified as 'sample location 2' (*see* Permit Section 9.4.7.1.ii.a(4));

e. one sample at the sump located in Dome 215 (*see* Permit Section 9.4.7.1.ii.a(5)); and

f. one sample at all joints and intersections of the permitted unit's underground piping (*see* Permit Section 9.4.7.1.ii.a(5)).

At the time of sampling, the precise locations of the grid samples will be randomly selected within each 900 square foot sampling box (*see* Figure G.15-1). These locations will be determined by applying a sub-grid of potential sampling points and randomly choosing one. This sampling strategy will result in a minimum of 123 samples collected from the permitted unit. 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 collection locations will be in addition to the grid sample locations.

Rainwater flow at the permitted unit is directed across the pad by the eastward slope and through a drainage point in the north-east section of the surrounding fence. A sample will be collected where this outlet discharges to soil.

A soil sample will also be collected where liquid discharges from the double-walled fire water collection holding tank on the eastern end of the permitted unit (identified as 'sample 2' on Figure G.15-2).

If there is liquid found in any of the 12 sumps, the double-walled holding tank, or the piping system at the time of sample collection, liquid samples will be collected in accordance with Section 6.2.1 of this closure plan.

6.2 Sample Collection Procedures

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

6.2.1 Liquid Sampling

Liquid samples will be collected and analyzed to determine if residual hazardous constituents remain in the sumps, holding tank, or drain lines at the permitted unit. Liquid samples will be collected using glass or plastic tubes, a composite liquid waste sampler, a bacon bomb, a bailer, or by pouring liquid into sample containers.

6.2.2 Wipe Sampling

Surface wipe samples will be collected and analyzed to determine if residual hazardous constituents remain on structures or 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.

6.2.3 Soil Sampling

Soil 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 analyte (*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.15-4.

6.2.4 Cleaning of Sampling Equipment

Reusable sampling equipment will be cleaned and rinsed prior to use. Sampling equipment rinsate blanks will be collected and analyzed only if reusable sampling equipment is used. Reusable decontamination equipment, including protective clothing and tools, used during closure activities will be scraped as necessary to remove residue and cleaned with a wash water solution. Sampling equipment will be cleaned prior to each use with a wash solution, rinsed several times with tap water, and air-dried 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 section provides 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 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/chain-of-custody form. A chain-of-custody form must accompany all samples from collection through laboratory analysis. The completed original chain-of-custody form will be returned by the analytical laboratory and will become a part of the permanent record documenting the sampling effort.

6.3.1.2 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.15-4 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.15-3. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.15-3. 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. The 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.15-3 was based on the following considerations:

e. the physical form of the waste;

f. constituents of interest;

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 contaminations associated with the sampling and analysis process and are 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.15-5 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. results from QC samples such as blanks, spikes, and calibrations;

c. reference to standard methods or a detailed description of analytical procedures; and

d. 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.15-2 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, as summarized in Table G.15-2, that cannot be decontaminated 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

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

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

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

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

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

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

Table G.15-1

Closure Schedule for the Technical Area 54, Area L 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

Table G.15-2

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.
Dome structures	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.

Potential Waste Materials	Waste Types	Disposal Options
	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.15-3

Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method [a]	Test Methods/ Instrumentation	Target Detection Limit [b]	Rationale
Metal Analysis				
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	
Organic Analysis				
Target compound list VOCs plus ten tentatively identified compounds (TIC)	8260B	GC/MS	10 mg/L	Determine the VOCs concentration in the samples.

Target compound list SVOCs plus 20 TICs	8270D, 8275	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.
Other Parameters				
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
ug/L = micrograms per liter.

Table G.15-4

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

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
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	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Solid Media: Cool to 4°C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	
Semi-Volatile Organic Compounds			

Target Compound Semi-volatile Organic Compounds	Aqueous Media: Four 1-L Amber Glass with Teflon-Lined Lid	Aqueous Media: Cool to 4 °C	Seven days from field collection to 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
HNO_3 = nitric acid
HCl = hydrochloric acid
L = Liter
mL = milliliter
TCLP = Toxicity Characteristic Leaching Procedure

Table G.15-5

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.15-6

List of Equipment at the Technical Area 54, Area L Outdoor Container Storage Unit

Equipment	Decontamination	Disposal
Perma-Con structure and associated equipment on Pad 36	X	X
Dome and Canopy materials		X
Equipment and spill kit cabinets	X	
Container pallets	X	X
Communication equipment	X	X
Access barriers and chains	X	X
Double-walled holding tank	X	

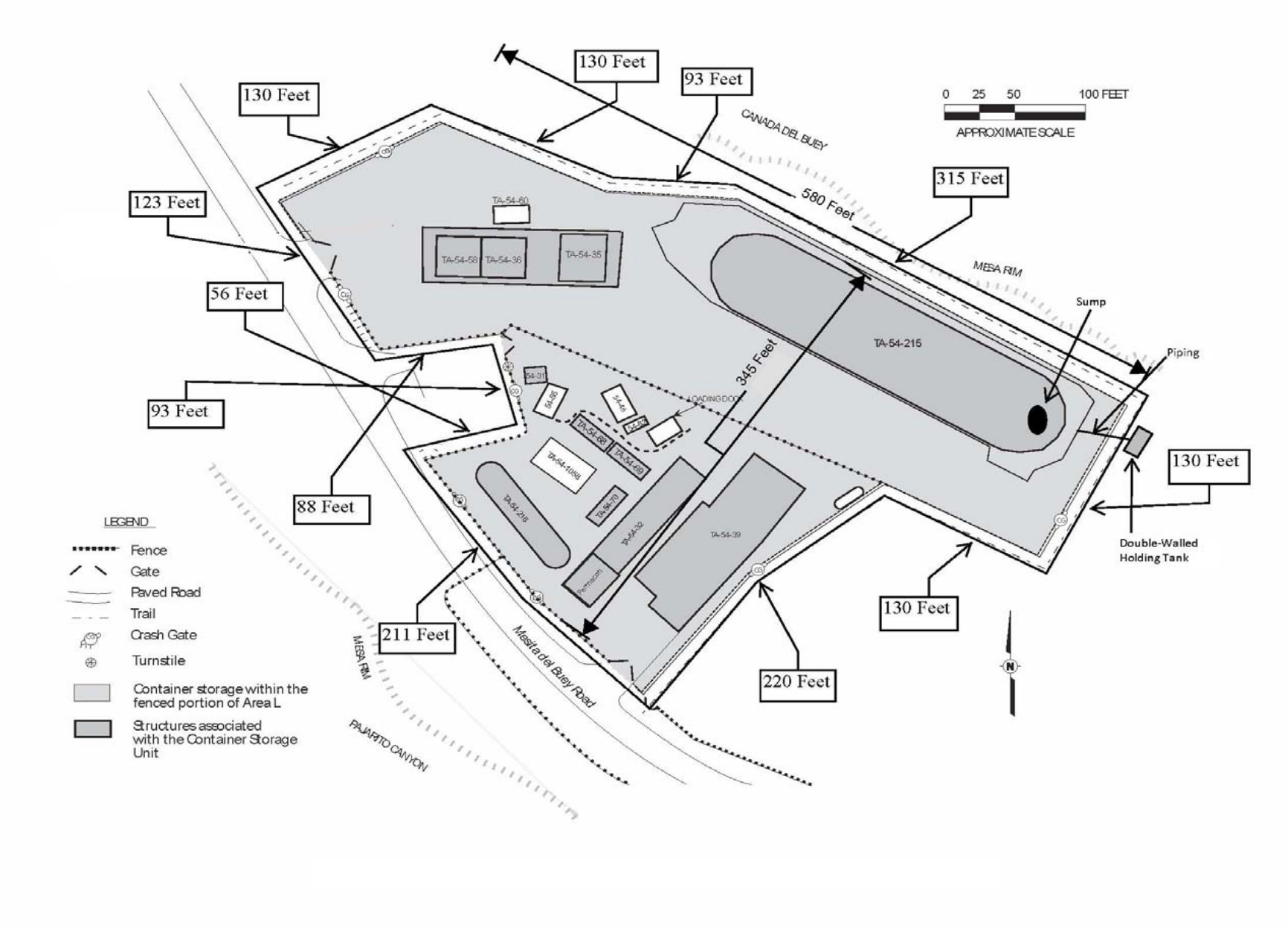

Figure G.15-1: Technical Area 54, Area L, Outdoor Container Storage Unit Sampling Grid and Dimensions

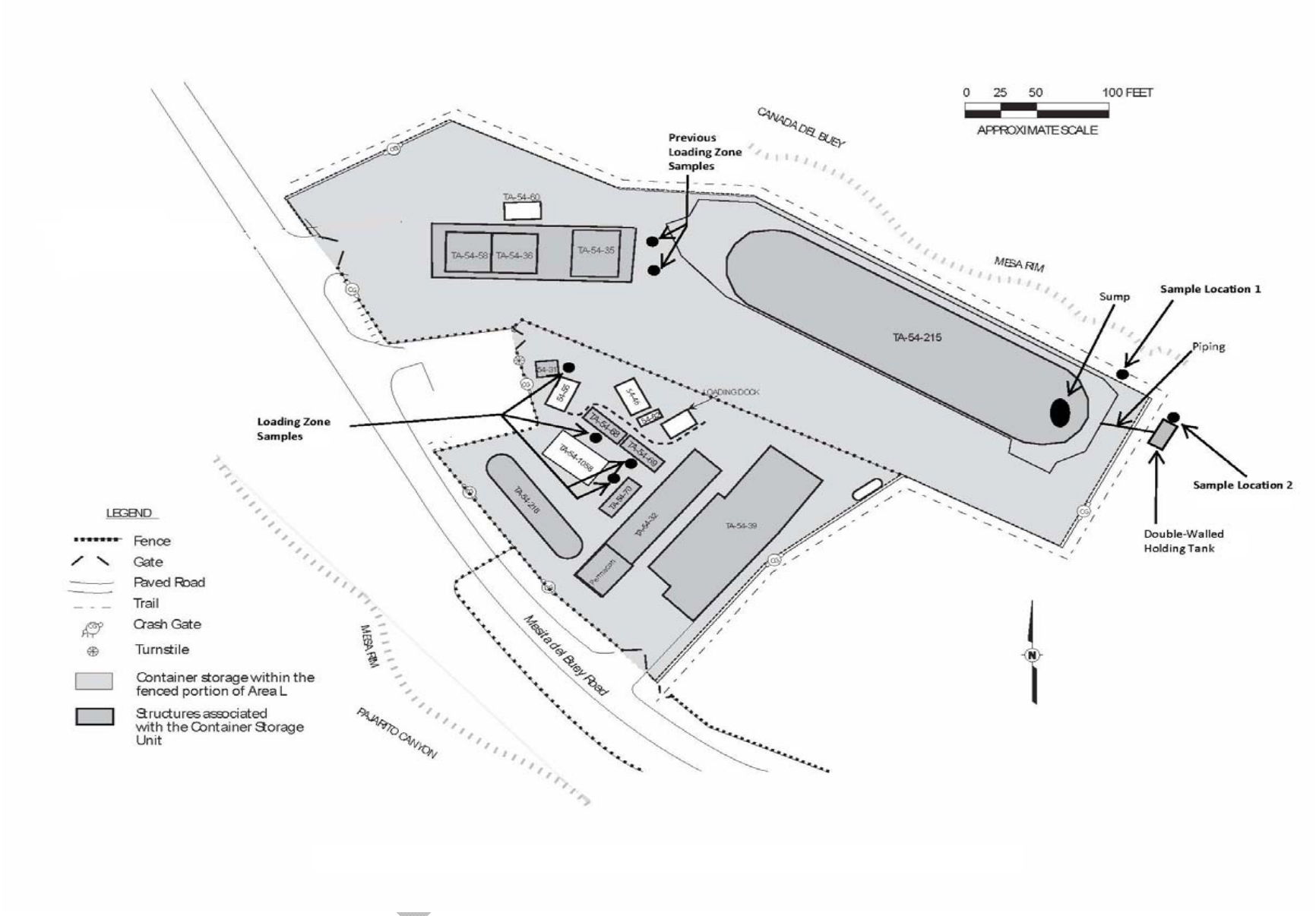

Figure G.15-2: Technical Area 54, Area L, Outdoor Container Storage Unit Additional Soil Sampling Locations