

ATTACHMENT A
TECHNICAL AREA (TA) - UNIT DESCRIPTIONS

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ATTACHMENT A

This attachment contains TA-specific unit descriptions, including the dimensions, materials of construction, security procedures, and emergency equipment of each unit provided by the Permittees in their permit application.

A.1 TA-3

TA-3 is located in the northern portion of the Facility on South Mesa between Los Alamos Canyon on the north and Two Mile Canyon on the south. Sandia and Mortandad Canyons head on the east margin of TA-3 forming steep cliffs at the top of canyon walls.

A.1.1 TA-3 Building 29

TA-3-29, the Chemistry Metallurgy Research Building (CMR), was established in 1952 as a research facility (*see* Figure 12 in Permit Attachment N (*Figures*)). It is a three story structure containing offices, laboratories, and one permitted container storage unit located in the basement at TA-3 building 29 of Wing 9. The TA-3-29 permitted unit consists of a room (9010) and portions of two other rooms (9020 and 9030) where storage of hazardous and mixed waste occurs. The following provides a description of the permitted unit.

A.1.1.1 TA-3-29 Room 9010

Room 9010 measures 21 feet by 8 inches wide by 106 feet, 9 inches (in) long (*see* Figure 13 in Permit Attachment N (*Figures*)). The floor is concrete and is painted with an epoxy sealant. Waste storage takes place in the lower level portion of Room 9010 but may also take place in or near the two room enclosures 9010A and 9010B.

The northern enclosure is approximately 10 ft wide by 24 ft long; the southern enclosure measures approximately 17 ft wide by 54 ft long. The enclosures have ceilings, walls with windows, and doors for entry through airlocks; the enclosures are anchored to the floor. The wall to floor joints are sealed with grout. Floors and the lower six inches of the interior enclosure walls are coated with an epoxy sealant. Each enclosure includes emergency and communication equipment as well as ventilation, fire sprinkler, water, and electrical support functions connected to the main building systems. The enclosures are kept at negative pressure by the building's exhaust system via exhaust ports in the enclosures which are ducted through high-efficiency particulate air filters to provide radioactive material air release protection.

A.1.1.2 TA-3-29 Portion of Room 9020

Room 9020 is approximately 27 feet wide by 141 feet long. The permitted container storage area measures 19 feet wide by 25 feet long (*see* Figure 14 in Permit Attachment N (*Figures*)) and is located in the northeast side of the room. The floor is concrete and painted with an epoxy sealant.

A.1.1.3 TA-3-29 Portion of Room 9030

Room 9030 is approximately 62 feet wide by 141 feet long. The permitted container storage area within Room 9030 measures approximately 30 feet long by 8 feet wide (*see* Figure 15 in Permit Attachment N (*Figures*)) and is located in the southwest corner of the room. The floor is concrete and has been painted with an epoxy sealant. Hand trucks, dollies, or casters will be used to move waste containers from the loading area to the storage portions of the permitted unit. Should a spill occur during waste handling activities, management of the spill and residual material will be performed in accordance with Attachment D (*Contingency Plan*). Drums on dollies will be moved manually and a pallet jack will be used to move standard waste boxes.

A.1.2 Security and Access

Security at TA-3-29 is maintained with physical and administratively-controlled barriers. These barriers prevent the unknowing entry and minimize the possibility for unauthorized entry of persons or livestock into the areas. Eight-foot-high chain-link security fences with barbed wire at the top surround the entire perimeter of the building. Bilingual (*i.e.*, English and Spanish) warning signs are also posted at the entrances to each portion of the permitted unit within the building and can be seen from any approach to these locations. The legends on the signs indicate "Danger: Hazardous Waste Storage Area" and "Unauthorized Persons Keep Out." The signs are legible from a distance of at least 25 ft. There are four entry gates through the security fence at TA-3-29 (*see* Figure 4 in Permit Attachment N (*Figures*)). A fire access and shipping gate is located south of TA-3-29 and is routinely closed and locked. When the gate is opened for shipments of material or waste, personnel are present at the gate to restrict the entry and exit of unauthorized persons. The northwest entrance is an open gate which allows vehicular and pedestrian entry. Access is controlled through a manned gate at the western entrance to the TA-3 Security Area. Another unmanned badge reader entry pedestrian gate is located at the southeast corner of the building's fence line. This gate is combined with a double vehicular gate which allows access from the parking area south of the building. Security personnel are present at each of these gates during operational hours to restrict the entry and exit of unauthorized persons. Outside doors to the main wings of TA-3-29 are always locked. Access for visitors to the operational portion of the building is controlled by turnstiles located in the east side lobby and another on the west side of the building. Roll-up doors to the building can only be opened from inside the building and are also locked; opening these doors must be coordinated with security personnel. The building site is patrolled by security personnel during nonoperational hours to ensure that the gates are locked and that unauthorized entry has not occurred.

A.1.3 Emergency Equipment

TA-3-29 is equipped with an audible alarm system to alert personnel to evacuate the area. The evacuation alarm system may be activated by facility personnel pushing one of the evacuation buttons located throughout TA-3-29. The building also contains a fire alarm system which may be activated by manual pull stations, heat and smoke detectors, and sprinkler system flow valves found throughout TA-3-29. Rooms 9010, 9020, and 9030 contain wet-pipe sprinkler systems that are equipped with fusible-link heads that actuate at 212 degrees Fahrenheit.

Wing 9 of TA-3-29 contains gamma alarms that monitor for the presence of gamma radioactive contamination. Continuous air monitors are utilized throughout TA-3-29 to detect airborne radioactive contamination and, when detected, sound an alarm. The building also has a public address system for announcing fires or evacuations. Telephones with paging capabilities are located throughout TA-3-29. Paging telephones are used to page on-site personnel and may be used in the event of an emergency to communicate the location and nature of hazardous conditions to personnel in the area. Personnel working in Rooms 9010, 9020, and 9030 can also use these phones to summons assistance from local emergency response teams in case of emergency. Rooms 9010, 9020, and 9030 are equipped with fire extinguishers and pull stations. Depending on the size of a fire and the fuel source, fire extinguishers may be used by on-site personnel. However, the Facility policy encourages immediate evacuation of the area and notification of appropriate emergency personnel. The fire alarm control panel continuously monitors all fire-suppression and detection systems and transmits signals to the Los Alamos Fire Department through the Facility's central alarm system.

Fire hydrants installed according to National Fire Protection Association standards are located around the outside of TA-3-29. Water is supplied to the fire hydrants by a municipal water system through 8-in. pipes at an adequate volume and pressure (*i.e.*, 200 gallons per minute and 90 pounds per square inch static pressure) to supply a water hose in the event of a fire. Spill kits, which contain sorbent pillows, safety glasses, and gloves, are located at the south end of Room 9010 in enclosures 9010a and 9010b. Trained personnel may use this equipment to mitigate small containable spills when they are certain their actions will not put themselves or others at risk. Available personnel decontamination equipment includes safety showers and emergency eyewashes in enclosures 9010a and 9010b.

Personnel working in Room 9020 have access to the eyewashes in enclosures 9010a and 9010b and a safety shower and emergency eyewash in Room 9030. The buddy system will always be employed when containers are actively managed in Rooms 9010, 9020, and 9030 to assure that safety showers and eyewashes can be reached in an emergency. Safety Data Sheets (SDS) (formerly Material Safety Data Sheets (MSDS)) provide useful exposure information and are available in Rooms 9010, Room 9030, and outside Room 9030.

A.2 RESERVED

A.3 TA-50

TA-50 is located at the northeast corner of the intersection of Pajarito Drive and Pecos Road, on the finger mesa bounded by Mortandad Canyon to the north and Two-Mile Canyon to the south (*see* Figure 22 in Attachment N (*Figures*)). The container storage units at TA-50 include the TA-50-69 Indoor unit (Rooms 102 and 103) and the TA-50-69 Outdoor unit.

The northern and eastern portions of TA-50 drain mainly to an unlined channel on the boundary between TA-50 and TA-35 (east of TA-50), although some flow diverges into a shallow channel running southward between TA-50-37 and TA-50-1.

A.3.1 TA-50-69 Indoor Permitted Unit

The TA-50-69 Indoor permitted unit consists of Rooms 102 and 103 as shown in Figure 23 in Attachment N (*Figures*). Room 102, the main process room, measures approximately 45 feet wide and 52 feet long. Room 103, the unloading area, measures approximately 18 feet wide and 19 feet long and is located adjacent to and southeast of Room 102. A 12 foot by 20-foot roll-up vehicle access door is located at the southernmost end of Room 103 separating the unloading area (Room 103) from the vehicle airlock entrance (Room 104). This design allows for unobstructed transport of oversized fiberglass-reinforced plywood boxes from outside the facility, through the vehicle airlock entrance, into the unloading area, and into the glove box cutting enclosure. A smaller glovebox, designed for mounting of a single parent container and multiple daughter containers at one time is also located within Room 102.

The small glovebox located in Room 102 is used for sorting, segregation, resizing, and treatment of transuranic mixed waste. The glovebox was designed in 1994 and installed in the mid-1990s. It has two 55-gallon daughter drum bag out ports, a 14-inch diameter bag-out port, and a single 55-gallon drum waste bag-on port. The box is 11 feet long, 3 feet wide, and 30 inches high. The box has seven work stations, three on the front side and four on the back. The waste drum is attached straight on from the front side of the glovebox and accessed from the back of the box. A liquid catch basin is located below the parent bag-on port to collect liquid from the parent drum. The glovebox is equipped with a water fire sprinkler for fire suppression. Ventilation for the glovebox is pulled in from the room and exhausted through high-efficiency particulate air (HEPA) filters on the glovebox and then through the facility HEPA filters.

Mixers and blender will be used to provide mixing to ensure the waste being treated is well blended; first with water to aid in processing (by reducing the viscosity and dissolving the nitrate salts, in the case of solids), and then with zeolite to absorb the nitrate solution and provide an inorganic matrix. Volumetric containers will be used to measure the ingredients (water, waste, and zeolite). Waste removed from the parent container will be collected in a container to move to the mixers for processing. Water will be delivered to the mixer via piping through the glovebox patch panel, and/or from a container mounted to a glovebox opening via a pump. Zeolite will be loaded into the glovebox. All contents of a single waste container will be treated with in a single shift, or the waste containers (parent and daughter) will be closed using a vented, rigid cover if the waste must be left unattended mid treatment.

The liquid contents of the nitrate salt-bearing waste containers will be decanted from the parent waste container, captured in a container, added to the mixer and then blended with zeolite. A waste liquid-to-zeolite volume ratio of at least 1:3 will be utilized, followed by blending using a mixer until the mixture is combined. If liquid enters the catchment basing within the glovebox, it will be absorbed in the catchment basin using zeolite and then moved to the mixer and zeolite will be added and blended to combine until the mixture is stabilized. Stabilized liquids will be placed into a daughter container. All three subsets of nitrate salt-bearing waste streams require this treatment process for liquids within the parent container. In the case of cemented nitrate salt-bearing waste, no further treatment is necessary for the cemented solids within the container.

Waste treatment of the solids (for remediated and unremediated nitrate salt-bearing waste) will occur by first adding a premeasured amount of water to the mixing bowl if the waste is not already wet. A premeasured quantity of waste will then be added to the mixing bowl and mixed to decrease the viscosity to aid with the final blending step. The waste and water mixture will then be blended with zeolite until absorbed. Blending of the waste will occur using mixers, pre-sized measuring containers, and a container for the movement of waste. Size reduction of the solids may require the use of hand tools (such as a masher, hammer and sieve) or the use of a blender.

The volumetric blend ratios are the guiding requirements for the process. These then drive the treatment process to be used based upon the size of the batch to be prepared. The blend ratios are:

- waste-to-water: 1.0:0 < volume ratio < 1.0:1.0
- blended waste and water mixture-to-zeolite: 1.0:2.0 < volume ratio < 1.0:5.0

Using the volumetric ratios, the waste process steps of (1) add water, if necessary, (2) blend with nitrate salt-bearing waste, and then (3) add zeolite and blend until mixed. The Operator will first add a quantity of water and waste within the mixing bowl and blend until combined. A premeasured quantity of zeolite will be added to the mixer bowl and blended until stabilized.

Most debris within the waste containers do not require additional treatment and will either be placed back into the parent container or placed directly into the daughter container with the treated waste. Excess salt or salt-organic absorbent mixtures stuck to the debris waste will be removed from the debris using glovebox gloves, a brush, or a non-sparking brush as necessary. Debris may be stored temporarily in a container that will be attached to a glovebox opening and resized as necessary to be packaged in a waste container. Resizing of debris may include tearing or crumpling the debris using shears or other cutting tools utilizing non-sparking tools or processes. Any additional cellulosic material (*e.g.*, Kimwipes or Wypalls) found within the parent container will require additional treatment and will be macerated with water using a high speed blender and then mixed with zeolite in a least a 1:3 blended waste-water mixture to zeolite ratio.

A.3.2 TA-50-69 Outdoor Permitted Unit

The TA-50-69 Outdoor permitted unit was constructed before 1980 and was first used to store mixed waste in 1982. It is located in the southwest corner of TA-50 (*see* Figure 23 in Attachment N (*Figures*)). The TA-50-69 Outdoor unit is comprised of an unlined and non-coated asphalt pad measuring 24 feet in width and 90 feet in length. The entire pad is approximately 4 inches thick and slopes gently (approximately one to five percent) from west to east and up to 2.5 percent toward the centerline. Transportainers and other weather protective structures (*i.e.*, containers covered with tarps, containers inside SWBs) in the permitted unit provide weather protection for containers of various sizes. Painted lines are used to visually delineate the TA-50-69 Outdoor unit boundary. Drainage swales located in the vicinity divert storm water away from the pad. One drainage swale is located just south of the unit; between it and the material disposal area C. A second drainage swale is located on the west side of the permitted unit between Pecos Drive and the TA-50 fence line.

A.3.3 Security and Access

Security at TA-50 is predominantly maintained with artificial barriers. These barriers prevent the unknowing entry and minimize the possibility for unauthorized entry of persons or livestock into the area.

An 8ft high chain-link security fence surrounds the entire perimeter of TA-50. Bilingual (*i.e.*, English and Spanish) warning signs are posted on the fences at approximately 50 to 75 foot intervals. Warning signs are also posted at the entrances to each area that will manage hazardous and mixed waste and are visible from any approach to these areas. The legends on the posted signs indicate “Danger–Hazardous Waste Storage Area” and “Unauthorized Persons Keep Out.” Existing signs with a legend other than “Danger–Unauthorized Persons Keep Out” may be used if the legend on the sign indicates that only authorized personnel are allowed to enter the active portion, and that entry into the active portion can be dangerous. The signs are legible from a distance of 25 ft. Additionally, signs are posted at the entrance to each hazardous and mixed waste permitted unit to address requirements associated with entering and working in the area.

There are four entry gates into TA-50. Two entry gates are located north of TA-50-1. During normal business hours, the easternmost of these two gates may remain open to receive deliveries. After normal business hours, this gate is padlocked. The westernmost of these two gates is the main access gate and remains open during normal business hours for personal and government-owned passenger vehicles. After normal business hours, access through this gate is by badge-reader only. The third gate is a fire access and shipping gate which is located west of TA-50-69 and is routinely kept closed and locked. When this gate is opened for shipments of materials or waste, facility personnel are present in the yard west of TA-50-69 to limit entry by unauthorized persons. When shipments are completed, the gate is re-closed and locked. A fourth gate to the south of TA-50-1 is locked except when authorized access is necessary.

TA-50-69 is located in the southwest quadrant of TA-50. The TA-50-69 Indoor unit was constructed in 1979 to house the Waste Characterization, Reduction, and Repackaging Facility (WCRRF). The primary purpose of WCRRF was to size reduce and repackage large transuranic contaminated metallic items (*e.g.*, glove boxes, process equipment) into standard sized containers for transport to, and disposal at, the Waste Isolation Pilot Plant. The facility was first used to size reduce mixed transuranic waste in 1982. The original function of the WCRRF has since been expanded to include other activities related to hazardous and mixed waste management including waste characterization, transuranic and mixed transuranic waste prohibited item disposition and repackaging operations, and experimental process demonstration support.

TA-50-69 is a single-story building constructed in two phases. The original structure (45ft by 52 ft) was built in 1979 to house the main process room (Room 102) and personnel change rooms. An unloading area (Room 103), a vehicle airlock entrance (Room 104), and a mezzanine over the western third of the main process room were added to the building in 1986.

The exterior walls of TA-50-69 are load-bearing and constructed of structural steel framing with a plastic veneer finish on polystyrene insulation and gypsum wallboard. The interior walls are similarly constructed. The epoxy-painted floor of the building is a reinforced concrete slab on compacted fill.

A forklift or other manual, mechanical, and hydraulic drum handling equipment will be used to move containers stored at the permitted units at TA-50-69. Fiberglass-reinforced plywood boxes and palletized drums will be handled with a forklift equipped with tines or other types of mechanical or hydraulic drum handling equipment. Individual drums of waste will be manipulated with a drum-grapple attachment on the forklift or other manual, mechanical, and hydraulic drum handling equipment. Small containers may be handled manually or with a dolly. Inside TA-50-69 two cranes are available to move heavy objects.

TA-50 is patrolled by security personnel during non-operational hours to ensure that unauthorized entry has not occurred. The locations of the security fences and entry gates at TA-50 are shown on Figure 6 in Permit Attachment N (*Figures*).

TA-50-69 access is controlled through a centralized Operations Center located in TA-50-84. The Indoor permitted unit is always locked and access is gained by a badge reader. Doors to the building and transportainers are locked. Keys to these doors are distributed to designated personnel only. A chain is installed at the east end of the operations area and adjacent to TA-50-84 and is posted with the bilingual hazardous waste sign.

All personnel involved in waste management activities at the TA-50-69 indoor and outdoor permitted units have immediate access to an internal alarm or emergency communication device. In the event of an emergency, this communication equipment allows personnel to contact the operating group management, the Emergency Management and Response personnel, or the Central Alarm Station operator.

TA-50-69 is equipped with an audible alarm system to alert personnel to evacuate the area. The alarm system may be activated by one of the fire alarm pull stations located throughout the building. Personnel can also use phones to summon assistance from local emergency response teams in case of an emergency. Personnel may carry pagers, two-way radios, or cellular telephones so they can contact, or be contacted by, on-site and the Facility emergency support personnel at all times.

TA-50-69 is equipped with fire extinguishers and fire suppression systems. Depending on the size of a fire and the fuel source, fire extinguishers may be used by on-site personnel. However, the Facility policy encourages immediate evacuation of the area and notification of appropriate emergency personnel. The fire alarm control panel continuously monitors all fire suppression and detection systems and transmits signals to the Los Alamos County Fire Department through the Facility's central alarm system.

A fire hydrant installed according to National Fire Protection Association standards is located approximately 55 feet west of TA-50-69. Water is supplied to the fire hydrant by a municipal water system through eight inch pipes at an adequate volume and pressure (*i.e.*, 200 gallons

per minute and 90 pounds per square inch static pressure) to supply a water hose in the event of a fire.

TA-50-69 has an automatic wet-pipe sprinkler system in the main building and in the large glove box enclosure. The sprinkler system is heat-activated at 100°C (212°F). The TA-50-69 Outdoor permitted unit transportainers and weather protective structures are not equipped with automatic sprinkler systems; however, a fire extinguisher is located within 20 feet of the unit. Personnel may use the fire alarm pull station at TA-50-69 in the event of a fire at both the indoor and the outdoor permitted units.

Two spill centers are located in TA-50-69 Room 102. They contain spill control equipment, personal protective equipment, and sorbents. Trained personnel may use this equipment to mitigate small containable spills when they are certain their actions will not put themselves or others at risk. Depending on the size and severity of the spill, EM&R provides additional spill control equipment and assistance upon request. Available personnel decontamination equipment includes safety showers and eye wash stations located in the TA-50-69 indoor permitted unit.

A.4 TA-54

TA-54 consists of 130 acres atop Mesita del Buey and is used for treatment and storage of hazardous and mixed waste generated throughout the Facility (*see Figure 24 in Attachment N (Figures)*). A principal mission of TA-54 is to manage Facility waste safely and efficiently, consistent with federal and state regulations and U.S. Department of Energy (DOE) requirements. TA-54 has three separate areas where hazardous and mixed waste is stored and treated; Area L, Area G, and TA-54 West (*see Figure 25 in Attachment N (Figures)*). There is one permitted unit at Area L, nine permitted units at Area G, and two permitted units at TA-54 West (*see Attachment J (Hazardous Waste Management Units)*).

Waste containers are transported to the permitted units at Areas L, G, and West by flatbed trucks, closed-box trucks, or trailers. The permitted units have design features that promote safe unloading and handling of waste containers from these trucks and trailers. Ramps are typically located at vehicle entrances to the dome structures at the Area L and Area G permitted units. Shed 31 at Area L and Shed 8 at Area G have sloped entryways for container-handling equipment. The storage domes have roll-up or roll-away vehicle access doors. The loading dock at TA-54 West allows access from the transport vehicles to the loading dock platform. These design features facilitate safe handling of containers in and out of the permitted units.

All waste containers at the TA-54 permitted units are handled in a manner that will not cause them to rupture or leak. Most containers are handled with forklifts (using drum grapplers, when appropriate) and are placed directly in the appropriate permitted unit. For larger containers, personnel can use a boom or, at TA-54 West and in portions of Area L, a bridge crane or mobile crane, respectively. At TA-54-412, waste containers (*e.g.*, fiberglass reinforced plywood crates, drums, large boxes) are generally handled with forklifts, overhead

cranes, or frictionless air pallets. Smaller containers are generally handled manually or with drum dollies. The use of proper handling equipment, appropriate to a container's size and weight, helps to prevent hazards while moving containers (*e.g.*, when loading and unloading containers).

A.4.1 AREA L

The Area L permitted unit is the area within the fence and is comprised of several storage structures: dome 215; concrete pad with canopy 32; concrete pads 35 and 36; storage sheds 68, 69, 70, 31; modular units 39 and 58 (*see* Figure 26 in Attachment N (*Figures*)).

The permitted unit stores containers of hazardous and mixed low level waste in solid and liquid form. Liquid wastes are stored primarily in structures that are designed for secondary containment; however, secondary containment pallets are also used. Secondary containment pallets are typically constructed of polyethylene or metal painted with a chemical-resistant coating. Polyethylene secondary containment pallets used at TA-54 are generally 50 inches long by 50 inches wide by 17 inches deep, with a designed capacity of 83 gallons. Currently, two sizes of metal secondary containment pallets are used at TA-54. One is 52 inches long by 52 inches wide by 6.5 inches deep, with a designed capacity of 57 gallons; the other is 60 inches wide by 60 inches long by 6.5 inches deep, with a designed capacity of 77 gallons. The metal secondary containment pallets are coated with chemically-resistant urethane. The stressed- or tensioned-membrane fabric used on Storage Dome 215 at the aboveground permitted unit within the fence at Area L is coated with ultraviolet (UV)-stabilized plasticized polyvinyl chloride (PVC). It is fungus-resistant and certified flame-retardant (*i.e.*, self-extinguishing).

A.4.1.1 Storage Dome 215

Storage Dome 215 is 60 feet wide, approximately 266 feet long, and 26 feet high (*see* Figure 25 in Attachment N (*Figures*)). It is an arch frame-supported stressed-membrane structure. The dome is of modular construction and uses light construction materials (*i.e.*, aluminum framework with membrane or fabric covering). It is equipped with 14 personnel doors and two roll-up doors. The dome's pad is equipped with a 6-inch-high, 8-inch-wide concrete ring wall that surrounds the perimeter of the dome, and the dome is anchored to the concrete ring wall with anchor bolts. A ramp is located at the vehicle entrance to the dome and allows vehicles and container handling equipment to pass safely over the ring wall. The ring wall and the ramp prevent run-on into the dome. Any liquid that might accumulate within the storage dome (*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 dome 215 by a double-walled pipe.

A.4.1.2 Reserved

A.4.1.3 Storage Sheds 68, 69, and 70

Storage sheds 68, 69, and 70 are prefabricated sheds constructed of steel (Safety Storage Building, Model 22) (*see* Figure 26 in Attachment N (*Figures*)). Each shed measures approximately 23 feet long, 9 feet wide and 8.5 feet high. Access to these storage sheds is obtained through one of three sets of double doors. Storage Shed 68 has three separate compartments with one door leading to each compartment. Storage Sheds 69 and 70 each have two separate compartments with one door leading to the smaller compartment and two doors leading to the larger compartment. The sheds are elevated by design which prevents run-on. Each shed is constructed with liquid-tight sumps to ensure containment of any potential leaks or spills and to prevent runoff. The floor of each shed consists of a metal grate that covers the sump areas. Containers are placed directly on the metal grates which prevent contact with liquids that may have accumulated in the sumps. The sump of each shed is lined with high-density polyethylene liners. The designed sump storage capacity of each shed is 750 gallons, which exceeds the amount necessary to hold 10% of the total storage capacity of each shed (1,760 gallons).

Shed 68 has three separate compartments each having its own sump with individual capacities of 250 gallons. Sheds 69 and 70 have two separate compartments, each having its own sump. One compartment consists of two thirds of the surface area (and capacity) of Sheds 69 and 70. The capacity of this compartment's sump is 500 gallons; the smaller compartment's sump capacity is 250 gallons. The designed sump storage capacity of each shed is 750 gallons which exceeds the amount necessary to hold 10% of the total storage capacity of each shed (1,760 gallons).

A.4.1.4 Storage Shed 31

Storage Shed 31 is a prefabricated shed constructed of steel. It measures approximately 14 feet long, 13 feet wide, and 8 feet high (*see* Figure 26 in Attachment N (*Figures*)). The shed sits on a concrete foundation that has a raised edge and is surrounded by asphalt that 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. Two of the sumps are approximately 6 feet long by 4 feet wide; the third sump is approximately 7 feet long by 6 feet wide. All three sumps are 5 inches deep. The total capacity of the three sumps is approximately 285 gallons, which exceeds the amount necessary to hold 10% of the total storage capacity of the shed (1,320 gallons). The total capacity of the three sumps is approximately 285 gallons, which exceeds the amount necessary to hold 10% of the total storage capacity of the shed (1,320 gallons).

A.4.1.5 TA-54-32

TA-54-32 (*see* Figure 26 in Attachment N (*Figures*)) consists of a concrete pad that is 116.5 feet long by 15.5 feet wide. The structure is covered by a 117.75 feet-long by 25.75 feet-wide canopy. The canopy provides protection from the weather. The concrete pad is bermed by a 1-foot-wide, 6- to 8-inch-high concrete curb. This curbed area is divided into six separate containment cells to segregate wastes with different hazard classes. The curb prevents run-on of storm water. Each containment cell 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 cells are separated by metal partitions above the flooring. The concrete sumps are treated with chemical-resistant epoxy filler-sealer and protective coating, providing an impervious seal to contain any potential leaks, spills, or accumulation of precipitation. Cells 1 and 6 are approximately 26.5 feet long by 13.5 feet wide by 1 foot deep, with a sump capacity of 2,675 gallons each. Cells 3 and 5 are approximately 16.8 feet long by 13.5 feet wide by 1 foot deep, with a sump capacity of 1,700 gallons each. Cells 2 and 4 are approximately 13.5 feet long by 11.2 feet wide by 1 foot deep, with a sump capacity of approximately 1,130 gallons each. These sump capacities exceed the amount necessary to hold 10% of the maximum storage capacity for TA-54-32.

A.4.1.6 TA-54-35

TA-54-35 (*see* Figure 26 in Attachment N (*Figures*)) consists of a concrete pad that measures 31.5 feet long by 31.5 feet wide. The area is covered by a 136 ft-long, 48 feet-wide canopy that provides protection from the weather. The pad has a 6-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 bermed secondary containment area of the pad is approximately 29.5 feet long by 24.5 feet wide by 8 inches deep. Stored waste containers are elevated on pallets to prevent contact with any potential accumulated liquids. The secondary containment capacity of the bermed area is approximately 3,570 gallons, which exceeds the amount necessary to hold 10% of the maximum storage capacity for TA-54-35 (15,840 gallons)

A.4.1.7 TA-54-36

TA-54-36 (*see* Figure 26 in Attachment N (*Figures*)) is a 33-feet-long by 31.5-feet-wide concrete pad. It is covered by a 136 feet-long, 48 feet-wide canopy that provides protection from the weather. The pad is surrounded by a 1-foot-wide berm that varies from 6 inches to 1 ft in height. The berm prevents run-on and runoff of liquids. The bermed secondary containment area of the pad is approximately 30.5 feet long by 30 feet wide by 9 inches deep. The pad also contained a Perma-Con® structure which has been removed and disposed. The secondary containment capacity of the bermed area is approximately 4,595 gallons, which exceeds the amount necessary to hold 10% of the maximum storage capacity for TA-54-36 (13,200 gallons).

A.4.1.8 TA-54-58

TA-54-58 (*see* Figure 26 in Attachment N (*Figures*)) is a pad that measures 33 ft long by 31.5 ft wide. It is covered by a 136 ft-long, 48 ft-wide canopy that provides protection from the weather. The pad has a 1-ft-wide berm that varies from 6 in to 1 ft in height. The berm 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 bermed secondary containment area of the pad is approximately 30.5 ft long by 25 ft wide by 6 in deep. The secondary containment capacity of the bermed area is approximately 2,850 gallons, which exceeds the amount necessary to hold 10% of the maximum storage capacity for TA-54-58 (15,840 gallons).

A.4.1.9 TA-54-39 and Containment Pad

TA-54-39 measures 40 ft-long by 40 ft-wide (*see* Figure 26 in Attachment N (*Figures*)). It 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. There are two areas associated with TA-54-39 that provide secondary containment. These areas include Room 101, located inside the building, and a containment pad located at the south end of the building. Room 101 inside TA-54-39 has a 6-in-high concrete curb that surrounds the room. The containment pad at the south end of TA-54-39 consists of two sections. The pad is covered by a metal canopy, which provides protection from the weather. The eastern section of the containment pad is constructed of asphaltic concrete and measures 83 ft-long by 23 ft-wide. The western section of the containment pad is approximately 58 ft-long by 16 ft-wide and is surrounded by a 1-foot-high concrete curb, which prevents run-on and runoff of liquids. The secondary containment capacity for Room 101 is approximately 3,280 gallons, which exceeds the amount necessary to hold 10% of the maximum storage capacity of the room (9,900 gallons). The secondary containment capacity for the western section of the TA-54-39 containment pad is approximately 7,120 gallons, which exceeds the amount necessary to hold 10% of the maximum storage capacity of this section of the containment pad (15,180 gallons).

A.4.2 AREA G

The permitted units at Area G are used to store and treat containers of hazardous, mixed low level, and mixed transuranic wastes in solid and liquid form (*see* Figure 27 in Attachment N (*Figures*)). Liquid wastes are stored primarily in structures that are designed for secondary containment. However, secondary containment pallets are also used.

Secondary containment pallets are typically constructed of polyethylene or metal painted with a chemical-resistant coating. Polyethylene secondary containment pallets used at TA-54 Area G are generally 50 in long by 50 in wide by 17 in deep with a designed capacity of 83 gallons. Two sizes of metal secondary containment pallets are typically used at TA-54 Area G. One size is 52 in long by 52 in wide by 6.5 in deep with a designed capacity of 57 gallons. The other is 60 in long by 60 in wide by 6.5 in deep with a designed capacity of 77 gallons.

A.4.2.1 Pad 9

The 4 to 6 in thick asphalt pad is approximately 570 feet long and 275 feet wide (*see* Figure 28 in Attachment N (*Figures*)). Transuranic Waste Inspectable Storage Project (TWISP) domes 229, 230, 231, and 232 are located on Pad 9 at the east end of Area G. Each dome is approximately 246 ft long, and 88 ft by 7 inches wide and consist of a rigid aluminum frame that supports a tensioned membrane. A series of aluminum I-beam trusses spanning the width of the structures comprise the dome framework. The membrane material is a polyester fabric coated with UV-stabilized plasticized PVC. The material is fungus-resistant and fire-retardant (*i.e.*, self-extinguishing). The membrane is integrally connected to the frame to provide a fully tensioned fit. Each dome is equipped with personnel doors and a roll-up door for vehicle access and is anchored to a concrete ring-wall with anchor bolts. Under Pad 9 is a fire water collection system that collects water from Domes 232 and 231 and transports it to a sump system in Dome 229 at the south end of Pad 9. The system is not intended for, nor was it designed to provide, secondary containment of liquid waste releases. It was designed to provide an augmented fire water collection capability to prevent fire water running off the pad if any fire suppression activities exceeded the capacity contained in the upstream domes. Domes 231 and 232 have three drain inlets apiece in the southeast portion of the domes. The drains in each dome are connected and drain to a collection pipe line that runs down the east side of Pad 9. The line terminates in the collection sump in the east end of Dome 229. The floor of Dome 230 is designed for secondary containment of liquids. The asphalt pad floor is sloped (1%) towards a concrete sump at the east end of the dome. The asphalt floor and curbs in Dome 230 are lined with a double layer of 40 mil high-density polyethylene (HDPE), and the sump is lined with a single layer of 40 mil HDPE, creating an impervious layer to contain any liquids that might accumulate. The secondary containment capacity for Dome 230, which includes the sump and curbed area, is approximately 48,255 gallons which exceeds the amount necessary to hold 10% of the total storage capacity of the dome (330,000 gallons). The TWISP domes on Pad 9 are unheated; the storage of waste within the transportainer is for the purpose of temperature equilibration of the waste for characterization procedures (*i.e.*, real-time radiography and headspace gas sampling associated with the transuranic waste characterization program).

Dome 231

The building is an aluminum A-frame truss design, anchored to a concrete ring wall. The dome is of modular construction using a membrane or fabric covering. It is equipped with personnel doors and two roll-up doors, each along the eastern and western ends of the dome. Inside the dome is a Perma-Con that is approximately 16 ft high by 68 ft long by 28 ft wide. A radiological buffer area (RBA) tent is attached to the Perma-Con's western side. The RBA tent is 16 ft high, 36 ft long and 28 ft wide. The Perma-Con is divided into three main areas; cell 1 and cell 2 are designated for sort, segregate, size reduction, and repackaging activities and a control room is located along the eastern-most side. The Perma-Con has six personnel doors between the cells; control room, the RBA, and the dome itself; one metal roll-up door between cell 1 and cell 2; and two plastic roll-up doors along the northern and eastern walls of the RBA. Ramped entrances allow for safe movement of container-handling equipment and vehicle access. Hazardous wastes will be characterized, sorted, segregated, and resized.

Prohibited items (*e.g.*, aerosol cans) will be removed and repackaged. Some liquids and cemented sludge waste will require treatment before shipment to the Waste Isolation Pilot Plant (WIPP) for disposal.

The following pieces of mobile equipment are used in the treatment and repacking processes: gantry cranes, fume hoods, glove bags, dedicated ventilation units, high-efficiency particulate air (HEPA) filters, vacuums, and drums lifts. Emergency and safety equipment located in TA-54-0231 include a HEPA filtration system, a fire detection system, fire extinguishers, a fire alarm pull station, and an emergency notification system that supplements safety requirements and controls potential contaminant releases. Additionally, a cargo container (connex) will provide a localized point source exit from the permitted treatment unit. The connex will house a personnel contamination monitor (PCM) and will be as close to the area as possible. The PCM must be installed in a connex to provide shielding from low-gamma radiation.

Waste containers transported from permitted storage units at TA-54, Area G, will be moved into the RBA of the TA-54-0231 Perma-Con. Waste removed from the parent container will be repackaged into certifiable 55-gal. drums. All contents of a single waste container will be treated within a single shift, or the waste containers (parent and daughter) will be closed using a vented rigid cover, if waste must be left unattended mid-treatment. Waste will not be stored in the glove bag.

Treatment processes include neutralizing and then stabilizing liquids with zeolite (*i.e.*, absorption). Waste containers that meet a specific decision criterion for waste matrix complexity will be processed outside of the glove bag but within the Perma-Con.

The Permittees will evaluate the waste matrix complexity, which in this instance refers to the ability of the Permittees to treat, process, and repackage waste with or without manipulation of the waste inside the drum. When manipulation of the waste inside the drum is not needed for the retrieval of a prohibited item, then the waste consolidation, and/or sort, segregate, and size reduction activities will be processed outside of the glove bag but inside the confines of the Permacon. If the Permittees determine that the retrieval or resolution of a prohibited item will require the manipulation of the waste inside the drum, this retrieval, resolution or treatment, will take place inside a glove bag. The Permittees will utilize Real-Time Radiography (RTR) informational scans to make the determination if a prohibited item removal or if waste consolidation is possible. If a prohibited item is present, then it will be removed and necessary activities such as: sort, segregate, or size reduction will be conducted as necessary for repacking or waste consolidation purposes inside of the glove bag or outside of the glove bag but inside of the Perma-Con.

Treatment of cemented sludge waste must occur within glove bags inside the designated portion of the Perma-Con. The glove bags are well configured to safely accommodate the stabilization (including absorption) and pH adjustment processes. Workers will be operating in cells 1 and 2 in the protective equipment required by radiological work permit and the operating procedures.

Within the Perma-Con unit, glove bags will be used to enclose a contaminated item and form a small work area to confine the spread of contamination. Glove bags will allow work to be performed on potentially contaminated items, provide protection to personnel, and will allow access to waste within the containment using gloved sleeves, which will enable repackaging or manipulations without directly contacting contaminated surfaces.

The neutralization process will consist of verifying pH and adding hydrochloric acid (HCl) or sodium hydroxide (NaOH) incrementally and iteratively to aqueous waste to bring the waste to within a 3-10 pH range. Pourable liquids in the waste drums will have their pH measured using a calibrated pH meter prior to the neutralization process. –The Permittees will generally follow EPA method 9040C (as updated) for pH Electrometric Measurement of pH testing. However, because of the need for “real-time” pH screening results at the time of waste processing, strict adherence to all aspects of EPA method 9040C or an equivalent method, if approved in advance by NMED will be followed. The liquids will be neutralized, if necessary, and stabilized with zeolite in a minimum ratio of 3:1 (three parts zeolite to one-part liquid waste). The treated waste will be repackaged into a new certified 55-gal. daughter drum and characterized by Central Characterization Program (CCP) personnel in accordance with the WIPP Waste Acceptance Criteria (WAC). All measuring tools used in stabilization processes (*i.e.*, glass/plastic pipettes, graduated cylinders, beakers, etc.) will be resistant to a wide variety of reagents.

In cases where there is insufficient volume of liquid waste, the neutralization step of the treatment process will not be performed and these minute quantities of liquids will only be stabilized with zeolite or a WIPP-approved absorbent.

Drill and drain operations will be located in the cell separate from where glove bag operations are taking place. The drum liner will be de-nested and punctured, and the sludge or liquid will be suctioned and drained out. The collected liquid will be characterized, neutralized (if necessary), and treated with zeolite or a WIPP-approved absorbent. For free liquids observed between the liner and the existing parent drum, de-nesting operations will take place via gantry crane and the liquid will be collected, characterized, neutralized (if necessary), and stabilized with zeolite or a WIPP-approved absorbent.

A.4.2.2 Pad 1

The 4 to 6 inch thick asphalt pad is approximately 358 feet long and 213 feet wide. TA-54-412 is located on the pad in the northeastern portion of Area G (*see* Figure 29 in Attachment N (*Figures*)).

TA-54-412 (*see* Figure 29 in Attachment N (*Figures*)) is a one story building that is approximately 220 feet long by 60 feet wide (13,200 ft²). It consists of two structures, an internal primary confinement structure that houses the DVRS processing operations and an external secondary confinement structure which surrounds the primary confinement structure. The external secondary confinement structure (hereinafter referred to as “building”) provides

protection from the elements and a temperature-controlled space for the internal structures and associated process equipment. A 16 ft by 16 ft roll-up vehicle-access door is located on the north end of the building. The roll-up vehicle access door opens to the secondary confinement structure area and serves as a pass-through for moving DVRS feed-stock waste into the primary confinement structure. There is also vehicle access on the south end of the building for removal of compacted waste from DVRS operations. The concrete slab provides a structural foundation for the building and the shearer and baler system and provides a direct working surface for movement of fiberglass reinforced plywood boxes and processing equipment. The concrete slab is above grade to direct potential run-on away from the building. The floor in the building is sloped to a sump that has a grating cover to provide traction and a level working surface. The sump is treated with chemical-resistant epoxy filler-sealer and protective coating.

The primary confinement structure is housed entirely within the building and consists of five interconnected enclosures or cells. The system is approximately 150 feet long by 50 feet wide by 16 feet high and sits directly on the sealed concrete floor. The primary confinement structure is constructed of 6-inch-thick, two-hour fire-rated sandwich panels made of 16-gauge steel and gypsum wallboard measuring 40 feet wide by 4 or 8 feet long. The structure interlocks in a self-supporting steel framework that can be assembled into multiple configurations. The primary confinement structure has five cells each of which is used for a specific function of the DVRS process. The cells are equipped with both personnel and large roll-up doors so that personnel, equipment, and material can access the structure and move from one cell to the next. A cell is used to sort and segregate transuranic and mixed transuranic waste and contains various tools used to dismantle the fiberglass reinforced plywood boxes. Other cells are used for decontamination and packaging and a final cell contains the shearer and baler used to compact waste items. The shearing and baling process takes place within a tightly sealed compartment. Waste containers that need to be dismantled are processed using circular saws, reciprocating saws, hammers, pry bars, and other tools, as needed. Waste containers are moved with trucks, forklifts, air pallets, and hand dollies. The primary and secondary confinement structures are built to meet criteria specified in DOE-STD-1020-92, "*Natural Phenomena Hazards Design and Evaluation Criteria for DOE Facilities*" (DOE, 1992) for Performance Criteria 2 structures. Performance Criteria 2 structures include active fire suppression, emergency communications, and confinement systems that provide important safety functions related to emergency handling or hazard recovery and are designed to protect the health and safety of workers and visitors during active operations. The building contains fire protection piping and heating, ventilation, and air conditioning ducting and is a two-hour code-compliant fire-rated building. Panels in the primary confinement structure are the same material as the two-hour fire-rated wall construction with additional supports. A dry-pipe fire-protection system provides coverage for the primary confinement structure. A water collection area in the south end of the building provides for containment of any potential leaks, spills, or accumulated water resulting from the activation of the fire protection system.

Northwest Bay of Building 412

Waste treatment, storage, and repackaging are performed in a pre-engineered containment tent adjacent to the primary confinement structure located in the northwest bay of Building 412 (Attachment N, Figure 27). The containment tent measures approximately 30 ft long by 27 ft

wide by 15 ft high. The containment tent is equipped with a HEPA filtration system and a fire-detection system. Additional emergency and safety equipment for Building 412 are listed in Attachment D, Contingency Plan. Attached to the containment tent are a radiological buffer area (RBA), dress-out room, and control room. The RBA measures 15 ft long by 10 ft wide. The RBA entrance allows safe transport of containers into the containment tent. Waste-handling activities do not take place within the dress-out room or the control room. The dress-out room measures approximately 10 ft wide by 20 ft long. The control room measures approximately 10 ft wide by 17 ft long.

Mobile equipment such as gantry cranes, fume hoods, dedicated ventilation units, drum shakers and drum lifts are used in the treatment and repackaging processes. Containers holding hazardous or mixed waste with free liquids will be stored on portable spill pallets or pans which meet the secondary container requirements of 40 CFR 264.175. Containers vary in size and will determine the quantity of waste to be treated. These include 55-gallon drums, 85-gallon drums, and standard waste boxes (SWBs).

Waste characterization data shall be used to determine whether waste is amenable to stabilization and whether pretreatment via neutralization is necessary. Neutralization may be performed as pre-treatment option via pH adjustment to facilitate subsequent treatment via stabilization with zeolite.

When deemed necessary, neutralization will be performed in containers in the containment tent within TA-54-0412. Whenever possible, treatment will take place within the existing fume hoods to protect human health and the environment. The neutralization step will consist of verifying pH and adding hydrochloric acid (HCl) or sodium hydroxide (NaOH) to bring the waste within a pH range of 3-10 to ensure that waste is amenable to stabilize with zeolite. The liquids will then be stabilized with a minimum ratio of 3:1 (three parts zeolite to one-part liquid waste). In cases where there is insufficient volume of liquid waste, the neutralization step of the treatment process will not be performed, and these minute quantities of liquids will only be stabilized with zeolite or a WIPP-approved absorbent.

Debris waste (i.e., waste containing no liquids) does not require additional treatment and will either be placed back into the parent container or placed directly into the daughter container with the treated waste.

A.4.2.3 Pad 3

The 4 inch thick asphalt pad 3 is approximately 339 feet long and 50 feet wide. Storage Dome 48, located at the eastern end of pad 3, is 285 feet long and 50 feet wide and has a peak height of 24 feet (*see* Figure 30 in Attachment N (*Figures*)). The design and materials of construction for dome 48 are the same as the other domes at TA-54. The dome is equipped with a double-panel rolling door at the south end of the dome and eight personnel doors located approximately every 80 feet along the dome's length mainly to allow for adequate access both by vehicles and personnel. The interior perimeter of the dome is surrounded by a 6-inch-high, 8-inch-wide asphalt curb which helps prevent run-on into, and runoff from, the dome. An asphalt ramp located at the vehicle entrance allows vehicles and container handling

equipment to pass safely over the curb. The dome is anchored to Pad 3 with standard drift pins.

A.4.2.4 Pad 10 (former Pads 2 and 4)

Pad 10 is constructed at the location of former Pads 2 and 4. The asphalt pad measures approximately 350 feet long by 250 feet wide and is constructed of asphalt (*see* Figure 31 in Attachment N (*Figures*)). The transuranic waste characterization facilities and container storage area are located on this pad. The transuranic waste characterization facilities consist of mobile and modular units equipped with instruments and equipment for waste characterization and repackaging. The transuranic waste characterization facilities include the following: drum-loading or receiving unit(s); equilibration units(s); gas mobile characterization unit(s); and mobile repack units. External containment is provided by the trailers and transportainers because waste characterization activities take place inside the structures. Activities at Pad 10 include the following:

TA 54-0498, LANL HENC

The Canberra Facility High Efficiency Neutron Counter (HENC) is designed to provide a passive neutron and gamma measurement of transuranic waste drums in 55-gal containers. The trailer housing the HENC is Structure #498. The HENC supported the Facility's TWCP and Project 2010 and subsequently CCP operations beginning in 2004 to the present.

TA 54-0547, Super High Efficiency Neutron Coincidence (SuperHENC) counter

Trailer TA-0547 houses a high efficiency neutron counter designed to handle large waste containers. It is designed to provide a passive neutron and gamma measurement of large transuranic waste containers like standard waste boxes. The SuperHENC will support the Facility's TWCP and the CCP operations beginning in 2010.

TA 54-0545, Storage

Heated transportainer for transuranic and mixed transuranic waste storage prior to characterization

TA 54-0546, Storage

Heated transportainer for transuranic and mixed transuranic waste storage prior to characterization.

TA-54-0609, Real-Time Radiography Unit

The Real-Time Radiography (RTR) Unit is mounted on a flatbed trailer 52 feet in length by 9 feet wide. Radiography is a non-destructive examination (NDE) technique used to examine waste containers. The NDE equipment in the RTR unit is designed to provide X-ray

examination of the contents of TRU waste containers, including drums and standard waste boxes, to verify the physical form of the waste, and to detect items prohibited for WIPP disposal (e.g., liquids greater than 1%). The RTR unit will support the Facility's waste management and CCP operations at Pad 10.

Pad 10 asphalt

Pad 10 is primarily used for storage of feed stock and empty drums for the transuranic waste characterization activities. Additionally, storage of oversized mixed wastes in transportainers and metal boxes can occur on the pad.

A.4.2.5 Pad 5

This asphalt pad consists of former pads 5, 7, and 8, located on the south-central portion of Area G, has one dome and eight sheds (*see* Figure 32 in Attachment N (*Figures*)) associated with it. Former Pad 5 is approximately 500 feet long, 65 feet-wide, and 4 inches thick. It is sloped approximately 2% from north to south. Former Pad 8 is approximately 150 feet long, 95 feet-wide, and 3 inches thick. It is sloped approximately 1% from west to east. Former Pad 7 is approximately 200 feet long, 64 feet-wide, and 4 inches thick. It is sloped approximately 1% from west to east.

Dome 49

Storage dome 49, located on former Pad 5, is 440 feet long and 60 feet wide and has a peak height of approximately 26 feet (*see* Figure 32 in Attachment N (*Figures*)). The design and materials of construction for Dome 49 are the same as the other domes at TA-54. The dome is equipped with a double-panel rolling door at the north end of the dome and six personnel doors to allow for adequate access both by vehicles and by personnel. The interior perimeter of the dome is surrounded by a 6-inch-high, 8-inch-wide asphalt curb which helps prevent run-on into and runoff from the dome. An asphalt ramp located at the vehicle entrance to Dome 49 allows vehicles and container handling equipment to pass safely over the curb. The dome is anchored to Pad 5 with standard drift pins.

A maintenance gate is located along the fence-line west of Dome 49. The gate is not used for general access to the area, but is used by authorized personnel to access areas outside of the Area G fence-line to clear vegetation necessary to minimize fire hazards. The gate is chain-link and approximately eight feet tall with razor wire on the top. The gate is not equipped with a badge reader and is locked at all times unless used by authorized personnel for maintenance purposes.

Dome 224

Storage Dome 224, located on former pad 8, is approximately 110 feet long and 60 feet wide, with a peak height of 26 feet (*see* Figure 32 in Attachment N (*Figures*)). The design and materials of construction for Dome 224 are the same as other domes at TA-54. This dome is anchored to Pad 8 with anchor bolts. It is equipped with a single-panel roll-up door at the north end and four personnel doors to allow adequate access by vehicles and by personnel. A

1-foot, 8-inch wide by 2-feet, 4-inch deep concrete ring wall surrounds the interior of Dome 224. A high-density polyethylene (HDPE) liner exists below the asphaltic pad within the dome.

Storage Sheds

Storage sheds 144, 145, 146, and 177 are prefabricated sheds constructed of steel. Each shed measures 6 feet long, 5 feet-wide, and 9 feet high. Access to each shed is obtained through a single door. The sheds are elevated by design, which prevents run-on and each shed is constructed with a liquid-tight sump to ensure containment of any potential leaks or spills and to prevent runoff. The floor of each shed is constructed of steel and has a metal grate that covers the entire sump area. Containers are placed directly on the metal grates, which prevent contact with liquids that may have accumulated in the sumps. The designed sump storage capacity of each shed is 120 gallons which exceeds the amount necessary to hold 10% of the total storage capacity of each shed (330 gallons).

Storage sheds 1027, 1028, 1030, and 1041 are equipped with three sets of double doors on one side of the shed for ease of access. Sheds 1027, 1028, 1030, and 1041 contain a single compartment and sump within each shed (*see* Figure 32 in Attachment N (*Figures*)). The designed storage capacity of each sump is 750 gallons which exceeds the amount necessary to hold 10% of the total capacity of each shed (1,760 gallons).

A.4.2.6 Pad 6

This permitted asphalt pad, approximately 633 ft long, 99 ft wide and 4 inches thick, is sloped approximately 1.2% from west to east and is located in the north-central portion of Area G. Storage domes 153 and 283 are located on Pad 6 (*see* Figure 33 in Attachment N (*Figures*)) and the design and materials of construction for domes 153 and 283 are the same as the other domes at TA-54.

Dome 153

Dome 153 is approximately 326 ft long and 60 ft wide, with a peak height of 26 ft (*see* Figure 33 in Attachment N (*Figures*)). A double-panel rolling door is located at the west end of the dome and 10 personnel doors are located approximately every 40 to 125 ft along the dome's length. Dome 153 is equipped with a fire detection and alarm system.

Dome 283

Dome 283 is approximately 260 ft long and 60 ft wide with a peak height of 26 ft (*see* Figure 33 in Attachment N (*Figures*)). A double-panel rolling door is located at the east end of the dome and 10 personnel doors are located approximately every 50 ft along the dome's length. These accesses allow adequate traffic flow of vehicles and personnel into and out of the dome. An asphalt ramp is located at the vehicle entrance of each dome to allow vehicles and container-handling equipment to pass safely over the curb. Domes 153 and 283 are anchored to Pad 6 with standard drift pins. A control room is located within Dome 283. The control room is approximately 20 ft long and 8 ft wide with a height of 8 ft.

Transportainer 491

Structure 491 is a transportainer located on the south side of the pad. This transportainer is used to store hazardous waste.

A.4.2.7 Storage Shed 8

Storage shed 8 is located in the north-central portion of Area G (*see* Figure 34 in Attachment N (*Figures*)). The shed is 40 ft long and 16 ft wide and has a 14-ft-high galvanized steel roof that slopes to the north. The siding of Shed 8 is constructed of galvanized steel and the foundation is constructed of concrete. Two overhead doors and one personnel door on the south side of the shed allow both vehicles and personnel to access the shed.

A.4.2.8 TA-54-33

TA-54-33 is located in the north-central portion of Area G and consists of a dome attached to a concrete-block building (*see* Figure 35 in Attachment N (*Figures*)). This permitted unit is used for waste storage and potential or future waste characterization activities. The dome and building are located on a concrete foundation surrounded by an asphalt pad. The concrete foundation is 8 inches thick and overlies 6 inches of base course. The concrete-block building attached to the dome is approximately 40 ft long and 34 ft wide. The dome is 157 ft long and 50 ft wide with a peak height of 24 ft. A double-panel rolling door is located at the west end of the dome for vehicle access. A single-panel rolling door is located at the southeast end of the dome for container-handling access. Two personnel doors are located approximately 40 ft apart along the north wall of the dome. Two additional personnel doors are located in the concrete-block building; one on the west side, and one on the east side. In addition, two overhead doors are located on the north side of the building to allow free movement of personnel and container-handling equipment between the building and the dome.

The design and materials of construction for the TA-54-33 dome are the same as the other domes at TA-54. The dome's aluminum frame is directly connected to the building which extends approximately 5 ft into the dome. Inside the dome the concrete foundation is sloped to a 6-inch-wide centralized concrete drainage trench that is covered with 12-inch-wide steel grating. The trench slopes toward a steel sump located at the east end of the dome. Two additional trenches, located in Rooms 100A and 100B, are perpendicular to and feed into the main trench. A floor drain in Room 105 connects with the trench in Room 100A.

The steel sump is located within a concrete basin that has 8-inch-thick walls, a 9-inch-thick base and measures approximately 15 ft long by 7 ft wide by 6 ft deep. The sump is approximately 14 ft long by 6.5 ft wide by 5 ft deep and has a capacity of 3,473 gallons. A primary holding tank associated with the sump is located in a concrete basin that is 15 ft long by 12 ft wide by 5.5 ft deep and has a capacity of approximately 7,405 gallons. A secondary holding tank associated with the sump is located in a separate concrete basin that is 12 ft long by 12 ft wide by 5.5 ft deep and has a capacity of approximately 5,924 gallons. These basins have the capacity to contain any spills or leaks resulting from a potential overflow or breach of the holding tanks.

A maintenance gate is located along the fence-line north of the TA-54-33 dome. The gate is not used for general access to the area, but is used by authorized personnel to access areas outside of the Area G fence-line to clear vegetation necessary to minimize fire hazards. The gate is chain-link and approximately eight feet tall with razor wire on the top. The gate is not equipped with a badge reader and is locked at all times unless used by authorized personnel for maintenance purposes.

A.4.2.9 Pad 11

This asphalt pad is approximately 4 inches thick, measures approximately 478 ft long by 137 ft wide, and is sloped approximately 1 to 2% to the southeast. Storage Dome 375 is located on the western portion of pad 11 and is used for storage of hazardous, mixed low level, and mixed transuranic waste. It measures approximately 300 ft long by 100 ft wide (*see* Figure 36 in Attachment N (*Figures*)). The building is an aluminum A-frame truss design that is anchored to a concrete ring wall. The dome is of modular construction utilizing a membrane or fabric covering. It is equipped with 14 personnel doors and two roll-up doors, one each at the east and west ends of the building. Ramped entrances allow for safe movement of container handling equipment and vehicle access. Dome 375 contains a modular panel containment structure or Perma-Con® (approximately 120 feet long x 60 feet wide) used for size reduction, decontamination, segregation, waste assay, reclassification activities, and repackaging of transuranic waste prior to shipment offsite.

Dome 375 and the Perma-Con® is used for size reduction and repackaging of the corrugated metal pipes (CMPs). During the size reduction and repackaging, one CMP at a time is removed from a flatbed truck or from storage within Dome 375 with a forklift or another lifting device. The forklift moves the CMP into Dome 375 and places it on a pipe racks and pipe rollers at the loading dock of the Perma-Con®. The pipe racks/pipe rollers and a winch system is used to move the CMP into the Perma-Con® via room 124. The pipe racks/pipe rollers are moved the CMP through room 124 and into room 123 where a hydraulic shear and gantry cranes cut the CMP into approximately 4-ft sections and then place the cut sections into SWBs for shipment off-site (*see* Figure 36 in Attachment N (*Figures*)). A containment tray, equipped with localized HEPA-filtered ventilation equipment, is installed under the shear and under the cutting location on the CMP to collect the small amounts of debris and dust that may result from the shearing operation. Room 121 is used to temporarily stage SWBs for shipment to permitted on-site storage where they await characterization prior to shipment for off-site disposal. This process is repeated for all 158 CMPs.

Dome 375 also contains four structures that serve as an office area, a control area, and rooms for donning and doffing anti-contamination clothing. These structures are support structures and will not be used to store hazardous waste.

Waste treatment, storage and repackaging are performed in the Perma-Con® within Dome 375. The Perma-Con® is equipped with a HEPA filtration system and a fire detection system. Additional emergency and safety equipment for Dome 375 can be found in Attachment D,

Contingency Plan.

Mobile equipment such as gantry cranes, fume hoods, dedicated ventilation units, drum shakers and drum lifts are used in the treatment and repackaging processes. Containers holding hazardous or mixed waste with free liquids is stored on portable spill pallets or pans. Containers vary in size and determine the quantity of waste to be treated. These include 55- gallon drums, 85-gallon drums and SWBs.

Waste characterization data is used to determine whether waste is amenable to stabilization and whether pretreatment via neutralization is necessary. Neutralization may be performed as a pre-treatment option via pH adjustment to facilitate subsequent treatment via stabilization with zeolite.

When deemed necessary, neutralization is performed in containers within the Perma-Con® in TA-54-0375. The neutralization step consists of verifying pH and adding HCl or NaOH to bring the waste within a 3 to 10 pH range to ensure waste is amenable to stabilization with zeolite. The liquids are stabilized with zeolite in a minimum ratio of 3:1 (three-parts zeolite to one-part liquid waste). In cases where there is insufficient volume of liquid waste, the neutralization step of the treatment process is performed, and these minute quantities of liquids are stabilized with zeolite or a WIPP-approved absorbent.

Debris waste (i.e., waste containing no liquids) which do not require additional treatment are either be placed back into the parent container or placed directly into the daughter container with the treated waste.

A.4.3 TA-54 West

The two permitted units at TA-54 West include the indoor low bay and the high bay at TA-54-38 and the outdoor storage pad which surrounds the north, east, and south sides of TA-54-38 and the loading dock at TA-54-38. The permitted units at TA-54 West are used to store solid mixed low level and mixed transuranic waste (*see* Figure 37 in Attachment N (*Figures*)).

The permitted units at TA-54-38 West may receive any container that may be stored at the units in accordance with Permit Section 3.3 (e.g. 85-gallon drums, 100-gallon drums, and ten-drum overpacks); however, most often the units receive WIPP-ready 55-gallon drums and SWBs for final preparation and packaging. All waste containers are handled in a manner that will not cause them to rupture.

Waste is generally brought into the TA-54-38 West Outdoor Pad through the south-eastern vehicle gate and placed in storage on the northern portion of the TA-54-38 West Outdoor Pad. At the outdoor unit, waste is not stored in front of gates or within 10 feet of the fence line or within 60 feet of the building. No paved or unpaved roadways are located within 5 feet of the waste storage area. From the outdoor permitted unit, containers are generally moved into the Low Bay at TA-54-38 West and made amenable for placement in a WIPP-compliant shipping container. Normal operations for making the individual waste containers ready for shipment include stretch wrapping 14 drum configurations (or drum payloads) and ratchet strapping SWBs one on top of the other. Generally, these Type A container configurations are then

moved by forklift into the High Bay where they are loaded into TRUPACT II Type B shipping containers using a bridge crane.

Empty TRUPACT II containers that are received from WIPP are usually moved into the High Bay using the western bay door and are opened and inspected prior to waste being placed within the High Bay. After the containers are opened, the drum payloads or SWBs are placed into the containers. The TRUPACT II containers are then closed. Metal loading platforms allow for personnel access to the top of the TRUPACT II containers so that the TRUPACT II containers can be opened or closed, and to ensure that there is no issue while placing the shipping containers within the TRUPACT II containers.

After the TRUPACT II containers are loaded and the trailer is prepared for shipment, the trailer is moved via trailer jockey or other approved vehicle through the eastern bay door and to the TA-54-38 West Outdoor Storage Pad for storage prior to shipment to WIPP or out the southeastern gate of the TA-54-38 West Outdoor Pad to a staging area to await inspection and shipment to WIPP. When a loaded trailer of TRUPACT II containers is stored at the TA-54-38 West Outdoor Pad, the trailer is not placed in front of a gate and is not stored within 10 feet of the fence line. Gates at the TA-54-38 West Outdoor Pad are locked when not in use.

Containers are handled with forklifts (using drum grapplers, when appropriate) or drum dollies while present at TA-54-38 West and are placed directly in the appropriate permitted unit when active packaging is not underway. The bridge crane is utilized in the High Bay to place drum payloads directly into the TRUPACT II containers. A second bridge crane provides redundancy and ensures that a back-up crane is available while the original is undergoing maintenance activities. A switch mechanism ensures that only a single crane will be used at one time.

A.4.3.1 TA-54 West Building (RANT)

TA-54-38 is a building constructed of 36-ft-high pre-cast concrete panel walls topped by pre-stressed double-T concrete roof sections. Its foundation consists of a 6-inch reinforced concrete slab on compacted fill. The building is divided into several offices and houses the Indoor permitted unit which includes the low bay and the high bay (*see* Figure 37 in Attachment N (*Figures*)). The low bay is approximately 40 ft-wide and 34 ft long. An 8 ft-wide by 12 ft-high roll-up door is located at the east end and opens to an outdoor loading dock. A second 8-ft-wide by 12-ft-high roll-up door is located in the southeast corner and opens into the high bay. The walls and floor of the low bay are coated with industrial grade enamel paint. The high bay, approximately 40 ft wide and 80 ft long, is used for loading transuranic and mixed transuranic waste into Transuranic Package Transporter-II containers. It is equipped with 14-ft-wide by 18-ft-high roll-up doors on the east and west ends to allow convenient, indoor loading of the tractor-trailers that transport shipments of waste to the Waste Isolation Pilot Plant. The high bay floor is not painted and slopes at an angle of 1.5 degrees toward a central trench (which is 5 inches wide, 6 inches deep and 50 ft long) and a sump. The entire length of the trench is covered with a metal grate and is designed to hold precipitation and snow melt from tractor-trailers.

Outside the perimeter of TA-54-38 is a fire water collection system that collects water from TA-54-38 and transports it to a fire water retention pond. The system is not intended for, nor was it designed to provide secondary containment of liquid waste releases. It was designed to capture fire water releases from the building and convey the fire water in an underground pipe that discharges into the fire water retention pond.

Within 24 hours of a fire event, the Permittees shall collect a sample of fire suppression water collected in the retention basin and analyze it for any hazardous waste constituents managed at the facility. If the fire suppression water present in the retention basin is determined to be hazardous waste, the Permittees shall manage the waste water as required by Attachment D, *Contingency Plan*. The Permittees shall use the analytical results, together with information from the Operating Record, to characterize the water in accordance with Permit Attachment C, *Waste Analysis Plan*. The Permittees shall record the type and quantity of waste water present in the retention basin, the date of the incident, and the date of removal of the waste water in the Operating Record. If the Permittees determine that the fire suppression water is not a hazardous waste, the Permittees shall ensure the water meets the applicable clean-up requirements in Permit Section 11.4.3, *Surface Water Clean-up Levels*, prior to discharge.

A.4.3.2 TA-54 West Outdoor Pad

The outdoor permitted asphalt pad (which is approximately 4 inches thick and slopes toward the curbed edges to allow for storm water runoff (*see* Figure 37 in Attachment N (*Figures*)) consists of the loading dock at TA-54-38 and the storage pad located on the north, east, and south sides of TA-54-38. The loading dock is 16 ft wide by 38 ft, 10 inches long and is covered by a metal awning. The loading dock is constructed of 6-inch cast-in-place concrete and is located approximately 4 inches above grade. The boundary of the storage pad is delineated by the fence surrounding the pad. The canopy located on the pad and approximate dimensions of the pad are shown on Figure 37. Storage sheds for supplies and equipment are also located on the pad at the outdoor permitted unit (*see* Figure 37 in Attachment N (*Figures*)).

The Permittees shall coordinate shipments with WIPP in an attempt to minimize the use of excess storage capacity at the outdoor pad. However, the Permittees may utilize excess storage capacity for up to 59 days as specified in Attachment J, Table J-1, when at least one of the following unexpected events occur that impacts the Permittees' ability to transport waste to WIPP:

- Unexpected delays or shutdowns at WIPP;
- Storm events;
- Security concerns; or
- Other transportation issues (e.g., TRU waste shipping containers unavailable)

The Permittees must notify the Secretary and those on the e-mail notification list (as specified in Permit Sections 1.13 and 3.12.1) upon using the excess storage capacity and provide justification for its use (see 40 CFR § 270.32(b)(2)).

A.4.4 Security and Access Control

The permitted units at TA-54 are provided security by both their locations on top of Mesita del Buey and by 8-foot industrial chain-link fences topped by razor wire or barbed wire. Additional security is provided by a system of facility access controls to ensure that only authorized personnel are granted access. These access controls also ensure that all facility personnel can be identified and located in an emergency. Depending on national security conditions a guard station will be manned west of the TA-54 timed vehicle-access control gate. Guard stations control public access on Pajarito Road east and west of TA-54; only properly identified Facility employees or individuals under their escort will have access to TA-54. During times of low national security, any access to the TA-54 administrative area for Areas L and G is limited by a timed vehicle-access control gate on the entrance road to TA-54. This gate is open during normal working hours from 6:00 a.m. to 6:30 p.m., Monday through Friday (except holidays). Gate hours are subject to change. Access to TA-54 West is by a manually operated gate on the west side of the facility. The gate is also open during normal working hours. Access to any part of TA-54 before or after normal working hours or on weekends requires approval of the appropriate Group Leader or Facility Manager at TA-54. TA-54 is patrolled by security personnel during non-operational hours to ensure that the gates are locked and that unauthorized entry has not occurred. Anyone entering the fenced Area L and Area G waste management areas from the TA-54 administrative area is “badged in” before proceeding. Badging in is the process of identifying the person, assessing his or her security and training status using DOE security badges, and determining the need for an escort. Authorized personnel may enter the fenced portions of Areas L and G only after negotiating additional access controls in the form of walk-through turnstiles and motorized vehicle gates. Each turnstile and vehicle gate is equipped with a badge reader to ensure authorized access only. Resident personnel are required to badge in upon arrival and prior to leaving TA-54. Non-resident personnel and visitors are required to badge or sign in and out at an access control point at the facility operations center. Depending on their level of training, non-resident personnel may be required to be escorted in order to access TA-54 Areas L and G and TA-54 West. Access to the Area L, Area G, and TA-54 West permitted units requires additional controls. Bilingual (*i.e.*, English and Spanish) warning signs are posted on the fence at 50- to 75-ft intervals, are legible from a distance of 25 ft, and can be seen from any approach to this area. The legends on the signs indicate "Danger—Hazardous Waste Storage Area" and "Unauthorized Persons Keep Out." The security fence is inspected by on-site personnel and repairs are made as necessary. The locations of the security fence, entry gates, and entry stations are shown on Figures 7, 8, and 9, in Attachment N (*Figures*).

A.4.5 Emergency Equipment

Emergency equipment is located throughout TA-54 and includes internal communications, alarm systems, fire alarms, spill kits, and decontamination equipment. Area L is equipped with an audible alarm system to alert personnel of a fire or the need to evacuate the area. These alarms can be activated by pulling a fire alarm or by pushing the evacuation alarm

button. The fire alarm pull boxes are located in Dome 215 and are connected to the Los Alamos Fire Department (LAFD) through the Facility's central alarm system at all times. Evacuation alarms are located adjacent to the fence line crash gates and other locations in Area L (see Attachment D, Table D-1). Alphanumeric pagers, cellular telephones, and/or two-way radios are also distributed to workers at Area L. Employees can be notified of an emergency situation and appropriate response actions through the use of a text message sent on the emergency alphanumeric pagers, or cellular telephone, or by two-way radio. The emergency paging system can be utilized to alert workers of an emergency situation as well as appropriate response actions. Emergency paging telephones are also available at the facility so that information can be announced throughout the area and personnel can contact onsite and facility emergency personnel at all times. Windsocks are also located at strategic locations to indicate wind direction and strength. Fire control equipment at Area L includes fire extinguishers (*e.g.*, ABC-rated, water, carbon dioxide, dry chemical), a dry-pipe sprinkler system, and dry chemical systems. The fire extinguishers are available at or near most structures within Area L for use by on-site personnel depending on the size and fuel source of a fire. Dome 215 has an automatic dry-pipe sprinkler system that is heat activated in the event of a fire. Storage sheds 68, 69, and 70 have dry chemical systems. Fire hydrants are located near TA-54-37 and the southeast corner of TA-54-62. Personal decontamination equipment at Area L includes emergency eyewash stations and showers. This equipment is for use by personnel in emergencies involving chemical or radiological materials. These stations are generally located near or inside structures where waste is being handled. Emergency shower and eyewash stations are located at or near TA-54-39, TA-54-31, and TA-54-215. Waste characterization documentation and SDS are also available in the event of a chemical exposure. There are several spill kits available at Area L to mitigate small containable spills. These kits typically contain sorbents, neutralizers, PPE, and other equipment essential for containment of small spills. In addition to the spill kits, shovels for cleanup are stored in TA-54-46. Oversized drums and sorbents are also stored at various locations throughout Area L. For larger spills or other unusual hazardous situations, a variety of equipment is available to emergency personnel. This equipment includes forklifts, self-propelled loaders, and other heavy equipment from Area G.

Area G is equipped with an audible alarm system to alert personnel of a fire or the need to evacuate the area. The alarms can be activated by pulling a fire alarm or by pushing the evacuation alarm button. Fire alarms and evacuation alarms are in place at strategic locations to alert personnel of emergency conditions. The fire alarms are located throughout Area G and are connected to the LAFD through the Facility's central alarm system at all times. Flame or smoke detection equipment is located within structures TA-54-229, TA-54-230, TA-54-231, and TA-54-232. Security personnel and LAFD are notified upon activation of the flame or smoke detectors. Fire control equipment is located throughout Area G. This equipment includes ABC-rated or BC-rated fire extinguishers, dry-chemical fire suppression systems, and several fire hydrants. Trained personnel can use the fire extinguishers to extinguish small, non-chemical fires. For larger fires, security personnel and the LAFD are alerted. Personnel working in Area G carry alphanumeric pagers, cellular phones, or two-way radios as the main form of communication. Emergency paging telephones are in place so that information can be announced throughout the area. This equipment ensures that personnel can contact on-site and Facility emergency personnel at all times. Windsocks are at strategic locations to indicate wind direction and strength. PPE and emergency equipment supplies are stored a various

locations throughout Area G. There are different types of monitoring equipment located at the Area G CSUs that are used to qualitatively and quantitatively evaluate airborne contaminants. Alarms and strobe lights warn personnel when airborne concentrations exceed preset limits. They are for use by personnel in emergencies involving chemical or radiological materials. Waste characterization documentation and SDS are available in the event of a chemical exposure. First aid equipment can be used to treat injuries until trained medical personnel arrive at the scene. Spill control equipment is maintained at various structures within Area G. Trained personnel use this equipment to mitigate small, containable spills if they know what has been spilled and are sure their actions will not put themselves or others at risk. PPE is also maintained at various structures within Area G and is available for use during routine and non-routine operations to protect personnel from exposure to chemical and radiological contaminants. Warning tapes and barricades are used to post areas and prevent unauthorized entry into restricted areas. Heavy equipment is also available at Area G to move heavy objects.

TA-54-38 at TA-54 West is equipped with separate local alarm systems to alert personnel of fire or the need to evacuate the area. Fire alarm pull stations are located throughout the building and can be activated in the event of an emergency. The alarm system can also be activated by using evacuation alarm buttons located near the entrances to the building. Upon activation of the evacuation alarm system, horns sound to alert personnel of emergency conditions. The building's manual fire alarm pull stations at TA-54 West are connected to the LAFD through the Facility's central alarm system at all times. The evacuation alarm system is a local system that notifies occupants in TA-54-38 of a local emergency. Additionally, a roll-up door exists between the high and low bay areas. The roll-up door is fire rated but does not automatically close upon activation of a fire alarm.

Personnel at TA-54-38 are also equipped with cellular telephones and pagers to provide adequate communication and to summon external emergency assistance, if necessary. Paging telephones are located throughout the building and are used to contact on-site personnel. Paging telephones are also used in the event of an emergency to communicate the nature and location of hazardous conditions to personnel in the area. The alarm system is interrupted when the paging telephone system is activated to allow personnel to hear the announcement. Additionally, an emergency telephone is located outside the main entry area. Personnel working within the building can also use these telephones to summon assistance from local emergency response teams in case of emergency.

Fire control equipment is available for use within TA-54-38 and at the outdoor permitted unit. Portable ABC-rated fire extinguishers are located in the high bay, low bay, and at the outdoor permitted unit. The fire extinguisher located by the east personnel entrance door in the low bay can also be used at the loading dock. Depending on the size of the fire and the fuel source, fire extinguishers can be used by on-site personnel. TA-54-38 is equipped with a pre-action sprinkler system activated by loss of compressed air pressure (*e.g.*, an open sprinkler) anywhere in the building or by heat detection (high bay and loading dock) or smoke detection (balance of building). A fire hydrant installed according to National Fire Protection Association standards is located approximately 220 ft west of TA-54-38 near the west entrance to TA-54 West.

A portable chemical spill center is maintained within TA-54-38. It contains sorbents and PPE. Personnel working anywhere within the building have access to this spill center. Trained personnel use this equipment to mitigate small containable spills when they are certain their actions will not put themselves or others at risk. Personnel decontamination equipment available includes a safety shower and eyewash located in the high bay and a safety shower and eyewash on the loading dock.

A.4.6 Preventing Run-on and Runoff

At TA-54, controlling run-on and runoff at the locations where waste management operations regularly occur is accomplished by appropriate contouring of surface areas and the use of control structures such as drainage channels, berms, and culverts. Canopies, dome structures, and other buildings are used to eliminate or minimize contact between run-on and waste containers. In addition, all stored waste containers are elevated or are placed in areas with sloped floors and sumps to provide protection from liquids that could be introduced through fire-suppression activities. Existing operational controls include inspecting run-on and runoff controls in accordance with Attachment E (*Inspection Plan*) and maintaining the structural run-on and runoff controls, as necessary. Run-on and runoff management methods specific to the Area L, Area G, and TA-54 West permitted units are discussed below.

A.4.6.1 Area L

The Area L permitted unit is maintained so that structural and operational controls divert storm water to a single outfall. These include asphalt channels, a 12-inch corrugated pipe storm drain to convey storm water to a single outfall at the northeast corner of Area L, and a contoured paved surface to direct storm water to the conveyances. Snow removal is performed to minimize run-on and runoff.

A.4.6.2 Area G

In certain drainage areas at Area G, structures are maintained to efficiently channel storm water to the ephemeral streams draining the mesa. These structures include asphalt and concrete drainage channels, a weir, riprap-lined channels, retention dam, berms, and culverts. Roads and drive pads are configured, by grading and paving, to carry storm water away from the areas of active vehicular and loading operations. Silt fences and other erosion control structures are maintained throughout the drainage areas in locations prone to erosion or affected by heavy runoff during storm events.

A.4.6.3 TA-54 West

The foundation at TA-54-38 is above grade to prevent run-on of storm water. Storm drains and trenches are maintained to collect any precipitation or snowmelt that may enter the Facility through the loading bays. The outdoor permitted unit is maintained to be sloped away from TA-54-38 towards the edges of the pad allowing storm water to flow to the edges of the pad. All containers of waste stored at the TA-54 West permitted units are located in areas with sloped floors and sumps or are elevated by design, on dollies, or on pallets. This prevents

the containers from coming into contact with liquids. Positive surface drainage throughout TA-54 West directs potential run-on away from the TA-54 West permitted units. A drainage swale and curbing direct storm water runoff toward an outfall on the northeast side of the storage pad.

A.5 TA-55

TA-55 is located in the north central portion of Los Alamos National Laboratory on a mesa between a branch of Mortandad Canyon on the north and Two Mile Canyon on the south (*see* Figure 38 in Attachment N (*Figures*)). TA-55 is a plutonium processing facility, which began operating in 1978. Hazardous and mixed waste container storage at TA-55 is conducted at seven permitted units. These permitted units are identified as B40, B05, K13, B45, B13 and G12, the Vault, the Container Storage Pad and the 55-0355 Pad. The B05 and, B45 permitted units are used to store containers with only non-liquid bearing waste (*i.e.*, solid form). These permitted units all reside in a building; therefore, run-on and run-off from storm events are not applicable. In the event of a water leak from facility systems, the TA-55-4 basement has sumps to contain the liquid. The Outdoor Storage Pad and the 55-0355 Pad are outdoor units, no free liquids will be stored at these units and containers will be stored in accordance with Permit Section 3.5.1.

A.5.1 B40

The B40 permitted unit is used to store containers of hazardous and mixed waste that may contain liquids. B40 is located in the southwest section of the TA-55-4 basement, as shown on Figure 40 in Attachment N (*Figures*). The permitted unit is L-shaped and has long dimensions of 61.5 by 55 feet (ft). The maximum storage capacity of this unit is 21,500 gallons (gal), the equivalent of 391 55-gal drums. The types of waste containers holding hazardous or mixed waste that are stored in B40 include: 5-, 10-, 12-, 15-, 30-, 55-, and 85-gal drums; large waste boxes; special order waste boxes; and standard waste boxes (SWB).

A.5.2 B05

The B05 permitted unit is used to store containers of hazardous and mixed waste that do not contain liquids. B05 is located in the southwest section of the TA-55-4 basement, as shown in Figure 42 in Attachment N (*Figures*). The permitted unit is rectangular shaped and is 26 ft long by 10 ft wide. The maximum storage capacity of this unit is 3,600 gal, the equivalent of 66 55-gal drums. The types of waste containers holding hazardous or mixed waste that will be stored in B05 include 30-, 55-, and 85-gal drums, large waste boxes; and SWBs.

A.5.3 K13

The K13 permitted unit is used to store containers of hazardous and mixed waste that may contain liquids. K13 is located in the northwest section of the TA-55-4 basement, as shown on Figure 41 in Attachment N (*Figures*). The permitted unit is rectangular shaped and is 12 ft long by 13 ft wide. The maximum storage capacity of this unit is 2,500 gal, the equivalent of 46 55-gal drums. The types of waste containers holding hazardous or mixed waste that will be

stored in K13 include: 0.25-, 0.5-, 0.75-, 1-, 2-, 4-, and 6-liter/quart containers; 5-, 10-, 12-, and 15-gal containers; 30-, 55-, and 85-gal drums; and large waste boxes.

A.5.4 B45

The B45 permitted unit is used to store containers of hazardous and mixed waste that do not contain liquids. B45 is located in the northeast section of the TA-55-4 basement, as shown on Figure 43 in Attachment N (*Figures*). The permitted unit is rectangular shaped and is 45 ft long by 17.5 ft wide. The maximum storage capacity of this unit is 11,000 gal, the equivalent of 200 55-gal drums. The types of waste containers holding hazardous or mixed waste that will be stored in B45 include: 5-, 10-, 12-, and 15-gal containers; 55- and 85-gal drums; large waste boxes; and SWBs.

A.5.5 B13

The B13 permitted unit is used to store containers of hazardous and mixed waste that do not contain liquids; therefore, no secondary containment or safety showers are present in B13. B13 is located in the northwest corner of the TA-55 basement, as shown in Figure 57 in Attachment N (*Figures*). This permitted unit is approximately 8 ft. high, 17 ft. 6 in. wide and 28 ft. 4 in. long. The maximum storage capacity of this unit is 4,950 gal, the equivalent of 90 55-gal drums. The types of waste containers holding hazardous or mixed waste that will be stored in B13 include: 30-, 55-, 85-, gal. drums and SWBs.

A.5.6 G12

The G12 permitted unit is used to store containers of hazardous and mixed waste that do not contain liquids; therefore, no secondary containment or safety showers are present in G12. G12 is located in the northwest corner of the TA-55 basement, as shown in Figure 58 in Attachment N (*Figures*). This permitted unit is irregularly shaped (dimensions shown in Figure 58) with walls and ceilings that consist of chain link fencing. The maximum storage capacity of this unit is 5,225 gal, the equivalent of 95 55-gal drums. The types of waste containers holding hazardous or mixed waste that will be stored in G12 include: 30-, 55-, 85-, gal. drums and SWBs.

A.5.7 Vault

The Vault permitted unit is used to store containers of mixed waste that may contain liquids. The Vault is located along the eastern wall of the basement at TA-55-4, as shown on Figure 42 in Attachment N (*Figures*) and is approximately 79.5 ft long by 50.5 ft wide. The maximum storage capacity of this unit is 4,000 gal, the equivalent of approximately 73 55-gal drums. The types of waste containers holding mixed waste that will be stored in the Vault include: 0.25-, 0.5-, 0.75-, 1-, 2-, 4-, and 6-liter/quart containers; and 5-, 10-, 12-, 15-, 30- and 55-gal drums.

A.5.8 Outdoor Storage Pad

The Container Storage Pad is used to store containers of hazardous and mixed waste that may contain liquids. The pad is located outside and south southwest of TA-55-4, as shown on Figures 39 and 45 in Attachment N (*Figures*). It was installed in the mid-1980s and is

constructed of asphaltic-concrete with a variable thickness of 4 to 6 inches (in.). The Container Storage Pad permitted unit is shaped like a trapezoid and measures 102 ft, 86 ft, 156 ft, and 105 ft. The pad is sloped, is elevated 2 to 4 in. above ground level, and has a culvert beneath the pad running from the northwest side to the southeast corner to minimize run-on of precipitation. The storage capacity of this area is 135,000 gal, the equivalent of approximately 2,455 55-gal drums. The types of waste containers holding hazardous or mixed waste that will be stored on the container storage pad include: 0.25-, 0.5-, 0.75-, 1-, 2-, 4-, and 6-liter/quart containers; 30-, 55-, and 85-gal drums; SWBs; large waste boxes; and 5-, 10-, 12-, and 15-gal containers.

A.5.9 TA-55-0355 Pad

The TA-55-0355 Pad will be used to store containers of hazardous and mixed waste that do not contain liquids. The TA-55-0355 Pad is located outside and south of the Outdoor Storage Pad and TA-55-4, as shown in Figure 59 in Attachment N (*Figures*). It is a concrete pad with a variable thickness of 4 to 6 inches and dimensions of 130 ft. long and 115 ft. wide. The pad also includes a steel roof structure (canopy) with dimensions of approximately 93 ft. long and 63 ft. wide. The pad has a slope of 1/8 inch per ft., sloping from north to south. The apron around the pad gently slopes away from the concrete pad that is under the canopy. Site drainage allows rain water to flow away from the pad. The unit boundary is approximately 130 ft. long and 103 ft. wide. Two walls with roll-up doors for wind prevention are located on the south and west sides of the canopy. The maximum storage capacity on the pad will be 84,370 gal, the equivalent of approximately 1,534 55-gal drums. A mobile HENC system, three safes for the storage of calibration sources, and miscellaneous support equipment are currently located on the pad.

The TA-55-0355 Pad consists of one waste management unit that will provide storage in containers for hazardous or mixed waste. The types of waste containers holding hazardous or mixed waste will be stored on the container storage pad includes: 30-, 55-, 85-gal drums; standard waste boxes (SWBs), and large waste boxes.

A.5.10 Mixed Waste Storage Tank System

There is one storage tank unit at TA-55 that is comprised of two tank components, the evaporator glovebox tank and the stabilization unit pencil tanks. The two tank components share a common piping and pumping system.

The evaporator glovebox tank was constructed in 1986. The stabilization unit pencil tanks were constructed in 1985, installed from 1987-88, and were considered existing tanks until new components were installed in 1996. These new components were determined to be a major, non-routine modification; therefore, the stabilization unit pencil tanks are subject to the new tank system regulations and are addressed as new tanks in accordance with the requirements of 40 CFR § 264.192, which is incorporated herein by reference.

The TA-55 storage tank unit is located at TA-55, Building 4, in Room 401 and has a maximum capacity of 560 Liters (L) (137 gallons [gal]). The storage tank system consists of two components, with six tanks, that are used to store evaporator bottoms solutions prior to stabilization.

Liquid waste comes primarily from the evaporator as evaporator bottoms in approximately 25-L batches. Unrecyclable evaporator distillate waste (corrosive only) is also cemented when the low-level acid waste line to the TA-50 Radioactive Liquid Waste Treatment Facility is closed. Liquid waste generated from a source other than the evaporator (such as C-AAC analytical residues) is transferred to the Cementation Unit glovebox in plastic bottles up to 2L in volume via the trolley system.

The evaporator bottoms solutions are initially stored in the evaporator glovebox tank component, where they are sampled for radionuclides, oxides, and metals. They remain in the evaporator glovebox tank component until the radionuclide content is known. If the sampling results show radionuclide concentrations below the discard limit, the solutions are transferred to the stabilization unit pencil tanks component for storage pending the remaining analytical results. Upon completion of the remaining analyses, the solutions are transferred directly to the stabilization unit for treatment. If the sampling results show concentrations above the discard limit, the solutions are recirculated. Figure 47 in Attachment N (*Figures*) provides a general arrangement diagram and a process flow diagram for the TA-55 storage tank system.

The storage tank unit is connected to three main piping systems, which include the solution feed, ventilation, and vacuum piping systems. Each tank component has a separate header that connects to each of the piping systems. The wet-vacuum piping system is used for all transfers; and the vent-piping system is used to break vacuum. The wet-vacuum and vent-piping systems use vacuum traps to capture carryover liquid and prevent contamination of the lines downstream. One vacuum pump serves the storage tank system for liquid transfers and for vacuum sparging. The following attachment subsections provide descriptions of each of the tank system components and associated ancillary equipment.

A.5.10.1 Evaporator Glovebox Tank Component

The evaporator glovebox tank component is located in the northwest corner of TA-55-4, Room 401. It is approximately 8 feet (ft) high, 4-ft wide, and 13-ft long and consists of two welded-steel trays, eight glass columns, and associated ancillary equipment. The overall capacity of the evaporator glovebox tank component is approximately 270 L (71 gal). The evaporator glovebox tank component is fabricated from 0.1875-inch (in.), 316 stainless steel with a 2B finish conforming to the American Society for Testing and Materials (ASTM) “A240-Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels,” hereinafter referred to as ASTM A240 (ASTM, 1998). The lower half of the tank is fabricated with additional layers of materials welded to the outside of the 0.1875-in.-thick stainless-steel enclosure. These materials consist of 0.25-in.-thick lead shielding, conforming to ASTM “B29-Standard Specification for Refined Lead” (ASTM, 1997a), and an outer layer of 0.0625-in. 316 stainless steel cladding. The tank component is of welded construction with all welds blended, ground, and polished to blend with adjacent material. All joints are vacuum tight.

The support frame and legs of the evaporator glovebox tank component are constructed of carbon steel and conform to ASTM “A36-Standard Specification for Structural Steel for Welding” (ASTM, 1987). The support frame is bolted to the base of the tank component for stabilization. In addition, the legs of the tank component are bolted to the support frame and

secured to the 10-in.-thick concrete floor of Room 401 with anchor bolts. The 10-in.-thick concrete floor was constructed to conform to the reinforced concrete building code requirements of the American Concrete Institute (ACI) “318-71-Building Code Requirements for Structural Concrete and Commentary,” hereinafter referred to as ACI 318-71 (ACI, 1995). The reinforcing steel was detailed and fabricated in accordance with ACI “315-Details and Detailing of Concrete Reinforcement,” hereinafter referred to as ACI 315 (ACI, 1992). The design construction and tolerance of the framework around the concrete is in accordance with ACI “347-Guide to Formwork for Concrete,” hereinafter referred to as ACI 347 (ACI, 1994). The window portions of the evaporator glovebox tank component are constructed of 0.25-in. leaded glass, laminated on both sides with 0.125-in. clear glass, and installed with a neoprene gasket. Additionally, each window is backed with 0.25-in. safety glass installed with a neoprene gasket/seal that provides airtight containment. The dual glass configuration is secured to the tank component with a welded frame consisting of a 0.25-in.-thick lead shielding and a 0.0625-in. 316 stainless steel cladding similar to the additional layers of materials welded to the outside of the lower half of the tank component. The welded window frames are bolted to the tank component. Replacement windows and gaskets, if and when needed, shall be made of the same or similar materials.

The glove portions of the evaporator glovebox tank component are constructed of neoprene and Hypalon®. Each glove is tested for material continuity by the manufacturer before acceptance and installation in the evaporator glovebox tank component. Each glove is selected for its resistance to nitric acid. Replacement gloves, when needed, are made of the same or similar materials.

The evaporator bottoms solutions are vacuum-transferred from the steel trays to the glass columns. Each glass column is individually filled and visually monitored during transfer from the steel trays to a glass column. To prevent overflow, the evaporator bottoms are automatically directed to a vacuum trap when the maximum capacity of a column is reached. The maximum capacity of the vacuum trap is approximately 5.5 L. The glass columns and the vacuum trap are constructed of PYREX® glass, manufactured by Corning, with stainless steel end plates. Replacement parts for the columns and vacuum trap will be of the same or similar materials. The glass columns are equipped with a vacuum sparging system designed to homogeneously mix the evaporator bottoms prior to sampling or transfer.

The piping associated with the evaporator glovebox tank component includes the transfer line from the evaporator, the wet-vacuum line, the lean-residue transfer line, and the ventilation lines entering and exiting the evaporator glovebox tank component. All piping and associated valves are constructed of single-walled, 316 stainless steel. The transfer line from the evaporator is 1.0-in. pipe, the wet-vacuum line and the lean-residue transfer line are 0.75-in. pipe, and the ventilation lines are 2.0-in. pipe. Pipe diameters may change in the event that a portion of the piping requires replacement. The evaporator glovebox tank component’s ancillary equipment is supported by a steel channel Uni-strut® support frame. The Uni-strut® support frame is secured to the concrete ceiling with anchor bolts and provides the component’s ancillary equipment with support and protection against physical damage and excessive stress that could potentially result from settlement, vibration, expansion, or contraction. Replacement supports are made of the same or similar materials.

The evaporator glovebox tank component does not operate under pressure; therefore, excessive stress due to expansion and contraction is not anticipated.

A helium leak-test using a mass spectrometer was performed on the evaporator glovebox tank component upon fabrication at Silver Engineering and again after it was installed and made operational at its present location in TA-55-4, Room 401. Because secondary containment is provided for this tank, the requirements in 40 CFR § 264.193(i), incorporated herein by reference, are not applicable.

A.5.10.2 Stabilization Unit Pencil Tanks Component

The stabilization unit pencil tanks component consists of five vertical tanks located perpendicular to the west wall of TA-55-4 in Room 401. Each of the pencil tanks has a working capacity of 50 L (13 gal), an outside diameter of 6.625 in., a straight side height of 10 ft, a wall thickness of 0.28 in., and a conical bottom. The pencil tanks are constructed of 316 stainless steel. The stainless steel materials are corrosion-resistant and are compatible with the liquid waste stored in the tanks. The vent trap and the vacuum trap operating within the stabilization unit pencil tanks component have an outside diameter of 6.625 in. The vent trap has a straight side height of 9 in. and a maximum capacity of approximately 4 L. The vacuum trap has a straight side height of 37 in., a conical bottom, and a maximum capacity of approximately 17 L. The vent trap and the vacuum trap are constructed of 316 stainless steel for corrosion resistance and materials compatibility with the waste. All of the pencil tanks were designed in accordance with the standards applicable at the time of construction, including American Society of Mechanical Engineers (ASME) “Boiler and Pressure Vessel Code” (BPVC) (ASME, 1998), hereinafter referred to as ASME BPVC, Section VIII, Division 1. The pencil tanks are installed such that, if necessary, they can be replaced.

A.5.10.3 Ancillary Equipment

The piping associated with the stabilization unit pencil tanks component includes the header/manifold, vacuum manifold, and lower manifold for the stabilization unit pencil tanks component; the vent trap, vent line, and drain line; the transfer line from the evaporator glovebox tank component to the stabilization unit pencil tanks component header/manifold; and the transfer line from the lower manifold to the stabilization unit. All inter-tank piping and transfer piping is single-walled 0.75-in., Schedule 40, stainless steel pipe. All tank-to-piping connections are flanged.

The stabilization unit pencil tanks component is equipped with a vacuum trap that is designed to collect any mists or carryover liquid that might accumulate in the vacuum or vent lines. The vacuum trap is equipped with a sight glass for local level indication and is normally empty. Each stabilization unit pencil tank is equipped with three sight glasses located on the side of each tank for overfill protection.

The stabilization unit pencil tanks component is erected upon a 10-in.-thick concrete floor in TA-55-4, Room 401. The 10-in.-thick concrete floor provides a foundation that will maintain the load of the tank component when full. The concrete floor and ceiling were constructed to

conform to the building code requirements of ACI 318-71 for reinforced concrete (ACI, 1995). The reinforcing steel was detailed and fabricated in accordance with ACI 315 (ACI, 1992). The design, construction, and tolerance of the framework around the concrete is in accordance with ACI 347 (ACI, 1994). The stabilization unit pencil tanks component and its ancillary equipment are elevated and supported by a steel channel, Uni-strut[®] support frame. The Uni-strut[®] support frame is secured to the concrete floor with anchor bolts and provides the ancillary equipment with support and protection against physical damage and excessive stress due to settlement and vibration.

In accordance with 40 CFR § 264.192(a), incorporated herein by reference, a written assessment has been prepared attesting that the stabilization unit pencil tanks component has sufficient structural integrity and is acceptable for handling mixed waste. The written assessment was reviewed and certified by an independent, qualified, registered professional engineer.

A.5.10.4 Secondary Containment

The storage tank unit is located at TA-55-4, inside Room 401. This room has a floor and walls that completely surround the tank system and serve as secondary containment, therefore, the secondary containment meets the requirements of 40 CFR § 264.193(1)(iv), incorporated herein by reference, for an external liner system. The walls and floor of Room 401 prevent the migration of wastes or accumulated liquids to any soil, groundwater, or surface water and are capable of collecting releases and accumulated liquids until the material is removed. Because the storage tank system and secondary containment are inside a building, run-on or precipitation will not affect the containment capacity. The capacity of the containment area is sufficient to contain 100 percent of the capacity of the largest liquid-bearing tank within its boundary.

The floor of Room 401 consists of 10-in.-thick reinforced concrete slab that is compatible with the wastes stored in the storage tank system and will effectively prevent migration of waste. The concrete in Room 401 is sealed with an epoxy or similar coating to aid in decontamination should a spill occur. In addition, tertiary containment is provided by the floor of the basement level of TA-55-4, which also consists of 10 in. of concrete. The construction joints in the floor slab and exterior walls are all constructed with chemical-resistant water stops in place. The conduit piping penetrating the floor of the room is secured with rubber boots, bushings, and flanges. All penetrations (*i.e.*, holes for conduit) in the floor have been sealed to prevent liquids from entering the penetrations.

Additional leak detection will be provided by continuous air monitors (CAM) at various locations throughout Room 401. CAMs will detect any airborne alpha contamination that would be present if a leak were to occur at any point in the system. Additionally, radiological control technicians periodically monitor for radioactive contamination and would detect any leaks during monitoring.

A.5.11 Mixed Waste Stabilization Unit

The stabilization unit treats homogeneous liquid and solid mixed waste generated primarily from R&D and processing and recovery operations at TA-55 and at the Chemistry and Metallurgy Research Building at TA-3. The liquid wastes (Summary Category Group L1000) generally consist of evaporator bottoms solutions and laboratory solutions that may exhibit the hazardous characteristics of corrosivity and toxicity for metals (including arsenic, barium, cadmium, chromium, lead, mercury, and silver), as defined in 40 CFR §§ 261.22 and 261.24, respectively. The homogeneous solid process wastes (Summary Category Group S3000) generally consist of process residue from the evaporator, process leached solids, filter cake, and other miscellaneous solids. This waste stream typically exhibits the hazardous characteristics of toxic metals. These waste streams are mixed with cement in 55-gallon drums and allowed to cure into a non-corrosive solid matrix.

The stabilization unit is located in Glovebox GB-454 along the west wall of TA-55-4, Room 401. The unit has been in operation since 1991 and has a maximum capacity of 568 liters (L) (approximately 150 gallons [gal]). It consists of a pH adjustment column, a vacuum trap, two motor-driven mixers, four impellers, associated support structures, a glovebox, and piping.

The pH column has a straight side height of 5 feet (ft) and an outside diameter of 6.66 inches (in.). The maximum capacity of the column is approximately 27 L. The column is raised above the glovebox floor approximately 3 in. by three steel legs and is secured to one wall of the glovebox with a steel bracket that binds the column approximately 3 ft up from the base of the column. The vacuum trap associated with the column has a straight side height of 2 ft and an inside diameter of 6 in. The maximum capacity of the vacuum trap is approximately 11 L. The pH column and the vacuum trap are constructed of PYREX® glass with stainless steel end plates similar to the glass columns in the evaporator glovebox tank component. The glass and stainless steel materials are corrosion-resistant and compatible with the waste received in the column. The pH column is used to adjust the pH of approximately 5 L of waste to ensure compatibility with the cement used for solidification. A compressed-air line enters the glovebox and is connected to two pressurized air tanks outside of the glovebox. The compressed-air line is used for remote valve operation.

The two mixers within the unit are high-flow, gear-driven, fixed-mount mixers. All couplings, shafts, and impellers are constructed of 316 stainless steel. The shafts are 5 ft long. Two impellers are mounted to each shaft. Each impeller has a diameter of approximately 11 in. The mixers are driven by 3.5-horsepower motors encased within the mixer housing. The mixer housing is approximately 2.5 ft long. The maximum weight of each mixer is 225 pounds. Each mixer is mounted on steel plates and supported by two steel guides on either side of each mixer. Each guide is bolted to a 6-in. steel flange at either end and is secured to the glovebox floor and ceiling. Each motor is mounted to a center screw drive that allows the mixers to be independently raised and lowered within the glovebox.

The glovebox is constructed of a section of 0.75 in. lead between two sections of approximately 0.188-in.-thick low-carbon grade, 316 stainless steel. The floor of the glovebox contains two circular openings with removable covers that allow the shafts and impellers of each mixer to be lowered into drums attached beneath the glovebox.

During stabilization operations, two 55-gal steel drums are positioned under the glovebox directly under the openings in the floor of the glovebox. A “bag-out” bag extends from the glovebox into each drum between the drum and the drum liner. This liner is fastened at the bottom of the glovebox with an elastic cord and clamped into place to prevent hazardous constituents from escaping the confinement of the glovebox and the drums during treatment operations. The cement and the waste to be solidified are transferred into the drums and homogeneously mixed inside the drums. Each drum is positioned on a steel platform/scale that is secured in a steel track. The platform allows the drums to be safely and easily removed from the unit after the cement has hardened.

The majority of the piping associated with the stabilization unit is 316 stainless steel. Tygon[®] tubing is used to transfer sodium hydroxide and the contents of the pH column to the drums. The cement is transferred into the glovebox and drums from a hopper/screw feeder through rubber tubing.

The homogeneous solid process wastes generated at TA-55 are delivered to the Cementation Unit in a closed container from the generator glovebox through a trolley system. The generator is instructed to size reduce the waste to minus 8 mesh. The Stabilization Unit personnel confirm this and do the size reduction if necessary. The particulate waste is poured into the waste drum just before or during the addition of cement to the drum and homogeneously mixed with the cement paste.

The stabilization unit is located in a vacuum-pressurized glovebox at TA-55-4 inside Room 401. Room 401 provides secondary containment for the stabilization unit. The floor of the room is recessed approximately 2.5 in. The room itself is approximately 60 ft long by 75 ft wide. The capacity of the secondary containment area is greater than 100 percent of the volume of waste that is treated in the stabilization unit at any one time. The entire floor is constructed of a 10-in.-thick reinforced concrete slab. Eight continuous air monitors installed at various locations throughout TA-55-4, Room 401 detect any airborne alpha contamination that would be present if a leak were to occur resulting in a release outside of glovebox GB-454.

The stabilization unit is located within a negative pressure glovebox that is connected to the TA-55-4 facility ventilation system. The high-efficiency particulate air filters on the glovebox are on the air intake side of the ventilation and are designed to prevent escape of contamination from the glovebox in the event of a power failure. TA-55-4 is equipped with a backup generator that re-establishes power to all vital systems, providing exhaust to the glovebox. The unit is a batch waste treatment system. If a power failure occurs, all operations cease inside the glovebox until power is restored. In addition, the glovebox is located within three succeeding greater pressure zones. These zones are (in order of increasing pressure) the glovebox, Room 401, and the main corridor outside of Room 401. These pressure zones are designed to create airflow into Room 401 and the glovebox and limit the potential for hazardous constituents to migrate to the atmosphere. Figure 48 in Permit Attachment N (*Figures*) provides a general arrangement diagram and a process flow diagram for the TA-55 stabilization unit.

A.5.12 Security and Access Control

Security at TA-55 is maintained with both manmade and natural barriers. These barriers prevent the unknowing entry and minimize the possibility for unauthorized entry of persons or livestock into TA-55. Two 12-foot (ft) high chain-link security fences with razor wire at the top surround the entire perimeter of TA-55. Three entry gates allow access to TA-55. One entry gate is located at the main entrance to TA-55 on the southeast side of the facility, one entry gate is located on the road to TA-48 at the northwest end of TA-55, and one entry gate is located at the northeast corner of TA-55 (for access to TA-55, Building 28 [TA-55-28] only). An entry station is located adjacent to the entry gate at the main entrance to the facility. The entry station is manned 24 hours a day by security personnel. Unescorted access to TA-55 is granted only to persons possessing appropriate security clearance and meeting specific training requirements.

TA-55 is patrolled by security personnel during both operational and nonoperational hours to ensure that the gates are locked and that unauthorized entry has not occurred. The entire length of both security fences is also inspected several times each day by on-site security personnel. The locations of the security fences, entry gates, and entry stations are shown on Figure 10 in Attachment N (*Figures*).

In addition to the fence and entry gates, cliffs and canyons surrounding TA-55 provide natural barriers to discourage unauthorized entry.

Warning signs are posted on the perimeter fences at approximately 40 to 110-ft intervals and can be seen from any approach to TA-55. Warning signs are also posted at each access to the waste management units in sufficient numbers to be seen from any approach. The legends on the signs are bilingual (*i.e.*, English and Spanish) and indicate “No Trespassing by Order of the United States Department of Energy.” The signs are legible from a distance of 25 ft.

A.5.13 Emergency Equipment

Buildings at TA-55 are equipped with multiple audible and visual safety-alarm systems to alert personnel in the event of an emergency and to evacuate the area. These alarm systems are located both inside and outside buildings at TA-55 and are monitored and controlled by the facility monitor and control system (FMCS). The FMCS is in operation 24 hours a day and is located in the Operations Center at TA-55-4 with access through TA-55-3. Specific FMCS alarm systems at TA-55 are discussed below.

A TA-55 computer system monitors the smoke and heat sensors, fire-alarm pull boxes, and drop box push-button alarms located throughout TA-55. Fire-alarm pull boxes and/or drop box push-button alarms are located in the vicinity of the waste management units addressed in this permit. Fire-alarm pull boxes may be used by personnel to activate a local fire alarm when a fire or other emergency is discovered. Fire-alarm pull boxes are located in TA-55-4, Room 401, and throughout the basement in the vicinity of the container storage management units. The equipment includes portable eyewash stations and safety showers. Eyewash stations and safety showers are located in Room 401 and throughout the basement of TA-55-4. Eyewash stations are also located on the Container Storage Pad and outside on the south side

of TA-55-4 near TA-55-185. Safety showers are readily available in the following locations: TA-55-4, Room 401; in the basement of TA-55-4; on the Container Storage Pad; and outside on the south side of TA-55-4. SDS provide useful exposure information and are available in Room 401 and in the basement of TA-55-4.

A.6 TA-63

The following section describes the Transuranic Waste Facility (TWF). Detailed descriptions of the unit's structures are included in the subsections. The TWF is located at TA-63 on a mesa between Ten-Site Canyon, a tributary of Mortandad Canyon, on the north and Pajarito Canyon on the south in the central portion of the Facility (*see* Figure 54 in Attachment N (*Figures*)). The unit is built at the intersection of Pajarito Road and Puye Road, within the triangle formed by Building 63-111 to the east, Puye Road to the north, and Pajarito Road to the southwest.

The TWF consists of one hazardous waste management unit that is used to store containers of newly generated hazardous, mixed low-level, and mixed TRU waste. Waste containers may be characterized at the TWF, as described in Permit Sections A.6.4 and A.6.5, and in applicable sections of Permit Attachment C, *Waste Analysis Plan*. Characterization activities at the TWF include review of generator acceptable knowledge (AK) documentation, head-space and flammable gas sampling, non-destructive assay (NDA), and non-destructive examination (NDE). Waste containers will be accepted at the TWF only if they are closed and equipped with Waste Isolation Pilot Plant (WIPP) approved filter vents. Waste containers are not opened during storage or characterization at the TWF, although their filter vents may be replaced if necessary. Remote-handled TRU waste is not managed at the TWF.

The types of waste containers holding hazardous or mixed waste that are stored at the TWF include: 55- and 85-gallon drums; 55-gallon pipe overpack containers (POCs); Standard Waste Boxes (SWBs); Oversize Waste Boxes (OWBs); and Standard Large Box 2s (SLB2s).

Some TRU waste containers are determined through final waste characterization not to meet the WIPP requirements for TRU waste. Depending on the presence of hazardous constituents, these waste containers are reclassified as either low-level waste or mixed low-level waste and stored at the TWF until they are dispositioned appropriately.

Waste shipments are made from the LANL waste generating facilities to the TWF for storage and characterization. TRU waste is then shipped to the RCRA permitted Radioactive Assay and Nondestructive Testing (RANT) Facility at TA-54-38 West. The RANT Facility is used to load the TRU waste containers into TRUPACTs (steel shipment containers) required for off-site shipment to the WIPP. TRU waste may also be shipped from TWF to the RCRA permitted TA-50-0069 Waste Characterization, Reduction, and Repackaging Facility (WCRRF) for repackaging and/or remediation of prohibited items if necessary. Low-level waste may be shipped from TWF to other LANL facilities or to off-site treatment or disposal facilities.

The TWF permitted storage unit is constructed on 1.82 acres (79,239 square feet). The layout of the unit is depicted in Figure 55. The main structure for the unit is a concrete pad providing a physical base for six waste storage buildings, three waste characterization trailers, and outside

storage of waste containers that are too large for placement in the buildings. The pad is surrounded by a security barrier system fence. The boundary of the hazardous waste management unit is limited to the northern portion of the concrete pad defined by those areas that drain to a retention basin. Along the northern and western sides of the unit, this is the edge of the concrete pad along the bottom of the retaining walls. On the east side, the edge of the curbing for the concrete pad is the boundary. The southern side of the boundary is defined by a painted line in compliance with Permit Section 3.5(2), *Management of Containers*. The line is situated approximately between the south east corner of the retention basin and the curb and gutter at the opposite corner of the fence line along the eastern side of the unit. This is defined by the limits of the catchment that drains to the retention basin.

The retention basin is designed to capture storm water run-off and fire suppression water released in the event of a fire at the TWF, as described in Permit Section A.6.5.

The unit also includes a small storage building for calibration sources used for waste characterization activities. Outside the boundary of the unit, other site structures include an operations support building, a fire water storage tank, an associated utility building, a covered forklift charging station, and an equipment storage shed.

A.6.1 Concrete Pad

The TWF pad consists of 8-inch thick reinforced concrete to provide support for the site structures and vehicle movement. The pad rests on leveled gravel base course and is nominally 8 inches thick. The existing ground at the site slopes from the northwest to the southeast. There is a significant grade difference from the northwest corner to the southwest corner of the site. Portions are lower in elevation than Pajarito Road and Puye Road. Given the elevation difference on the site, retaining walls were constructed along the northwest portion of the site. The pad is sloped in a range from 1.1% to 2.5% to drain storm water and potential fire suppression water to the retention pond.

The perimeter of the pad has a 15" to 18" gutter and 6" high curb to provide run-off control. A valley gutter isolates the northern portion of the pad. Storm water and potentially contaminated fire suppression water flow from the northern portion of the pad flows to the valley gutter that drains to the retention basin. This feature substitutes for berms, dikes, or sumps specific to each storage building. The southern portion of the pad, which is outside the hazardous waste management unit where waste is not stored, slopes to the southeast and drains off the pad toward the parking lot. Figure 55 provides details regarding the pad configuration.

A.6.2 Storage Buildings

The TWF includes six storage buildings, five of which are functionally identical and are described in this section. The remaining storage building is described in section A.6.3. The five buildings measure 33 x 64 ft or approximately 2112 square feet, and are 15 ft high. The storage buildings provide covered storage for hazardous, mixed low-level, and mixed TRU waste containers generated during current Facility operations. Multiple buildings are used to minimize the radioactive material content in individual storage buildings and to reduce the potential impact

from accidents relative to a single larger building. These five storage buildings are designated 63-0149, 63-0150, 63-0151, 63-0152, and 63-0153.

The storage buildings are constructed as covered single-story structural steel frames. Each of the storage buildings and its structural members are designed to exceed the snow load for roof design, the design wind force for buildings, and the seismic loading for structural components, as described in American Society of Civil Engineers specification ASCE 7-05, *Minimum Design Loads for Buildings and Other Structures*. The steel frame is an ordinary moment frame with joists to attach roof panels and girts to attach wall panels. The walls of the facility are rigid to provide protection from the elements and external forces. Gypsum board on light gauge metal studs with industrial coating finish the interior walls. The roof is a high quality metal standing seam. Batt insulation in the ceiling and on the inside of the walls reduces heat loss and gain inside the buildings. Electric heaters heat the interior to prevent fire suppression systems and eyewash stations from freezing. Cooling is provided by venting fans. In order to drain the building in the event of a fire, the floors are constructed to provide a shallow slope (1/8 inch to 1 foot) from the back end of the building towards the front, and then out the roll-up door opening and a loading ramp to the concrete pad outside the building.

The building floors (i.e., mat slabs) are six inches higher than the outside surface of the concrete pad to prevent run-on, and are sloped toward the roll-up door at the building entrances for drainage, in accordance with 40 CFR §264.175(b)(2) and (c).

The concrete floors are coated to provide a sealed surface and chemical resistance, although secondary containment pallets are used to meet the containment requirements of the Permit for potential liquid containing waste containers in the storage buildings and in compliance with 40 CFR §264.175(b)(1). The floor coating standards include:

- Minimum Class B per National Fire Protection Association (NFPA);
- Radiation resistant as determined by American Society for Testing and Materials, International specification ASTM D 4082; and
- Decontaminable to at least 95 percent of total activity removed and certified for Nuclear Coating Service level II.

A.6.3 Storage and Characterization Building

The sixth storage building is divided into a storage area, a staging room used for the thermal equilibrium of containers to prepare for head space gas sampling, and additional support and analytical equipment rooms. The storage area in this building is used for a variety of containers including SWBs and SLB2s. In order to accurately analyze headspace gas, the container temperature must be allowed to equilibrate to a minimum of 64 degrees Fahrenheit for 72 hours. Sampling equipment is stored in the building for use in obtaining headspace gas samples and flammable gas samples from waste containers. Gas chromatography and mass spectrometry on the flammable gas sample occurs in an adjacent room.

The building dimensions are 80 x 33 ft (approximately 2640 square feet) and 15 feet high. The building is constructed to the same standards as the other storage buildings. The building is numbered 63-0154.

A.6.4 Characterization Trailers

The TWF facility includes pads with utility hook-ups for the characterization trailers used to certify containers as meeting DOE WIPP waste acceptance criteria (WAC). The NDE and NDA equipment is provided for the TWF in mobile modified commercial trailers brought to the facility. The characterization trailers will house the following characterization equipment:

- Real Time Radiography (RTR) unit. The NDE equipment in the trailer is designed to provide X-ray examination of the contents of TRU waste drums.
- High-Efficiency Neutron Counter (HENC) unit. The NDA equipment in the trailer is designed to provide a passive neutron and gamma measurement of 55-gallon TRU waste drums.
- SuperHENC unit. The NDA equipment in the trailer is similar to the HENC but includes a high efficiency neutron counter and a gamma counter that are both designed to handle SWBs.

The RTR is a self-contained, non-intrusive X-ray unit, physically housed in a trailer 48 feet in length by 8 feet wide used to X-ray waste containers up to 85 gallons in volume. Radiography is a nondestructive qualitative and semi-quantitative technique that involves X-ray scanning of waste containers to identify and verify waste container contents. Radiography is used to examine the waste container to verify its physical form. This technique can detect prohibited items such as liquid wastes and gas cylinders, which are prohibited for WIPP disposal. Radiography examination must achieve the following to meet the WIPP WAC:

- Verify and document the physical form of each waste container.
- Identify any prohibited items in the waste container.
- Confirm that the physical form of the waste matches its waste stream description (i.e., homogeneous solids, soil/gravel, or debris waste [including uncategorized metals]).

The HENC is a self-contained, non-intrusive, passive assay unit, physically housed in a trailer 48 feet in length by 8 ½ feet wide by 12 ¾ feet high. The HENC is designed to assay 55-gallon (208 liter) drums containing fissionable radionuclides. The system simultaneously performs passive neutron counts and gamma spectrometry to detect gamma-emitting radionuclides for the purpose of determining quantitative concentrations of TRU constituents. The equipment and mobile container only require electrical power to operate. Approximately 10 to 13 drums a day can be processed through the HENC, with each drum taking approximately 45 minutes for examination. The HENC is a large rectangular-shaped neutron counter that is specifically designed to assay the container in a fixed geometry. The HENC system uses passive and add-a-source neutron analysis methods to assay the nuclide mass contained in 55-gal drums of TRU waste. Waste containers to be assayed are placed on a conveyor that feeds them into the system.

The SuperHENC operates on the same principle as the HENC, within a similar tractor trailer. The process however, is applicable to the assay of TRU radionuclides in waste packages such as SWBs. Data from this process is used to assay the radioactive content of SWBs containing TRU waste, sorting SWBs based on the 100 nanocurie per gram (nCi/g) TRU limit, and confirming radioisotopes identified using acceptable knowledge (AK).

The trailers are numbered 63-0155, 63-0156, and 63-0157 at TA-63. Additional trailers may be needed as characterization needs for the facility change. If additional trailers are needed or existing trailers are proposed to be moved at the unit, a request for a Permit modification must be submitted in accordance with Permit Section 3.1(3).

A.6.5 Retention Basin

The retention basin is located south of the storage buildings and characterization trailers in the south-western corner of the permitted unit. The retention basin is designed to collect surface storm water or melt water run-off from the concrete pavement via the slope (ranging from 1.1% to 2.5%) of the concrete pad, and in the event of a fire at the unit, fire suppression water that could flow out of the storage buildings or from other unit structures to the concrete pad.

The designed volume capacity for the retention basin includes the potential for a combination of both events. This includes run-off from a projected 25 year frequency and 2 hour duration precipitation event (1.94 inches of precipitation resulting in approximately 95,400 gallons (12,750 cubic ft.) from 1.82 acres). For a fire suppression event, an estimate of suppression water needed is calculated from NFPA 13 factors (380 gpm for 30 min. of sprinkler demand and 500 gpm for 30 min. fire hose stream allowance), for a total of approximately 26,400 gallons (3,530 cubic ft.). Volume from both events results in a total capacity of approximately 121,800 gallons (approximately 16,300 cubic ft.). The designed total retention basin volume also includes a minimum of 0.5 ft of freeboard, resulting in a total capacity of 137,450 gallons (18,375 cubic ft.). The dimensions of the basin are 125 ft by 42 ft by 5.5 ft deep. The retention basin is equipped with a manual release valve that may be used to discharge collected water that meets appropriate surface water discharge standards, as required by Permit Section 3.14.2. The concrete mixture used for construction of the retention basin is coated with a penetrating sealant to improve the concrete's water resistance.

Routine inspections of the retention basin pursuant to Permit Section 2.6, *General Inspection Requirements* and subsequent repairs as required by Permit Section 2.6.2, *Repair of Equipment and Structures* are conducted to ensure that the integrity of the retention basin is maintained.

A.6.6 Other Project Structures

Other project structures are present at the TWF to provide support for the hazardous waste management activities at the unit. These structures are either located outside the boundary of the hazardous waste management unit or are not used to store or manage hazardous waste.

The Operations Support Building provides offices and services for operations personnel and management. Personnel are housed in the separate building to ensure that radiological exposures are as low as reasonably achievable (ALARA) by increasing distance from the waste management activities. The Operations Support Building is approximately 75 ft by 80 ft. Operations and characterization personnel are housed in this building, although it will not be occupied continuously. However, it provides storage of waste container data and monitoring of key operational parameters (e.g., fire alarm systems, safety equipment status indicators, and communication systems including the public address system) and specific safety structure,

system, and component status. The building is located outside the security control fence; windows provide visual observation of the control area.

Vehicle access to the hazardous waste management unit is through a gated driveway located east of the concrete pad. Gates are kept closed and vehicle access to the controlled area within the unit fence line requires check-in at the Operations Support Building. Pedestrian access to the controlled area also requires check-in through the Operations Support Building.

A fire water supply tank and a utility building that houses two fire water pumps and instrumentation needed to ensure operation of the fire suppression system are located to the north of the Operations Support Building outside the controlled area fence. Two seismic power cutoff system enclosures are also present north of the building. A back-up power generator is located east of the Operations Support Building.

Regional aquifer monitoring well R-46 is located outside of the hazardous waste management unit north of the site.

An equipment storage shed used to store items such as metal pallets, containers used to over-pack waste containers, and snow removal equipment is located on the west side of the TWF. There is no fire protection in this building. A separate building designated the Characterization Source and Matrix Management (CSMM) Building will house radioactive sealed sources for calibration of RTR and HENC sensors sources.

A.6.7 Security and Access Control

The DOE restricts access to the entire Facility through a variety of methods. Guard stations control public access to Pajarito Road east and west of TA-63. Therefore, only properly identified Triad National Security, LLC (Triad) and DOE employees authorized to enter the facility or individuals under their escort have access to the TWF. The TWF is enclosed by a security barrier system with controlled access gates. This includes a continuous section of prefabricated steel vehicle barriers and an eight foot high chain link fence. Two vehicle access gates are integrated into the fence line. Controlled entry to the unit is provided by a system of access controls (badge readers and administrative controls are required prior to entrance) to ensure that only authorized personnel are granted access. Three emergency personnel one-way exit gates are also present in the fence. These access controls also ensure that all facility personnel can be identified and located in an emergency.

The TWF is patrolled by facility security personnel to prevent unauthorized entry. Warning signs stating “Danger – Unauthorized Personnel Keep Out,” are posted on the perimeter fences and gates in accordance with Permit Section 2.5.2, *Warning Signs*. The text on the signs are bilingual (i.e., English and Spanish) and indicate “No Trespassing by Order of the United States Department of Energy.” The signs are legible from a distance of 25 feet.

A.6.8 Required Equipment

In accordance with Permit Attachment D, *Contingency Plan*, emergency equipment is located throughout the TWF and includes fire alarms, fire response systems, alarm systems, internal communications, spill kits, and decontamination equipment.

The TWF is equipped with safety-alarm systems to alert personnel in the event of an emergency and to evacuate the area. These alarm systems are located both inside and outside the unit and are continuously monitored. The facility monitor/control system is located in the access control station at the TWF; the system is also connected to the Los Alamos County Consolidated Dispatch Center. Specific facility monitor/control system equipment located at the TWF is discussed below. Emergency equipment is located throughout the TWF and includes fire alarms, fire response systems, alarm systems, internal communications, spill kits, and decontamination equipment.

Fire-alarm pull boxes and/or drop box push-button alarms are located pursuant to NFPA standards in the TWF where waste management activities are conducted. Fire-alarm pull boxes can be used by personnel to activate a local fire alarm when a fire or other emergency is discovered. Once manually activated, an alarm will sound in the TWF access control station and at the LAFD through Los Alamos County Consolidated Dispatch Center. The TWF is also equipped with automatic fire suppression alarm systems. The fire-suppression alarms will be activated when water flow is detected in the sprinkler pipes of the fire-suppression system. Upon activation of the fire-alarm system, an alarm will sound and lights will flash to alert personnel of emergency conditions. All fire-alarm pull boxes and automatic fire-suppression systems located at the TWF are connected to the LAFD through Los Alamos County Consolidated Dispatch Center.

In addition to the alarms described above, a public address (PA) system is available to announce emergency conditions or to initiate an evacuation at the TWF. The PA system is audible throughout the TWF and is activated from the access control station in the Operations Support Building.

Personnel working at the TWF have the ability to communicate the location and nature of hazardous conditions using 2-way radios, conventional telephones, or cellular telephones to call the access control station. This type of call will summon assistance from the EO-EM, local police and fire departments, and state emergency response teams, as necessary.

Fire control equipment is readily available in the hazardous waste management unit. Portable fire extinguishers are available and may be used by trained on-site personnel depending on the size of the fire and the fuel source. However, LANL policy encourages immediate evacuation of the area and notification of appropriate emergency personnel. Fire hydrants are located in accordance with NFPA standards on the west and east sides of the TWF pad and near the Operations Building. Water is supplied to the fire hydrants by a municipal water system which can provide adequate volume and pressure (i.e., greater than 1,000 gal per minute and 90 pounds per square inch static pressure) to multiple water hoses in the event of a fire. The LAFD will supply all water hoses needed in the event of a fire at the TWF. Fire protection systems for the TWF storage buildings, including the Storage and Characterization Building 63-0154, include a dry-pipe sprinkler system for fire suppression. Water will be supplied via the 196,000 gallon tank north of the Operations Support Building with electric powered fire-water pumps, backed-up with a diesel generator to distribute water to automatic sprinkler systems in the buildings.

Spill response kits are available at the TWF in the storage areas to mitigate containable spills. These kits typically contain sorbents, neutralizers, personal protective equipment (PPE), and other equipment essential for containment of spills. Trained personnel will use the spill kits only if the composition of the release is known and they are sure their actions will not put themselves or others at risk. In addition to the spill kits, cleanup equipment such as shovels, bags and drums are available at the TWF. Overpack drums and sorbents are also stored in an equipment storage shed on the west side of the TWF. Emergency personnel can also provide additional spill control equipment and assistance upon request depending on the size and severity of the spill. Personnel decontamination equipment at the TWF includes safety showers and eye wash stations located inside each of the storage buildings. These are situated in all waste storage buildings in accordance with OSHA requirements. Additional decontamination equipment may be provided by emergency personnel. SDS (e.g., for cleaners, solvents, used on site) are available at the Operations Support Building to provide exposure information in accordance with OSHA requirements.

A.6.9 Control of Run-on/Run-off

Controlling run-on and run-off at the TWF locations where waste management operations occur is accomplished by the design of the buildings and the use of control structures with appropriate contouring of surface areas. Run-on of storm water into the storage buildings is prevented by walls that enclose raised floors and surface contouring that slopes away from the building to prevent storm water from pooling against the foundations, doors, and loading areas. The internal floors of the buildings are sloped toward the front doors to prevent flooding by precipitation or storm water in addition to providing internal drainage to the outside.

The concrete pad within the permitted unit at the TWF site is sloped in a range from 1.1% to 2.5% to drain storm water to the retention pond. A retention wall prevents slope failure between the surrounding roads and the site. The site is surfaced in concrete and includes a retention basin for collection and management of storm water and fire suppression water as described in Section A.6.5 above.

The secondary containment provided by secondary containment pallets has sufficient capacity to contain at least 10 % of the volume of containers or the volume of the largest container stored in the system, whichever is greater, pursuant to the requirements of 40 CFR §264.175(b)(3) and Permit Section 3.7, *Containment Systems*.

A.6.10 Subsurface Vapor Monitoring

The Permittees shall install a subsurface vapor monitoring network consisting of a minimum of five vapor monitoring wells in the vicinity of the buildings located within the TWF facility to evaluate for vapor-phase contaminants that may migrate from MDA C. Two of the monitoring wells must be located as close as possible to the building foundations that are adjacent to the unit boundary facing MDA C and the utility corridor on Puye Road as depicted by locations VMW-1 and VMW-2 on Figure 56 in Attachment N (Figures). A third monitoring well must be located at a point on the western edge of the permitted unit as close as possible to the utility corridor on Pajarito Road as depicted by location VMW-3 on Figure 56. Two monitoring wells must be located between MDA C and Puye Rd as depicted by locations VMW-4 and VMW-5

on Figure 56. These five wells must be installed and operational within 90 days of completion of construction of the TWF buildings.

Vapor monitoring wells VMW-1, VMW-2, and VMW-3 shall be constructed with a single vapor monitoring port located in the center of a sampling interval between 5 ft and 10 ft below ground surface (bgs). Vapor monitoring wells VMW-4 and VMW-5 shall be constructed with two vapor monitoring ports located at 25 ft and 60 ft below ground surface (bgs). Boreholes will be advanced using hollow stem auger drilling methods. The vapor monitoring wells shall be constructed utilizing the same type of stainless steel (SS) tubing sampling system used at Vapor Monitoring Well 50-613183 at MDA C.

Well boreholes for VMW-1, VMW-2, and VMW-3 must be advanced to the design depth of 10 ft bgs. A continuous 0.25 inch stainless steel sampling tube with a screened end opening must then be placed in the borehole centered in the sampling interval (5 ft to 10 ft bgs) depth and clean sand filter pack added as the auger(s) are withdrawn to create a vapor permeable medium in the interval 5 ft to 10 ft bgs. The vapor monitoring wells must then be sealed with 2.5 ft of hydrated bentonite clay overlain by 2 ft of bentonite-cement grout.

Well boreholes for VMW-4 and VMW-5 must be advanced to the design depth of 67.5 ft bgs. A minimum 5 ft hydrated bentonite clay plug must be placed above and below each sampling interval. A continuous 0.25 inch stainless steel sampling tube with a screened end opening must be placed in the borehole centered in the 5-foot sampling intervals and clean sand filter pack added as the auger(s) are withdrawn to create a vapor permeable medium in the intervals from 62.5 ft to 57.5 ft bgs and 22.5 ft to 27.5 ft bgs. Bentonite chips shall fill the borehole between sampling interval hydrated bentonite plugs and from the top of the 25 ft sampling interval to 5.5 ft bgs and overlain by a 5 ft bentonite cement grout surface seal.

Final construction of the vapor monitoring wells requires the installation of above ground steel protective casings to protect the wells. The Permittees shall take measures to ensure that the surface monuments will not be damaged by snow removal or other maintenance equipment. The well surface seals must be allowed to cure for at least 24 hr before collecting vapor samples. Sampling will be performed by extracting formation air through the sand layer and into the SS tubing.

G.1 - TECHNICAL AREA 3, BUILDING 29 INDOOR CONTAINER STORAGE UNIT

G.4 - TECHNICAL AREA 50, BUILDING 69, INDOOR CONTAINER STORAGE UNIT

G.5 - TECHNICAL AREA 50, BUILDING 69, OUTDOOR CONTAINER STORAGE UNIT

G.6 - TECHNICAL AREA 54, AREA G, PAD 1, OUTDOOR CONTAINER STORAGE UNIT

G.7 - TECHNICAL AREA 54, AREA G, PAD 3, OUTDOOR CONTAINER STORAGE UNIT

G.8 - TECHNICAL AREA 54, AREA G, PAD 5, OUTDOOR CONTAINER STORAGE UNIT

G.9 - TECHNICAL AREA 54, AREA G, PAD 6, OUTDOOR CONTAINER STORAGE UNIT

G.10 - TECHNICAL AREA 54, AREA G, PAD 9, OUTDOOR CONTAINER STORAGE UNIT

G.11 - TECHNICAL AREA 54, AREA G, PAD 10, OUTDOOR CONTAINER STORAGE UNIT

G.12 - TECHNICAL AREA 54, AREA G, PAD 11, OUTDOOR CONTAINER STORAGE UNIT

G.13 - TECHNICAL AREA 54, AREA G, STORAGE SHED 8, INDOOR CONTAINER STORAGE UNIT

G.14 - TECHNICAL AREA 54, AREA G, BUILDING 33, INDOOR CONTAINER STORAGE UNIT

G.15 - TECHNICAL AREA 54, AREA L, OUTDOOR CONTAINER STORAGE UNIT

G.16 - TECHNICAL AREA 54 WEST, BUILDING 38, INDOOR CONTAINER STORAGE UNIT

G.17 - TECHNICAL AREA 54, WEST, OUTDOOR CONTAINER STORAGE UNIT

G.18 - TECHNICAL AREA 55, BUILDING 4 ROOM B40, INDOOR CONTAINER STORAGE UNIT

G.19 - TECHNICAL AREA 55, BUILDING 4 ROOM K13, INDOOR CONTAINER STORAGE UNIT

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G.21 - TECHNICAL AREA 55, BUILDING 4, ROOM B45, INDOOR CONTAINER STORAGE UNIT

G.22 - TECHNICAL AREA 55, BUILDING 4, VAULT, INDOOR CONTAINER STORAGE UNIT

G.23 - TECHNICAL AREA 55, BUILDING 4, ROOM 401, INDOOR STORAGE TANK UNIT

**G.24 - TECHNICAL AREA 55, BUILDING 4, ROOM 401, INDOOR MIXED WASTE STABILIZATION
TREATMENT UNIT**

G.25 - TECHNICAL AREA 55, 0355 PAD

G.26 - TECHNICAL AREA 55, OUTDOOR STORAGE PAD

G.27 - TECHNICAL AREA 63, TRANSURANIC WASTE FACILITY

G.28 - RESERVED

G.29 – TECHNICAL AREA 55, BUILDING 4 ROOM B13 INDOOR CONTAINER STORAGE UNIT

G.30 – TECHNICAL AREA 55, BUILDING 4 ROOM G12 INDOOR CONTAINER STORAGE UNIT

ATTACHMENT G.1
TECHNICAL AREA 3, BUILDING 29
INDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

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1.0 INTRODUCTION

This closure plan describes the activities necessary to close the indoor hazardous waste container storage unit that is comprised of Room 9010 and portions of Rooms 9020 and 9030 at Technical Area 3, Building 29 (TA-3-29) 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, 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, 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 entire lower floor of TA-3-29 Room 9010 has been used for the storage of hazardous waste (*see* Figure G.1-1). The room measures 106 feet (ft), 9 inches (in.), by 21 ft, 8 in. and currently contains two enclosures as described in Permit Attachment A (*Technical Area Unit Descriptions*). The room also contains two stairways and a ramped area that leads to raised rooms; the stairways, the ramp, and the raised rooms are not part of the Room 9010 portion of the permitted unit. The wall of Room 9010 that is adjacent to the raised rooms ranges in height due to connection to these rooms. Portions of Room 9010 have a 48" high wall with a 42" high hand rail.

Room 9020 measures approximately 27 feet wide by 141 feet long; the area designated for hazardous waste storage is comprised of a part of the entire room consisting of: a portion of the floor; a portion of a wall; and a portion of a chain link fence (*see* Figure G.1-2) and measures 19 feet wide by 25 feet long. Also within the Room 9020 hazardous waste storage area is a floor drain that is connected to the Technical Area 50 Radiological Liquid Waste Facility. This drain is a design feature of the facility to protect facility and programmatic equipment in the event of a water release within the basement of TA-3-29. The drain will be required for facility use after closure of the permitted unit.

Room 9030 is approximately 62 feet wide by 141 feet long; the area designated for hazardous waste storage within Room 9030 measures approximately 30 feet long by 8 feet wide and is located in the southwest corner of the room (*see* Figure G.1-3). The floor is concrete and has been painted with an epoxy sealant.

The waste stored at the permitted unit consists of hazardous waste in both liquid and solid form since 1990 and has been subject to waste management regulations under the RCRA since July 25, 1990. Due to the scope of process operations at TA-3-29, the wastes stored include corrosive liquids, sludge, debris, and chemical wastes with metals and volatile and semi-volatile organic constituents.

Specific hazardous waste constituents stored at the permitted unit are included in Tables G.1-1, G.1-2, and G.1-3. 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

Approximately 50 cubic meters of waste have been stored in Room 9010, approximately 70 cubic meters of waste have been stored in Room 9020, and approximately 10 cubic meters of waste have been stored in Room 9030. Throughout the life of this Permit, it is estimated that an additional 27 cubic meters of waste will be stored in Room 9010, 38 cubic meters of waste will be stored in Room 9020, and 5 cubic meters of waste will be stored in Room 9030.

4.0 GENERAL CLOSURE REQUIREMENTS

4.1 Closure Performance Standards

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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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 for container storage units.

Closure of the permitted unit will be deemed complete when: 1) all 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 the 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.1-4 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.

Decontamination verification sampling, and soil sampling if applicable, will be conducted to demonstrate that surfaces, related equipment, and media, if applicable, at the permitted unit meet the closure performance standards in Permit Section 9.2.

All closure activities will be completed within 180 days after the final receipt of waste. A closure certification report shall be submitted to the Department within 240 days of 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 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 surfaces and equipment associated with the permitted unit; verification that the closure performance standards in Permit Section 9.2 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 waste 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. Appropriate shipping documentation will accompany the wastes during transport. Containers holding hazardous wastes 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 a structural assessment will

be conducted to determine any previous finding(s) or action(s) that may influence closure activities or potential sampling locations.

5.2.1 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 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 floor and walls of the permitted unit for any existing cracks or conditions that indicate a potential for, or an actual, release of hazardous 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 Structures and Related Equipment

In accordance with Permit Section 9.4.3, the unit's surfaces and related equipment will be decontaminated, or removed, or both and managed according to Section 7.0 of this closure plan. Decontamination activities will ensure the removal of all waste residues and hazardous waste constituents from the permitted unit to meet the closure performance standards in Section 4.1.

All surfaces and related equipment that are removed and not intended for recycle will not require decontamination, will be considered solid and potentially hazardous waste when removed, and will be disposed of in accordance with Section 7.0.

5.3.1 Removal of Structures and Related Equipment

The following structures and related equipment will be removed after the structural assessment: the two room enclosures within Room 9010; and the chain-link fence that runs along the side of 9020.

5.3.2 Decontamination of Structures and Related Equipment

All surfaces, structures, and related equipment that will be left in place or reused by the Facility will be decontaminated in accordance with Permit Section 9.4.3.1. Decontamination of the permitted unit's surfaces will include all features located within the unit (*e.g.*, walls, railings, stairways, ramps). There is no equipment located at the permitted unit that is expected to be left in place; however, if equipment is identified during the assessment that is expected to be left in place, it will be decontaminated in accordance with this section.

Decontamination of the permitted unit will be conducted by first removing loose material (*e.g.*, dust, dirt) through sweeping followed by washing using a manual wipe-down method with a solution consisting of a

surfactant detergent (*e.g.*, Alconox®) and water mixed in accordance with the manufacturer's recommendations rather than steam cleaning or pressure washing.

Migration of the wash solution (in the form of splashing, condensation, or drainage) from steam cleaning or pressure washing may potentially contaminate or otherwise negatively affect ongoing operations within the basement. Migration can potentially be mitigated using plastic barriers taped to surfaces to enclose the area. However, areas enclosed in this manner will require workers to use additional personal protective equipment (PPE). This PPE will include fully enclosed protective wear and supplied air because of the increased risk of exposure to personnel due to potential releases of radiological materials and organic compounds within the enclosure. Enclosure of the area increases the risk of personnel exhaustion, because of the additional PPE, and the potential for workers to reach radiological work exposure limits. Therefore, wipe-down washing, rather than steam cleaning or pressure washing, will be utilized because of the need to minimize the potential for exposure to workers and the migration of cleaning solution to other areas of the basement outside the permitted unit's boundary.

The entirety of the unit's floors will be decontaminated. Waste at the permitted unit is no longer stacked; however, past activities have allowed the stacking of 55-gallon drums. Including the height of pallets that may have been used, two stacked 55-gallon drums measure just over eight feet high. Therefore, to ensure that decontamination of the walls is conducted to a sufficient height, all walls in the permitted unit will be decontaminated to a height of 11 feet.

Ceilings of the permitted unit, walls above 11 feet, and the areas outside of the permitted unit will be presumed to be free of contamination unless there is some physical indication of contamination (*e.g.*, staining), the records review reveals that large amounts of liquid volatile or semi-volatile organic waste was stored in the permitted unit, or a spill or release occurred within the permitted unit that could have affected the ceiling or the walls above the height of 11 feet.

Cloths, or other absorbent cleaning devices, will not be reused to wipe down the surfaces after being wetted in the wash solution or after spraying solution onto the surfaces. Only one cloth or absorbent cleaning device will be used at a time in a single area to prevent cross-contamination. The quantity of the wash solution will be minimized by dispensing from buckets, spray bottles, or other types of small containers.

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 floor drain in Room 9020 will be plugged before decontamination activities begin to ensure that none of the wash water solution enters the drain located on the floor.

5.4 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during closure decontamination activities will be cleaned with a wash water solution. Residue, disposable equipment, and small reusable equipment that cannot be decontaminated will be containerized and managed as waste as summarized in Table G.1-5 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/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 Decontamination Verification Sampling Activities

Decontamination verification sampling activities will be conducted at the permitted unit in order to verify that surfaces 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 the floor and from the walls (up to 11 feet) of the permitted unit. Verification wipe samples will be collected from random locations within each of the sample areas indicated on Figures G.1-1, G.1-2, and G.1-3 of this closure plan.

A total of 17 wipe samples will be collected from Room 9010; eight from the floor, four from each of the longer walls, and five from the shorter walls. A total of five wipe samples will be collected from Room 9020; two from the floor, two from the wall, and one from the floor drain. A total of four wipe samples will be collected from Room 9030; two from the floor and two from the wall.

If there is liquid found in the drain at the time of the assessment liquid samples will be collected in accordance with Section 6.2.1 of this closure plan.

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit.

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, 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 drain at the permitted unit. Liquid samples will be collected using glass or plastic tubes, a composite liquid sampler, a bacon bomb, a bailer, or by pouring liquid in sample containers.

6.2.2 Wipe Sampling

Surface wipe samples will be collected and analyzed to determine if residual hazardous constituents remain on the surfaces and related 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 limits.

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 Solid Chip Sampling

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit. Any non-porous inclusions from the sampling location will be removed by brushing or wiping. Using a chisel, drill, hole saw, or similar tool, a minimum 100 grams of the sample will be collected to a depth of 2 cm, or to an alternate depth specified in the assessment and transferred to an appropriate sampling container. The holding time and the preservation techniques to be used for each analysis will be determined from Table G.1-7.

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

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

Chain-of-custody forms will be maintained by sampling personnel until 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 chain-of-custody form to the Facility and it will become part of the permanent sampling record documenting the sampling efforts.

6.3.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- a. 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.1-7 presents the requirements in SW-846 (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to four (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 the requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, wastes, 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 the packaging and transportation organization to independently tender shipments to common motor or air carriers.

6.4 Sample Analysis Requirements

Samples will be analyzed for all hazardous constituents listed in 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 (*see* Tables G.1-1, G.1-2, and G.1-3). Tables G.1-1, G.1-2, and G.1-3 will be modified, as necessary, to incorporate changes as a result of the permitted unit's records review. Samples will be analyzed by an independent laboratory using the methods outlined in Table G.1-6. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.1-6. 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;
- d. the capability to perform data reduction, validation, and reporting;

The selection of the analytical testing methods identified in Table G.1-6 is 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.1-8 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 and 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 sample preparations that occur during 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.1-5 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.1-5, 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, DC.

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

Table G.1-1
Hazardous Waste Constituents of Concern at Room 9010^a

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011 F006	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver Wastewater treatment sludge
Organic Compounds	D018, D022, D027, D029, D030, D032, D033, D034, D035, D036, D037, D038, D040, D041, D042 F001, F002, F003, F004, F005	Benzene; Chloroform; 1,4-Dichlorobenzene; 1,1-Dichloroethylene; 2,4-Dinitrotoluene; Hexachlorobenzene; Hexachlorobutadiene; Hexachloroethane; Methyl ethyl ketone; Nitrobenzene; Pentrachlorophenol; Pyridine; Trichloroethylene; 2,4,5-Trichlorophenol; 2,4,6-Trichlorophenol Trichloroethylene, Methyl ethyl ketone, Nitrobenzene, Pyridine

^a Based on the permitted unit's Operating Record

Table G.1-2
Hazardous Waste Constituents of Concern at Room 9020^a

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
	F006	Wastewater treatment sludge
Organic Compounds	D018, D022, D027, D029, D030, D032, D033, D034, D035, D036, D037, D038, D040, D041, D042	Benzene; Chloroform; 1,4-Dichlorobenzene; 1,1-Dichloroethylene; 2,4-Dinitrotoluene; Hexachlorobenzene; Hexachlorobutadiene; Hexachloroethane; Methyl ethyl ketone; Nitrobenzene; Pentachlorophenol; Pyridine; Trichloroethylene; 2,4,5-Trichlorophenol; 2,4,6-Trichlorophenol
	F001, F002, F003, F004, F005	Trichloroethylene, Methyl ethyl ketone, Nitrobenzene, Pyridine

^a Based on the permitted unit's Operating Record

Table G.1-3
Hazardous Waste Constituents of Concern at Room 9030^a

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Metals	D008	Lead

^a Based on the permitted unit's Operating Record

Table G.1-4
Closure Schedule for the Technical Area 3, Building 29 Indoor 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.	10 days after completed waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.1-5
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Table G.1-5

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded concrete	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	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.
Sampling equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.1-5

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	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.

Table G.1-6
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method ^a	Test Methods/ Instrumentation	Target Detection Limit ^b	Rationale
Metal Analysis				
Arsenic	7060A ^c , 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A ^d , 7081 ^c	FLAA,GFAA	200 ug/L	
Cadmium	7130 ^d , 7131A ^c	FLAA, GFAA	2 ug/L	
Chromium	7190 ^d , 7191 ^c	FLAA, GFAA	10 ug/L	
Lead	7420 ^d , 7421 ^c	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A ^e	CVAA	0.2 ug/L	
Selenium	7740 ^c , 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A ^d , 7761 ^c	FLAA, GFAA	10 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 ^c	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.

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

^b Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.

^c Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.

^d Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.

^e Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy ; GFAA = Graphite furnace atomic absorption spectroscopy

FLAA = Flame atomic absorption spectroscopy; ug/L = micrograms per liter

GC/MS = Gas chromatography/mass spectrometry; mg/L = milligrams per liter

Table G.1-7
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP/Total Metals: 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	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide Mouth- Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO ₃ to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon- Lined Septa	Solid Media Cool to 4 °C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	
Semi-Volatile Organic Compounds			

Target Compound Semi-volatile Organic Compounds	Aqueous Media: Four 1-L Amber Glass with Teflon-Lined Lid	Aqueous Media: Cool to 4 °C	Seven days from field collection to 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

HCl = hydrochloric acid

mL = milliliter

HNO₃ = nitric acid

L = Liter

TCLP = Toxicity Characteristic Leaching Procedure

Table G.1-8
Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis ^a	Frequency	Acceptance Criteria
Trip Blank	VOC	One set per shipping cooler containing samples to be analyzed for VOCs	Not Applicable
Field Blank	VOC/SVOC, metals	One sample daily per analysis	Not Applicable
Field Duplicate	Chemical	One for each sampling sequence	Relative percent difference less than or equal to 20 percent
Equipment Rinsate Blank ^b	VOC/SVOC, metals	One sample daily	Not Applicable

^a For VOC and SVOC analysis, if blank shows detectable levels of any common laboratory contaminant (*e.g.*, methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

^b Collected only if reusable sampling equipment used.

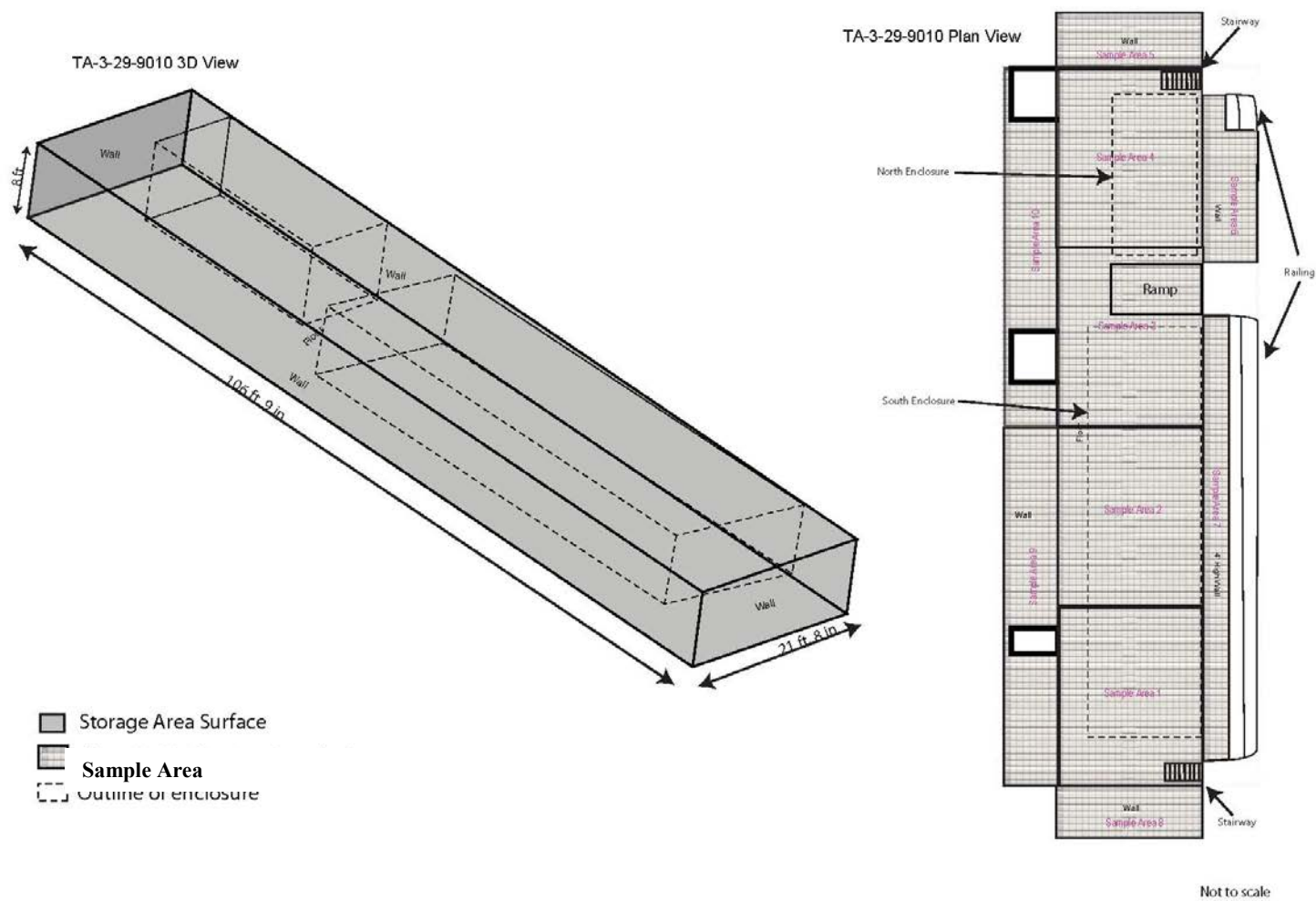


Figure G.1-1: Technical Area 3, Building 29, Room 9010 Grid Sampling Locations

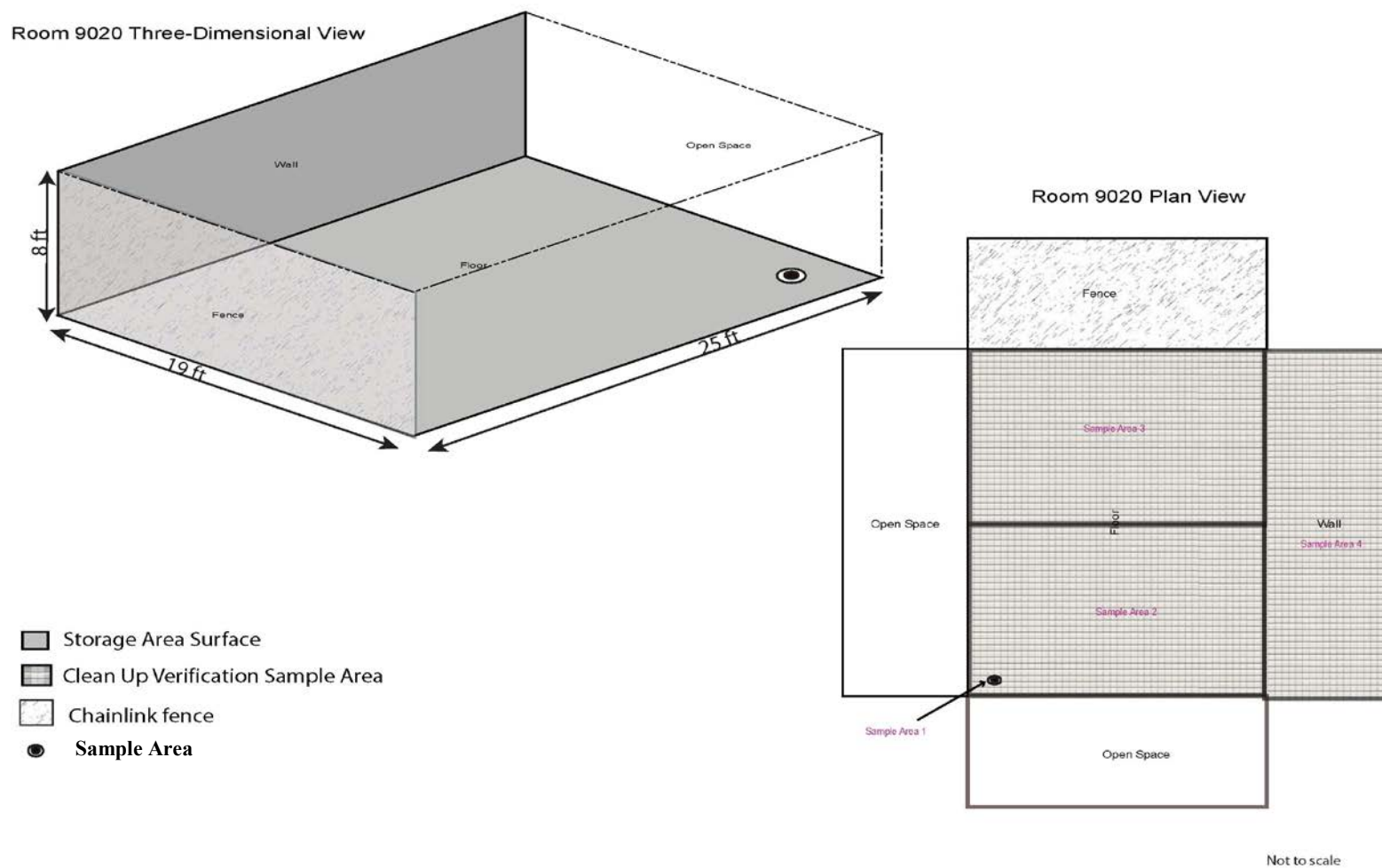


Figure G.1-2: Technical Area 3, Building 29, Room 9020 Grid Sampling Locations and Additional Sampling Locations

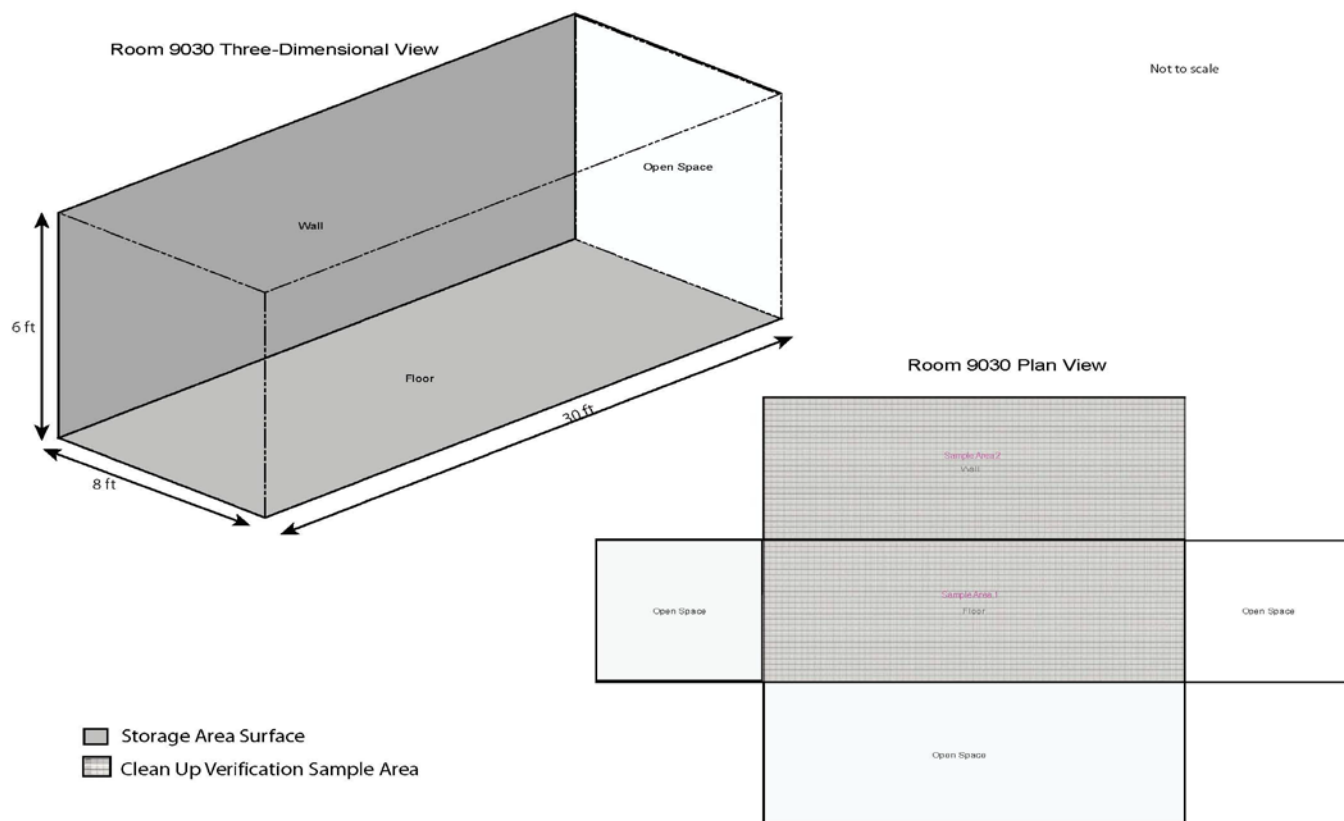


Figure G.1-3
Technical Area 3, Building 29, Portion of Room 9030

Figure G.1-3: Technical Area 3, Building 29, Room 9030 Grid Sampling Locations

ATTACHMENT G.4
TECHNICAL AREA 50, BUILDING 69
INDOOR CONTAINER STORAGE/TREATMENT UNIT
CLOSURE PLAN

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G.4-2	Technical Area 50, Building 69, Room 103 Container Storage/Treatment Unit Sampling Grid and Additional Sampling Locations

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the indoor hazardous waste container storage/treatment unit which is comprised of Rooms 102 and 103 at Technical Area (TA) 50, Building 69 (TA-50-69) 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, 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, 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 (TA)-Unit Descriptions*). Additional features and equipment located at the permitted unit and not described elsewhere in the Permit are described below.

The permitted unit consists of adjacent Rooms 102 and 103. Room 102, the main process room, measures approximately 45 feet (ft) wide and 52 ft long and contains a large glovebox which occupies a substantial portion of the room; the long dimension is oriented northwest-southeast. A smaller glovebox, designed for mounting of a single drum at one time is also located within Room 102 was designed in 1994 and is 11 feet long, 3 feet wide and 30 inches high. While the entirety of Room 102 may be used for storage, the primary area utilized for hazardous waste storage is an 11- by 11-ft roped-off section. The floor is concrete with an epoxy coating and there is an operational drain located in Room 102 in the northeast area near the north wall. There is a mezzanine above Room 102 which is not part of the permitted unit. A refrigeration unit that measured 6 feet by 6 feet was located in Room 102 for the remediated nitrate salt-bearing waste campaign. It was removed and dispositioned in late 2017.

Room 103, the unloading area, measures approximately 18 ft wide and 19 ft long and is located adjacent to, and southeast of, Room 102. A 12-ft by 20-ft roll-up loading vehicle access door is located at the southernmost end of the room and an operational drain is located in the middle of the room. Both drains in the two rooms are operational for firewater collection and will drain into holding tanks located in the building.

The waste stored at the permitted unit consists of hazardous waste in both liquid and solid form since 1995 and has been subject to waste management regulations under RCRA. Due to the scope of process operations at the permitted unit, the wastes stored include those in solid and liquid form. Additionally, the smaller glovebox within the unit is utilized for treatment by stabilization of waste in containers using zeolite. Permit Part 3 (*Storage in Containers*), Permit Part 7 (*Stabilization in Containers*), Permit Attachment A (*Technical Area (TA)-Unit Descriptions*), Permit Attachment B (*Part A Application*), and Permit Attachment C (*Waste Analysis Plan*) include information regarding waste management procedures

and hazardous waste constituents stored and treated at the permitted unit.

3.0 ESTIMATE OF MAXIMUM WASTE STORED AND TREATED

Approximately 67,200 gallons of hazardous waste has been stored at the permitted unit over its active life. It is estimated that approximately 11,500 gallons of hazardous waste will be treated at the permitted unit over its active life. Throughout the life of this Permit, it is estimated that the maximum volume of inventory of waste for the projected lifespan of the permitted unit is 446,400 gallons.

4.1 GENERAL CLOSURE REQUIREMENTS

4.2 Closure Performance Standards

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; and
- 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 clean-up levels shall be established based on residential use. The Permittees must also demonstrate that there is no potential to contaminate groundwater.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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 for container storage units.

Closure of the permitted unit will be deemed complete when: 1) all 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.

4.3 Closure Schedule

This closure plan schedule is intended to address the 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.4-2 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.

Decontamination verification sampling activities will be conducted to demonstrate that surfaces, related equipment, and media, if applicable, 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 Section 9.4.1.1.

5.0 CLOSURE PROCEDURES

Closure activities at the permitted unit will include, but not be limited to: removal of hazardous wastes; proper management and disposal of hazardous waste residues and contaminated structures and equipment associated with the permitted unit; verification that the closure performance standards in Permit Section 9.2 have been achieved; and submittal of a final closure certification report. The following sections describe the closure activities applicable to the permitted unit.

5.1 Removal of Waste

In accordance with Permit Section 9.4.2, all stored hazardous waste 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 flatbed trucks, trailers, or other appropriate vehicles for transport. Appropriate shipping documentation will accompany the wastes during transport. Containers holding hazardous wastes 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 a structural assessment will be conducted to determine any previous finding(s) or action(s) that may influence closure activities or potential sampling locations.

5.2.1 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 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 floor and walls of the permitted unit for any existing cracks or conditions that indicate the potential for, or an actual, release of hazardous 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 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 Structures and Related Equipment

In accordance with Permit Section 9.4.3, the unit's surfaces and related equipment will be decontaminated, or removed, or both and managed according to Section 7.0 of this closure plan. Decontamination activities will ensure the removal of all hazardous waste residues and hazardous waste constituents from the permitted unit to meet the closure performance standards.

5.3.1 Removal of Structures and Related Equipment

All surfaces and related equipment that are removed and not intended for recycle will not require decontamination, will be considered solid and potentially hazardous waste when removed, and will be disposed of in accordance with Section 7.0. Removal of Structures and Related Equipment

The following related equipment will be removed after the structural assessment: the two gloveboxes; and the one lift rack located within Room 102.

5.3.2 Decontamination of Structures and Related Equipment

All surfaces and related equipment that will be reused by the Facility will be decontaminated in accordance with Permit Section 9.4.3.1. Decontamination of the permitted unit's equipment will include, but not be limited to, the railings, the staircases, and the ladders, excluding the mezzanine in Room 102.

Decontamination of the permitted unit and its related equipment will be conducted by first removing loose material (*e.g.*, dust, dirt) through sweeping followed by pressure washing or steam cleaning with a solution consisting of a surfactant detergent (*e.g.*, Alconox[®]) and water mixed in accordance with the manufacturer's recommendations.

The entirety of the unit's floors will be decontaminated. Hazardous waste containers at the permitted unit are not stacked. Including the height of a pallet, a 55-gallon drum measures just over four feet high. To

ensure that decontamination of the walls is conducted to a sufficient height, all walls in the permitted unit will be decontaminated to a height of seven feet.

Ceilings of the permitted unit, walls above seven feet, and the areas outside of the permitted unit will be presumed to be free of contamination unless there is some physical indication of contamination (*e.g.*, staining), the records review reveals that large amounts of liquid volatile or semi-volatile organic hazardous waste was stored in the permitted unit, or a spill or release occurred within the permitted unit that could have affected the ceiling or the walls above seven feet.

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 floor drains in Rooms 102 and 103 will be plugged before decontamination activities begin to ensure that none of the wash water solution enters the firewater drains located on the floor.

5.4 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during closure decontamination activities will be cleaned with a wash water solution. Residue, disposable equipment, and small reusable equipment that cannot be decontaminated will be containerized and managed as waste as summarized in Table G.4-6 and in accordance with Permit Section 9.4.5 and Section 7.0 of this closure plan.

6.1 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/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.

6.2 Decontamination Verification Sampling Activities

Decontamination verification sampling activities will be conducted at the permitted unit in order to verify that surfaces 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 verification wipe sample from the floor and from the walls (up to seven feet) of the permitted unit. Samples will be collected from random locations within each of the sample areas indicated on Figures G.4-1 and G.4-2 of this closure plan.

A total of 13 wipe samples will be collected from Room 102; three from the floor; one from the drain; four from each of the longer walls; and five from the shorter walls. A total of seven wipe samples will be collected from Room 103; two from the floor; one from each of the walls; and one from the floor drain.

If there is liquid found in either of the drains at the time of the assessment liquid samples will be collected in accordance with Section 6.2.1 of this closure plan.

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit.

6.3 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, 2002), DOE (DOE, 1995), and other Department-approved procedures.

6.3.1 Liquid Sampling

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

6.3.2 Wipe Sampling

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

6.3.3 Solid Chip Sampling

Solid samples will be collected and analyzed to determine if residual hazardous constituents remain on the floor of the permitted unit. Any non-porous inclusions from the sampling location will be removed by brushing or wiping. Using a chisel, drill, hole saw, or similar tool, a minimum 100 grams of the sample will be collected to a depth of 2 cm, or to an alternate depth specified in the assessment and transferred to an appropriate sampling container. The holding time and the preservation techniques to be used for each analysis will be determined from Table G.4-3.

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

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

Chain-of-custody forms will be maintained by sampling personnel until 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 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 method;
- 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.4-3 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 the requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, wastes, 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 the packaging and transportation organization to independently tender shipments to common motor or air carriers.

6.4 Sample Analysis Requirements

Samples will be analyzed for all hazardous constituents listed in 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 (*see* Table G.4-1 of this closure plan). Table G.4-1 will be amended at the time of closure, as necessary, to incorporate all changes as a result of the permitted unit's records review. Samples will be analyzed by an independent laboratory using the methods outlined in Table G.4-4. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.4-4. 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.4-4 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 the 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 via the use of QA/QC samples to assess the overall quality of the data produced. QC samples evaluate precision, accuracy, and the potential for sample contamination associated with the sampling and analysis process which is described in the following sections. Information on calculations necessary to evaluate the QC results is also described below.

6.4.2.1 Field Quality Control

The field QC samples that will be collected are trip blanks, field blanks, field duplicates, and equipment rinsate blanks. Table G.4-5 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 sample preparations that occur during 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.4-6 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.4-6, 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

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

Table G.4-1
Hazardous Waste Constituents of Concern in Technical Area 50, Building 69 Indoor Container
Storage/Treatment Unit

Category	EPA Hazardous Waste Numbers	Specific Constituents
Nitrate Salt-Bearing Wastes	D001, D002	Ignitable, Corrosive
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver,
Organic Compounds	D018, D019, D021, D022, D026, D027, D028, D029, D030, D035, D036, D037, D038, D039, D040, D043 F001, F002, F003, F004, F005	Benzene, Carbon tetrachloride, Chlorobenzene, Chloroform, Cresol, 1,4-Dichlorobenzene, 1,2-Dichloroethylene, 2,4-Dinitrotoluene, Methyl ethyl ketone, Nitrobenzene, Pentachlorophenol, Pyridine, Tetrachloroethylene, Trichloroethylene, Vinyl Chloride Acetone, Methyl ethyl ketone, Methylene Chloride, Toluene, MIBK, DBCP, Tetrachloroethylene, 1,1,1-trichloroethane, Chlorinated Fluorocarbons, 1,1,2- Trichloro-1,1,2-Trifluoroethane, Ortho-dichlorobenzene, Trichlorofluoromethane, 1,1,2-Trichloroethane, Xylene, Ethyl acetate, Ethyl benzene, Ethyl ether, n-Butyl alcohol, Cyclohexanone, Methanol, Cresols, Cresylic acid, Nitrobenzene, Carbon disulfide, Isobutanol, Pyridine, 2-ethoxyethanol, 2-nitropropane

^a Based on the permitted unit's Operating Record

MIBK = methyl isobutyl ketone or 4-methyl-2-pentanone

DBCP = 1,2-dibromo-3-chloropropane

Table G.4-2
Closure Schedule for the Technical Area 50, Building 69, Indoor Container Storage/Treatment 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.	10 days after completed waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification	Day 180

report to the Department.	
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Table G.4-3
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP/Total Metals: 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	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide Mouth- Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO ₃ to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon- Lined Septa	Solid Media Cool to 4 °C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	

<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

mL = milliliter

TCLP = Toxicity Characteristic Leaching Procedure

L = Liter

HNO₃ = nitric acid

HCl = hydrochloric acid

Table G.4-4
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method ^a	Test Methods/ Instrumentation	Target Detection Limit ^b	Rationale
<i>Metal Analysis</i>				
Arsenic	7060A ^c , 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A ^d , 7081 ^c	FLAA, GFAA	200 ug/L	
Cadmium	7130 ^d , 7131A ^c	FLAA, GFAA	2 ug/L	
Chromium	7190 ^d , 7191 ^c	FLAA, GFAA	10 ug/L	
Lead	7420 ^d , 7421 ^c	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A ^e	CVAA	0.2 ug/L	
Selenium	7740 ^c , 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A ^d , 7761 ^c	FLAA, GFAA	10 ug/L	
<i>Organic Analysis</i>				
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 ^c	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.

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

^b Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.

^c Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.

^d Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.

^e Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy

GFAA = Graphite furnace atomic absorption spectroscopy

FLAA = Flame atomic absorption spectroscopy

GC/MS = Gas chromatography/mass spectrometry

mg/L = milligrams per liter

ug/L = micrograms per liter.

Table G.4-5

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.4-6
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded concrete	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	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.
Sampling equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	Non-regulated solid	Subtitle D landfill

Potential Waste Materials	Waste Types	Disposal Options
	waste	
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.

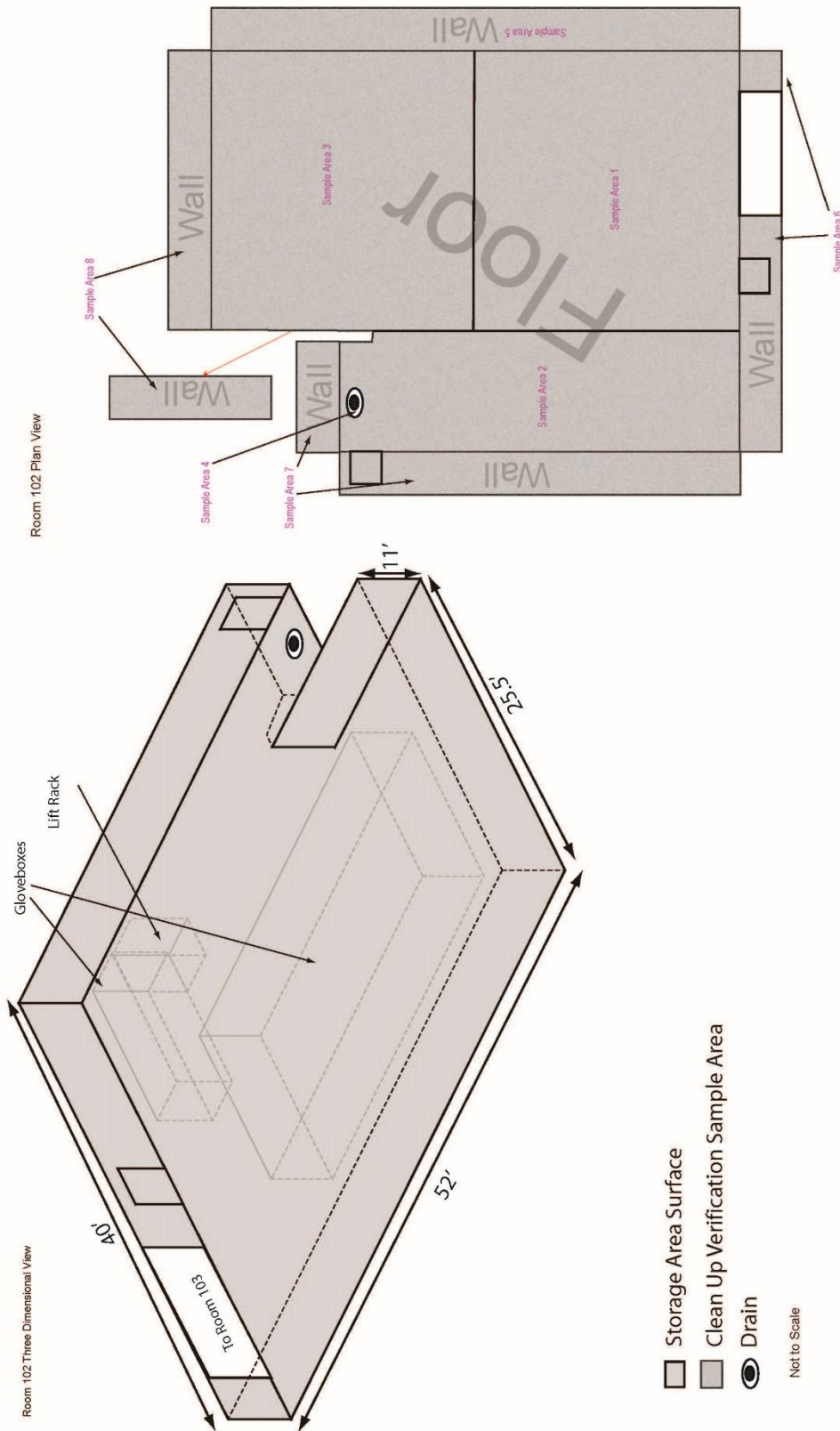


Figure G.4-1
Technical Area 50, Building 69, Room 102 Container Storage/Treatment Unit Sampling Grid and Additional Sampling Locations

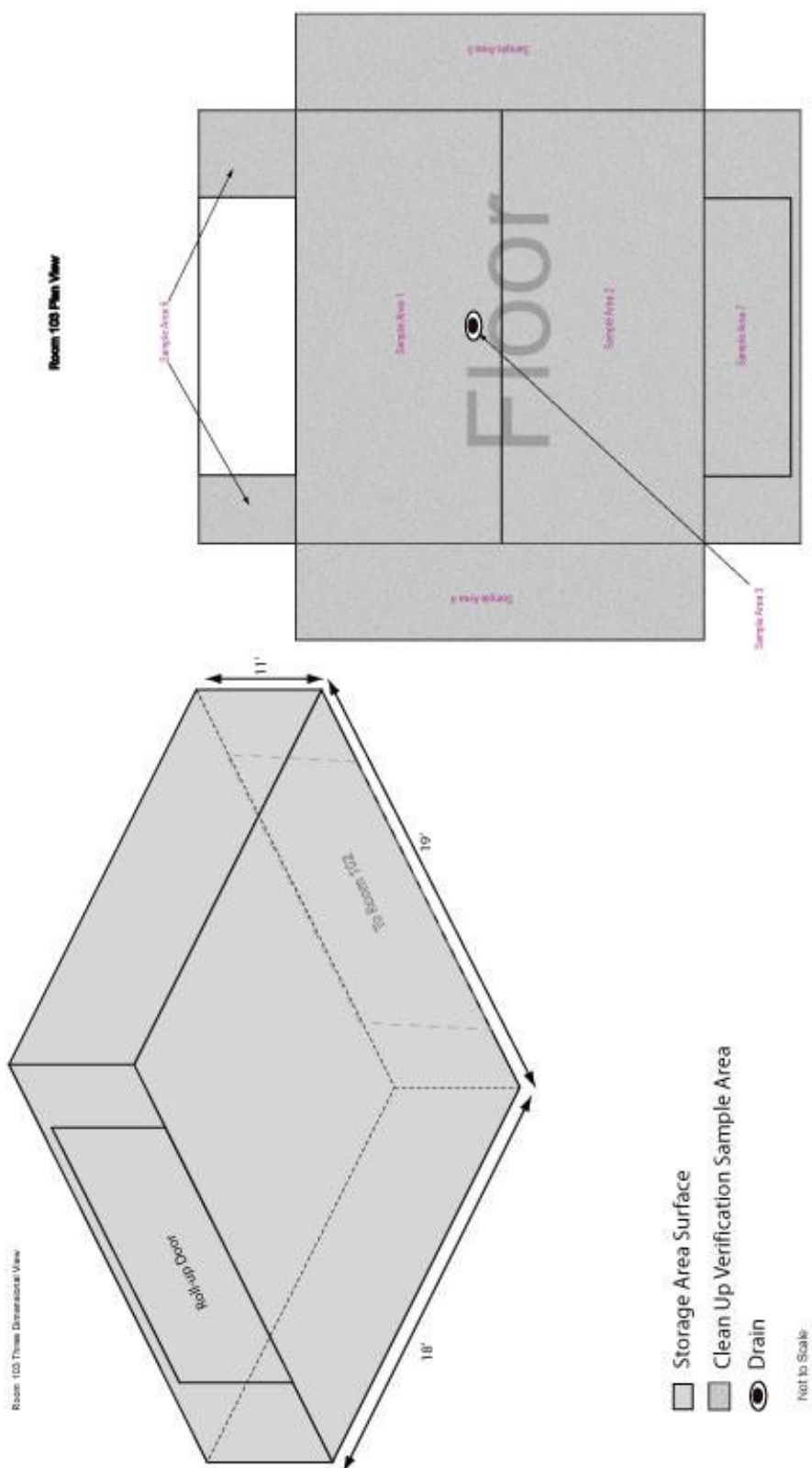


Figure G.4-2
Technical Area 50, Building 69, Room 103 Container Storage/Treatment Unit Sampling Grid and Additional Sampling Locations

ATTACHMENT G.5
TECHNICAL AREA 50, BUILDING 69
OUTDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

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<u>FIGURE NO.</u>	<u>TITLE</u>
G.5-1	Technical Area 50, Building 69, Outdoor Container Storage Unit Sampling Grid and Additional Sampling Locations

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the outdoor hazardous waste container storage unit at the Technical Area 50, Building 69 (TA-50-69) Outdoor Pad 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 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, 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 in the Permit are described below.

The permitted unit is located outside in the southwest corner of TA-50-69 (*see* Figure G.5-1). It consists of a four inch thick, rectangular-shaped, asphalt pad measuring 90 ft long by 24 ft wide. Hazardous waste storage has occurred on the permitted unit and in the two transportainers (75 and 194) situated on the permitted unit. Each transportainer is anchored by concrete blocks at either end of the pad and each measure eight feet (ft) wide by 40 ft long and 8.5 ft high. The unit is sloped gently (1% to 5% slope) to the south-southeast draining towards the south fence along a gravel/soil/sediment berm. The berm provides drainage for precipitation and is elevated approximately six to eight inches above-ground level in an easterly direction.

The waste stored at the permitted unit consists of hazardous and mixed waste in both solid and liquid form. The permitted unit was constructed and began managing waste in 1982; it has been subject to waste management regulations under RCRA since July 25, 1990. The wastes stored include corrosive liquids, sludge, debris, and chemical wastes with metals and volatile and semi-volatile organic constituents. 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 hazardous waste management procedures and hazardous waste constituents stored at the permitted unit.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

Approximately 1,999 cubic meters (528,000 gallons) of waste has been stored at the permitted unit. Throughout the life of this Permit, it is estimated that an additional 4,330 cubic meters (1,144,000 gallons) of waste will be stored.

4.0 GENERAL CLOSURE INFORMATION

4.1 Closure Performance Standards

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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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 surfaces, 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 the 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.5.2 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 structures, surfaces and related equipment.

Soil sampling and decontamination verification sampling activities 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 cannot proceed according to schedule, the Permittees will notify the Department in accordance with the extension request 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 in Permit Section 9.2 have been achieved; and submittal of a final closure certification report. The following sections describe the closure activities applicable to the permitted unit.

5.1 Removal of Waste

In accordance with Permit Section 9.4.2, all stored hazardous waste 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. Appropriate shipping documentation will accompany the wastes during transport. Containers holding hazardous wastes 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 previous 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 goal 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 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 asphalt pad for any existing cracks or conditions that indicate the potential for, or an actual, release of hazardous 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 along with 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 Permit Section 9.4.3, the unit's structures and related equipment will be decontaminated, or removed, or both and managed according Section 7.0 of this closure plan. Decontamination activities will ensure the removal of all hazardous waste residues and hazardous constituents from the permitted unit to meet the closure performance standards.

All surfaces and related equipment that are removed and not intended for recycle will not require decontamination, will be considered solid and potentially hazardous waste when removed, and will be disposed of in accordance with Section 7.0.

5.3.1 Removal of Structures and Related Equipment

The concrete blocks that support the transportainers will be removed before the assessment and disposed of accordingly. The asphalt pad and all the materials associated with the pad (*i.e.*, asphalt berm, minimum of 6 inches of the underlying soil, base course or fill used when constructing the pad) will 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 (*e.g.*, additional concrete or base course materials), additional soil and materials will be removed.

At this time there is not any other related equipment at the permitted unit that is expected to be removed or left in place; however, if equipment is identified during the review and assessment, it will be removed in accordance with Permit Section 9.4.3.2 and this closure plan section.

5.3.2 Decontamination of Structures and Related Equipment

The two transportainers at the permitted unit are to be reused and 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. Portable berms, and 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.

5.3.3 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during decontamination activities will be cleaned with a wash water solution. Residue, disposable equipment, and small reusable equipment that cannot be decontaminated will be containerized and managed as waste as summarized in Table G.5-3 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/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 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. In accordance with Permit Section 9.4.7.1.i, this closure plan will ensure the collection of at least one wipe sample from the floor, the ceiling, and from each wall of the transportainers (75 and 194) situated on the permitted unit (*see* Figure G.5-1 of this closure plan) for a total of 12 wipe samples. The precise locations for these wipe samples will be randomly determined at the time of sampling within the area of each surface.

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

- a. one sample on the northwest and southeast corners (*see* “biased sample location 1” and “biased sample location 2” on Figure G.5-1) of transportainer 75 and one sample on the northwest corner (*see* “biased sample location 3”) of transportainer 194 for a total of three samples (*see* Permit Section 9.4.7.1.ii(1));
- b. one sample every 900 square feet of the permitted unit for a total of four samples (*see* Permit Section 9.4.7.1.ii(2)); and
- c. one sediment sample at the storm water discharge point (*see* “additional sample of berm sediment” on Figure G.5-1).

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.5-1). 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 within the area of the sampling box (*e.g.*, at asphalt cracks), these sample collection locations will be in addition to the grid sampling locations.

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, 2002), DOE (DOE, 1995), and other Department-approved procedures.

6.2.1 Soil and Sediment Sampling

Soils and sediment will be collected and analyzed to determine if hazardous constituents are present in soils at the permitted unit. Soil and sediment samples will be collected using a spade, scoop, auger, or 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.5-5.

6.2.2 Wipe Sampling

Surface wipe samples will be collected to determine if residual hazardous constituents remain in the transporters 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 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 sections provide a description of sample documentation, handling, preservation, storage, packaging, and transportation requirements that will be followed during the sampling activities associated with the closure.

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

Chain-of-custody forms will be maintained by sampling personnel until the samples are relinquished to the analytical laboratory. This will ensure the integrity of the samples and provide for an accurate and

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

- 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 part of the permanent sampling record documenting the sampling efforts.

6.3.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- a. 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 and 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.5-5 presents the requirements in *SW-846* (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE Orders, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate Facility documents establish the requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, waste, and defense program materials.

Off-site transportation of samples will occur via private, contract, or common motor carrier, air carrier, or freight. All off-site transportation will be processed through 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 (*see* Table G.5-1 of this closure plan). Table G.5-1 may be modified, as necessary, to incorporate any changes as a result of the permitted unit's records review. Samples will be analyzed by an independent laboratory using the methods outlined in Table G.5-4. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.5-4. 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/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.5-4 is 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.5-6 presents a summary of QC sample types, applicable analyses, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample.

6.4.2.2 Analytical Laboratory 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.5-3 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.5-3, 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, DC.

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

Table G.5-1
Hazardous Waste Constituents of Concern at the Technical Area 50, Building 69, Outdoor
Container Storage Unit^a

Category	EPA Hazardous Waste Numbers	Specific Constituents
Nitrate Salt-Bearing Wastes	D001, D002	Ignitable, Corrosive
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver,
Organic Compounds	D018, D019, D021, D022, D026, D027, D028, D029, D030, D035, D036, D037, D038, D039, D040, D043 F001, F002, F003, F004, F005	Benzene, Carbon tetrachloride, Chlorobenzene, Chloroform, Cresol, 1,4-Dichlorobenzene, 1,2-Dichloroethylene, 2,4-Dinitrotoluene, Methyl ethyl ketone, Nitrobenzene, Pentachlorophenol, Pyridine, Tetrachloroethylene, Trichloroethylene, Vinyl Chloride Acetone, Methyl ethyl ketone, , Methylene Chloride, Toluene, MIBK, DBCP, Tetrachloroethylene, 1,1,1-trichloroethane, Chlorinated Fluorocarbons, 1,1,2-trichloro-1,1,2-trifluoroethane, ortho-dichlorobenzene, Trichlorofluoromethane, 1,1,2-trichloroethane, Xylene, Ethyl acetate, Ethyl benzene, Ethyl ether, n-butyl alcohol, Cyclohexanone, Methanol, Cresols, Cresylic acid, Nitrobenzene, Carbon disulfide, Isobutanol, Pyridine, 2-ethoxyethanol, 2-nitropropane

^a Based on the unit Operating Record

MIBK = methyl isobutyl ketone or 4-methyl-2-pentanone

DBCP = 1,2-dibromo-3-chloropropane

Table G.5-2

Closure Schedule for the Technical Area 50, Building 69, 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.	10 days after waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.5-3
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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 and concrete	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	Either an authorized on-site radioactive waste

Potential Waste Materials	Waste Types	Disposal Options
	waste	disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.5-4
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method	Test Methods/ Instrumentation	Target Detection Limit ^a	Rationale
<i>Metal Analysis</i>				
Arsenic	6010, 7010, 7061A	ICP-AES, GFAA, CVAA	10 ug/L	Determine the metals concentration in the samples.
Barium	6010, 7010	ICP-AES, GFAA	200 ug/L	
Cadmium	6010, 7010	ICP-AES, GFAA	2 ug/L	
Chromium	6010, 7010	ICP-AES, GFAA	10 ug/L	
Lead	6010, 7010	ICP-AES, GFAA	5 ug/L	
Mercury	6010, 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	
<i>Organic Analysis</i>				
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.

^a 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.5-5
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP/Total Metals: 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	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide Mouth- Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO ₃ to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon- Lined Septa	Solid Media Cool to 4 °C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	
Semi-Volatile Organic Compounds			

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

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

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

°C = degrees Celsius

HCl = hydrochloric acid

mL = milliliter

HNO₃ = nitric acid

L = Liter

TCLP = Toxicity Characteristic Leaching Procedure

Table G.5-6

Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis^a	Frequency	Acceptance Criteria
Trip Blank	VOC	One set per shipping cooler containing samples to be analyzed for VOCs	Not Applicable
Field Blank	VOC/SVOC, metals	One sample daily per analysis	Not Applicable
Field Duplicate	Chemical	One for each sampling sequence	Relative percent difference less than or equal to 20 percent
Equipment Rinsate Blank ^b	VOC/SVOC, metals	One sample daily	Not Applicable

^a For VOC and SVOC analysis, if blank shows detectable levels of any common laboratory contaminant (e.g., methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

^b Collected only if reusable sampling equipment used.



Figure G.5-1: Technical Area (TA) 50, Building 69, Outdoor Container Storage Unit Sample Grid and Additional Sampling Locations

ATTACHMENT G.6
TECHNICAL AREA 54, AREA G, PAD 1
OUTDOOR CONTAINER STORAGE AND TREATMENT UNIT
CLOSURE PLAN

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1.0 INTRODUCTION

This closure plan describes the activities necessary to close the outdoor hazardous waste container storage unit and the Building 412 treatment unit at Technical Area (TA)-54, Area G, Pad 1 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 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

Specific descriptions of the permitted units can be found in Permit Attachment A (*Technical Area Unit Descriptions*). This section of the closure plan provides a description of the permitted units which are located in the north-eastern portion of Area G and are comprised of an asphalt pad with the structure (Building 412, the Decontamination and Volume Reduction System (DVRS)) situated on it.

The irregularly-shaped asphalt pad is approximately 358 feet (ft) long and 213 ft wide or approximately 76,000 square feet. The pad, which is sloped 1% to 1.5% to the south and south-east for drainage, consists of a four to six inch (in) layer of asphalt over the underlying base course overlying fill (minimum six inches of tuff). The pad has one structure associated with it, Building 412 (DVRS). Storage of mixed waste occurs on the Pad and in Building 412.

Dome 226, which was decommissioned in October 2009, was located on the eastern portion of the permitted unit. The dome was approximately 286 ft long and 89 ft wide, was built of an aluminum framework of trusses covered with tension-fitted ultraviolet resistant, fire-retardant coated, polyester fabric anchored with bolts to the pad's concrete ring wall and had a surface area of about 22,300 square ft. The interior floor perimeter of the dome was surrounded with a 6-inch-high, 6-inch-wide asphalt curb and was equipped with personnel doors and a roll-up door on the south end for vehicle access. A ramp was located at the vehicle entrance to the dome, which allowed vehicles and container handling equipment to pass safely over the interior curb which prevented run-on into the dome. At the southern end of the dome was a drain connecting to the recessed sump in Pad 9's Dome 229. This fire protection drain system consists of a 10 in. line running southeast from where Dome 226 was located with secondary connecting drains from Domes 232 and 231. The purpose of this drain system was to provide additional fire water collection capacity in the event of an emergency. The sump and drain have been plugged to prevent storm water from entering the system at the drainage point.

Building 412 is a one story building that is approximately 220 ft long by 60 ft wide or 13,200 square ft. This building is currently used for storage and volume reduction of bulky mixed waste. It consists of two structures: an internal primary confinement structure that houses mixed waste processing operations; and an external confinement building, which contains the primary confinement structure. The building itself provides protection from the elements and a temperature-controlled space for the internal structures and associated process equipment. There are roll-up vehicle-access loading doors on the north and south ends of the building

and personnel access doors on the north, east, and south for support of operations. The floor and foundation of the building are concrete and the floor is painted with an epoxy sealant. The concrete slab is above grade to direct potential run-on away from the building. The floor in the building is sloped to a sump that has a grating cover to provide traction and a level working surface.

The primary confinement structure is housed entirely within the building and consists of interconnected enclosures. The primary confinement is approximately 150 ft long by 50 ft wide by 16 ft high and sits directly on the sealed concrete floor. The primary confinement interlocks in a self supporting steel framework that can be assembled into multiple configurations. It is equipped with both large roll-up doors so that personnel, equipment, and material can access the primary confinement and move from one enclosure to the next. Equipment in the enclosures includes gloveboxes, dismantling tools (*e.g.*, power saws, hammers, pry bars), shearing and bailing equipment. Building 412 contains fire protection piping as well as heating and ventilation ducting.

The permitted treatment process within the pre-engineered containment tent within Building 412 was used to treat mixed transuranic waste (MTRU) from the S3000 (homogenous solids), S4000 (soil/gravel) and S5000 (debris) waste matrices to deactivate the RCRA hazardous waste characteristics of D001, D002, and D003. Treatment occurred under fume hoods for 55-gallon and 85-gallon drums. The fume hoods were attached to the ventilation system when in use. Permit Attachment A (*Technical Area [TA] Unit Descriptions*), Permit Attachment B (*Part A Application*), and Permit Attachment C (*Waste Analysis Plan*) include information regarding waste treatment practices and hazardous waste constituents treated at the permitted unit. The permitted storage unit has been used for the storage of both liquid and non-liquid mixed waste and has stored the following waste types: 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 information about hazardous waste management procedures and hazardous waste constituents stored at the permitted unit.

A total of 16 transportainers and storage sheds, which are used for the storage of tools and equipment are also located on the permitted unit. These structures are situated on the permitted unit as support structures and, according to the Facility Operating Record, they have not been used to store hazardous waste.

3.0 ESTIMATE OF MAXIMUM WASTE STORED AND TREATED

Approximately 1,458,500 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 1,760,000 gallons of hazardous waste will be stored. It is estimated that approximately 99,000 gallons of hazardous waste will be treated and repackaged at Building 412 over its active life.

4.0 GENERAL CLOSURE REQUIREMENTS

4.1 Closure Performance Standards

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; and

- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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 surfaces, 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 the 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.6.1 of 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 structures, surfaces and related equipment.

Soil sampling and decontamination verification sampling activities 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 cannot proceed according to schedule, the Permittees will notify the Department in accordance with the extension request 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 in Permit Section 9.2 have been achieved; and submittal of a final closure certification report. The following sections describe the closure activities applicable to the permitted unit.

5.1 Removal of Waste

In accordance with Permit Section 9.4.2, all stored hazardous waste 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 be prepared for the wastes during transport. All hazardous waste containers 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 decontamination and sampling activities, the 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 inspecting the asphalt pad for any existing cracks or conditions that indicate the 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 (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 Surfaces, 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 waste constituents from the permitted unit to meet the closure performance standards outlined in Permit Section 9.2.

5.3.1 Removal of Surfaces, 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.

Building 412 (and its ancillary equipment) will be removed before the assessment. The asphalt pad, and all the materials associated with the pad (*e.g.*, concrete ringwall, sump, minimum of six inches of the base course and soil underlying the pad), will be removed after the assessment and before soil samples are collected. 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 (*e.g.*, additional concrete or base course materials), additional soil and materials will be removed. If it is determined to be appropriate at the time of the structural 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 Structures and Related Equipment

All surfaces, structures, and related equipment that will be reused by the Facility will be decontaminated in accordance with Permit Section 9.4.3.1. This includes: the gloveboxes, enclosure components, the cabinets in Building 412; bailing equipment; portable air monitors; all electronic devices and tools; and spill cleanup equipment containers in Building 412. This list of equipment requiring decontamination may be revised during the review and assessment which would result in an amendment to this closure plan.

Water-resistant equipment and operating machinery (*i.e.*, the gloveboxes, enclosure components, and cabinets) not sensitive to water intrusion will be decontaminated by steam cleaning, or pressure washing, with a solution consisting of a surfactant detergent (*e.g.*, Alconox®) and water and mixed in accordance with the manufacturer's recommendation. All other equipment at the permitted unit that is sensitive to water intrusion (*i.e.*, the bailing equipment, 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 and mixed in accordance with the manufacturer's recommendation.

The quantity of the wash solution will be minimized by dispensing from buckets, spray bottles, or other types of containers. The sump in the DVRS building will be plugged before decontamination activities begin to

ensure that none of the wash water solution enters the drain on the floor. 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 small reusable equipment that cannot be decontaminated will be containerized and managed as waste, as summarized in Table G.6-2, 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 and analytical methods as well as the quality assurance/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 Sampling Activities

Soil sampling and decontamination verification 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.ii, this closure plan will ensure the collection of soil samples at the following locations:

- a. one sample every 900 square feet of the permitted unit for a total of 64 soil samples (*see* Permit Section 9.4.7.1.ii(2));
- b. one sample just off the southeast edge of the permitted unit where stormwater runs off the pad (*see* Permit Section 9.4.7.1.ii(3));
 1. if the soil sample collected at the southeast edge of the permitted unit detects hazardous constituents, ten samples shall be collected along the swale between the permitted unit and Pad 10 (*see* Permit Section 9.4.7.1.ii(8)) (*see* Figure G.6-2).
- c. one sample at the rock check dam at the far southeast end of Area G where stormwater discharges (*see* Permit Section 9.4.7.1.ii(3));
 1. if the soil sample collected at the rock check dam detects hazardous constituents, ten samples shall be collected along the swale between the permitted unit and Pad 10 (*see* Permit Section 9.4.7.1.ii(8)) (*see* Figure G.6-2).

- d. one sample at the floor drain at the south end of the permitted unit underlying the removed Dome 226 and one sample at the sump in Building 412 (*see* Permit Section 9.4.7.1.ii(5)); and
- e. one sample at all the joints and intersections of the ten inch fire protection drain line running southeast and then east toward Pad 9 TWISP domes (*see* Permit Section 9.4.7.1.ii(7)).

Figures G.6-1 and G.6-2 illustrate these respective sampling locations at the permitted unit.

If there is liquid found in either the drain lines or the sumps at the time of the assessment liquid samples will be collected in accordance with Section 6.2.1 of this closure plan.

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.6-1). 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 within the area of the sampling box (*e.g.*, at asphalt cracks), these sample collection locations will be in addition to the grid sampling 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 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

Liquids will be collected and analyzed to determine if residual hazardous constituents remain in the drain lines or sumps 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 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.

6.2.3 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 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.6-4.

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

6.3.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- a. 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.6-4 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 hazardous constituents listed in 40 CFR Part 261 Appendix VIII and in Appendix IX of 40 CFR Part 264 that have been stored at the permitted unit over its operational history. This list may be modified, as necessary, to incorporate any changes as a result of the permitted unit's records review and history of hazardous waste constituents managed at the unit. Samples will be analyzed by an independent laboratory using the methods outlined in Table G.6-3 which presents analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses. 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 of this closure plan. 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.6-3 is 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 contaminations associated with the sampling and analysis

process which is described in the following sections. Information on calculations necessary to evaluate the QC results is also described below.

6.4.2.1 Field Quality Control

The field QC samples that will be collected are trip blanks, field blanks, field duplicates, and equipment rinsate blanks. Table G.6-5 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.6-2 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.6-2, 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.6-1
Closure Schedule for the Technical Area 54, Area G, Pad 1
Outdoor Container Storage/Treatment 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.	10 days after completed waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification /report to the Department.	Day 180

Table G.6-2
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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.

Potential Waste Materials	Waste Types	Disposal Options
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.6-3
Summary of Analytical Methods

Analyte	EPA <i>SW-846</i> Analytical Method	Test Methods/ Instrumentation	Target Detection Limit ^a	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 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.
<i>Other Parameters</i>				
Cyanide	9010, 9012	Colorimetric	20 ug/L	Determine cyanide concentration

^a 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.6-4
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP 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	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide-Mouth- Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO ₃ to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4°C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon- Lined Septa	Solid Media: Cool to 4°C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	
Semi-Volatile Organic Compounds			

Target Compound Semi-volatile Organic Compounds	Aqueous Media: Four 1-L Amber Glass with Teflon-Lined Lid	Aqueous Media: Cool to 4 °C	Seven days from field collection to 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. EPA, 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.6-5

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.6-6
List of Equipment at the Technical Area 54, Area G, Pad 1
Outdoor Container Storage/Treatment Unit

Equipment	Decontamination	Disposal
Drum venting and associated equipment	X	
Electrical infrastructure	X	X
Equipment and spill cleanup equipment containers	X	
Air pallets	X	
Container pallets	X	X
Communication equipment	X	X
Access barriers and chains	X	X
Gloveboxes	X	X
Portable air monitors	X	X
Enclosure components	X	X
Electronic devices or tools	X	
Cabinets	X	
Bailing equipment	X	

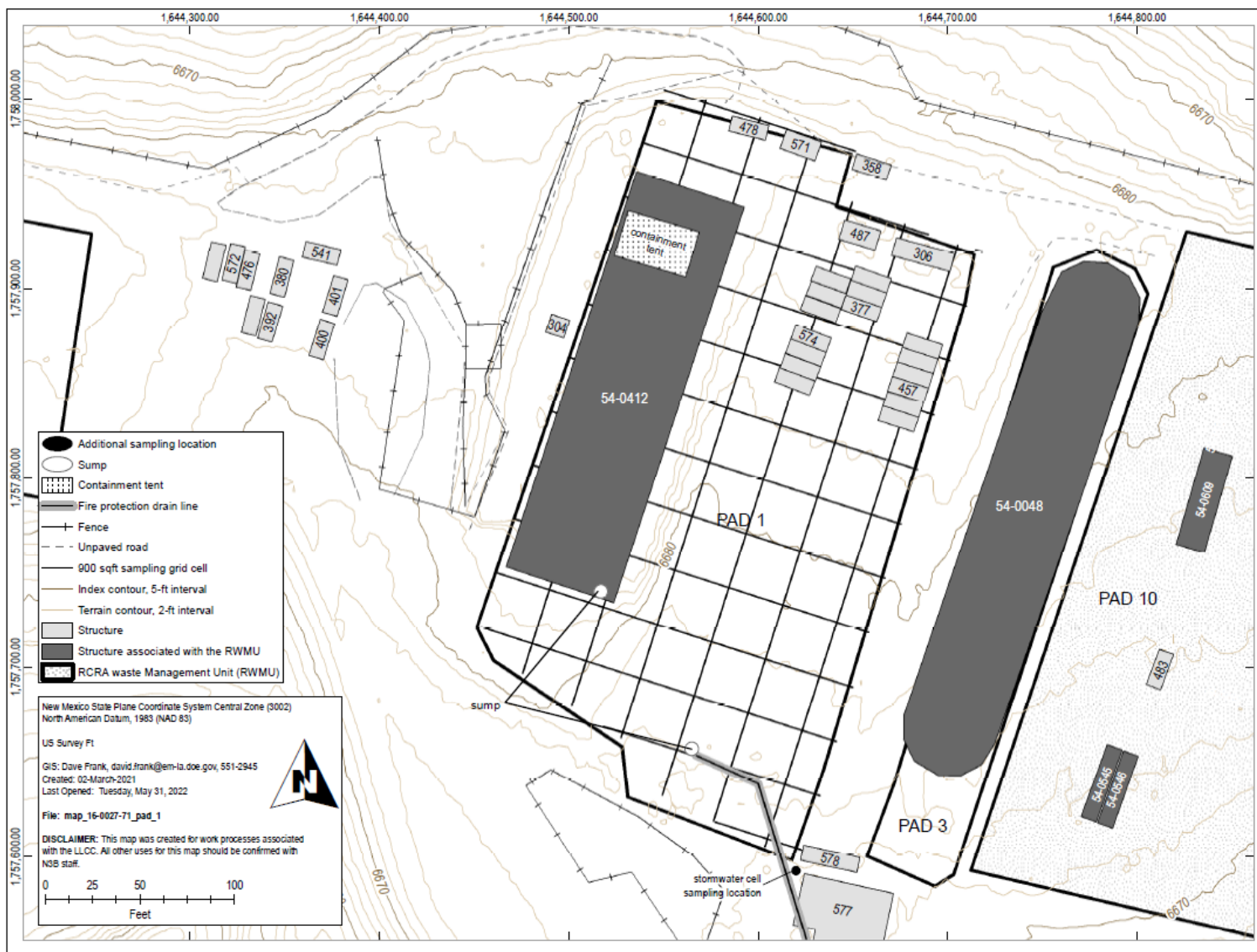


Figure G.6-1: Technical Area 54, Area G, Pad 1 Outdoor Closure Plan

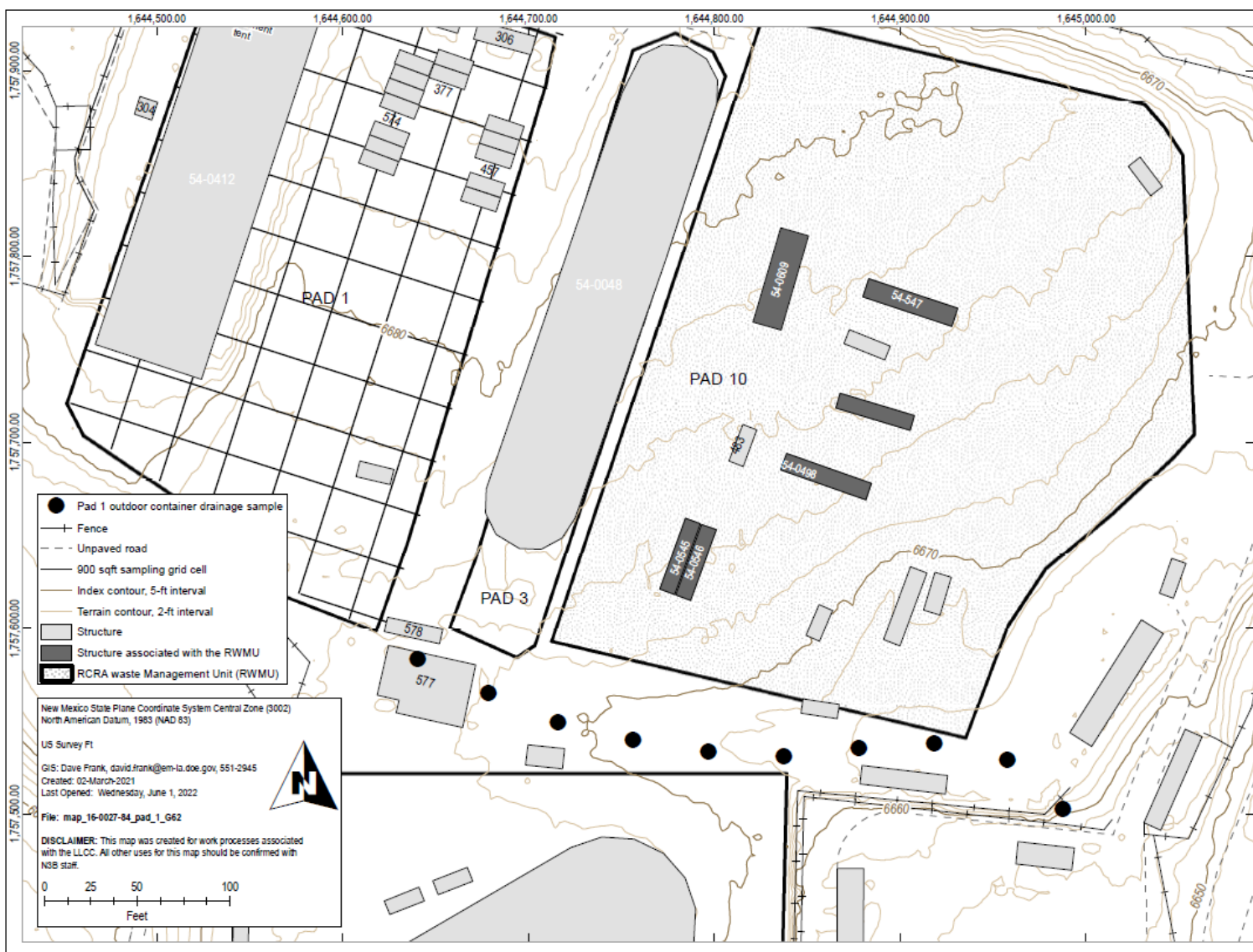


Figure G.6-2: Technical Area 54, Area G, Pad 1 Outdoor Container Storage/Treatment Unit Drainage Sampling

ATTACHMENT G.7
TECHNICAL AREA 54, AREA G, PAD 3
OUTDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

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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 3 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 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 339 feet long and 50 feet wide or approximately 17,000 square feet, is located in the eastern portion of Area G and was constructed in 1980. It consists of a four to six inch layer of asphalt over the underlying base course overlying fill (minimum six inches of tuff) and is sloped from 1% to 1.5% to the south for drainage. It has one structure associated with it: Dome 48 which is the only place where the storage of mixed waste occurs.

Dome 48 has been used for the storage of hazardous waste in both liquid and solid form since 1980. It is an aluminum framework of trusses covered with tension-fitted ultraviolet resistant, fire-retardant coated, polyester fabric that is anchored to the pad with standard drift pins. It is 285 feet long by 50 feet wide and covers a surface area of approximately 14,300 square feet. The dome is equipped with a double-panel rolling door at the south end and eight personnel doors, located approximately every 80 ft along the dome's length, which allow for adequate access both by vehicles and personnel. The interior perimeter of the dome is surrounded by a 6-inch-high, 8-inch-wide asphalt curb which helps prevent run-on into and runoff from the dome. An asphalt ramp located at the vehicle entrance allows vehicles and container handling equipment to pass safely over the curb.

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 regarding waste management procedures and hazardous waste constituents stored at the permitted unit.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

Approximately 1,026,500 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 1,283,000 gallons of hazardous waste will be stored.

4.0 GENERAL CLOSURE REQUIREMENTS

4.1 Closure Performance Standards

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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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, 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 the 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 a schedule of closure activities (*see also* Table G.7-1 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 sampling will be conducted to demonstrate that soils 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 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 in Permit Section 9.2 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 waste 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 be prepared for the wastes during transport. Containers holding hazardous wastes 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 inspecting 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 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 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 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.

Dome 48 (and its ancillary equipment) will be removed before the structural assessment. The asphalt pad, and all the materials associated with the pad (*e.g.*, curbing ramps, minimum of six inches of the base course and soil underlying the pad), will be removed after the structural 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 (*e.g.*, additional concrete or base course materials), 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 related equipment that will be reused by the Facility will be decontaminated in accordance with Permit Section 9.4.3.1. This includes: the equipment cabinets; bailing equipment; portable air monitors; all electronic devices and tools; and spill cleanup equipment containers from within Dome 48. This list of equipment requiring decontamination may be revised during the review and assessment which would result in an amendment to this closure plan.

Water resistant equipment and operating machinery (*e.g.*, the cabinets) and not sensitive to water intrusion at the permitted unit will be decontaminated by steam cleaning or pressure washing with a

solution consisting of a surfactant detergent (*e.g.*, Alconox[®]) and water and mixed in accordance with the manufacturer's recommendations. All other equipment at the permitted unit that is sensitive to water intrusion (*i.e.*, the bailing equipment, 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 and 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.7-2 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

Soil sampling and decontamination verification wipe sampling activities will be conducted at the permitted unit in order to verify that the soils at the permitted unit and that equipment related to 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 related to the permitted unit.

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

- a. one soil sample every 900 square feet of the permitted unit for a total of 22 soil samples (*see* Permit Section 9.4.7.1.ii(2));
- b. one sample just off the southeast edge of the permitted unit where stormwater runs off the pad (*see* Permit Section 9.4.7.1.ii(3));

1. if the soil sample collected at the southeast edge of the permitted unit detects hazardous constituents, then nine samples shall be collected along the swale between the permitted unit and Pad 10 (*see* Permit Section 9.4.7.1.ii(8)) (*see* Figure G.7-2); and
- c. one sample at the rock check dam at the far southeast end of Area G where stormwater discharges (*see* Permit Section 9.4.7.1.ii(3));
 1. if the soil sample collected at the rock check dam detects hazardous constituents, then nine samples shall be collected along the swale between the permitted unit and Pad 10 (*see* Permit Section 9.4.7.1.ii(8)) (*see* Figure G.7-2).

Figures G.7-1 and G.7-2 illustrate these respective sampling locations.

At the time of sampling, the precise locations of the grid sample will be randomly selected within each 900 square foot sampling box (*see* Figure G.7-1). 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 collection locations will be in addition to the grid sample locations.

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 Wipe Sampling

Surface wipe samples will be collected and analyzed to determine if residual hazardous constituents remain on the 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 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 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.7-4.

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

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

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

- 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.7-3 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 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. This list may be modified, as necessary, to incorporate any changes as a result of the permitted unit's records review and history of hazardous waste constituents managed at the unit. Samples will be analyzed by an independent laboratory using the methods outlined in Table G.7-3. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.7-3. 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.7-5 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 contaminations associated with the sampling and analysis process which are described in the following sections. Information on calculations necessary to evaluate the QC results is also described below.

6.4.2.1 Field Quality Control

The field QC samples that will be collected are trip blanks, field blanks, field duplicates, and equipment rinsate blanks. Table G.7-5 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.7-2 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 will be containerized and managed as waste as summarized in Table G.7-2.

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 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.7-1

Closure Schedule for the Technical Area 54, Area G, Pad 3 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.	10 days after completed waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.7-2
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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.

Potential Waste Materials	Waste Types	Disposal Options
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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

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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.7-3
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method	Test Methods/ Instrumentation	Target Detection Limit ^a	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.
<i>Other Parameters</i>				
Cyanide	9010, 9012	Colorimetric	20 ug/L	Determine cyanide concentration

^a 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.7-4
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:	Aqueous Media:	180 Days
	500-mL Wide-Mouth-Polyethylene or Glass with Teflon Liner	HNO ₃ to pH <2 Cool to 4°C	
	Solid Media:	Solid Media:	
	125-mL Glass	Cool to 4°C	
Total Mercury	Aqueous Media:	Aqueous Media:	28 Days
	500-mL Wide-Mouth-Polyethylene or Glass with Teflon Liner	HNO ₃ to pH <2 Cool to 4 °C	
	Solid Media:	Solid Media:	
	125-mL Glass	Cool to 4°C	
<i>Volatile Organic Compounds</i>			
Target Compound Volatile Organic Compounds	Aqueous Media:	Aqueous Media:	14 days
	Two 40-mL Amber Glass Vials with Teflon-Lined Septa	HCl to pH<2 Cool to 4 °C	
	Solid Media:	Solid Media:	
	125-mL Glass or Two 40-mL Amber Glass Vials with Teflon-Lined Septa	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-	Aqueous Media:	Aqueous Media:	Seven days from field

volatile Organic Compounds	Four 1-L Amber Glass with Teflon-Lined Lid	Cool to 4 °C	collection to extraction. 40 days from extraction to determinative analysis.
	Solid Media:	Solid Media:	
	250-mL Glass	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, USEPA, 1986 and all approved updates; °C = degrees Celsius; L = Liter; HNO₃ = nitric acid; mL = milliliter; HCl = hydrochloric acid; TCLP = Toxicity Characteristic Leaching Procedure

Table G.7-5

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

^aFor 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.

^bCollected only if reusable sampling equipment used.

Table G.7-6

List of Equipment at the Technical Area 54 Area G, Pad 3 Outdoor Containers Storage Unit

Equipment	Decontamination	Disposal
Equipment and spill kit cabinets	X	X
Container pallets	X	X
Communication equipment	X	X
Access barriers and chains	X	X

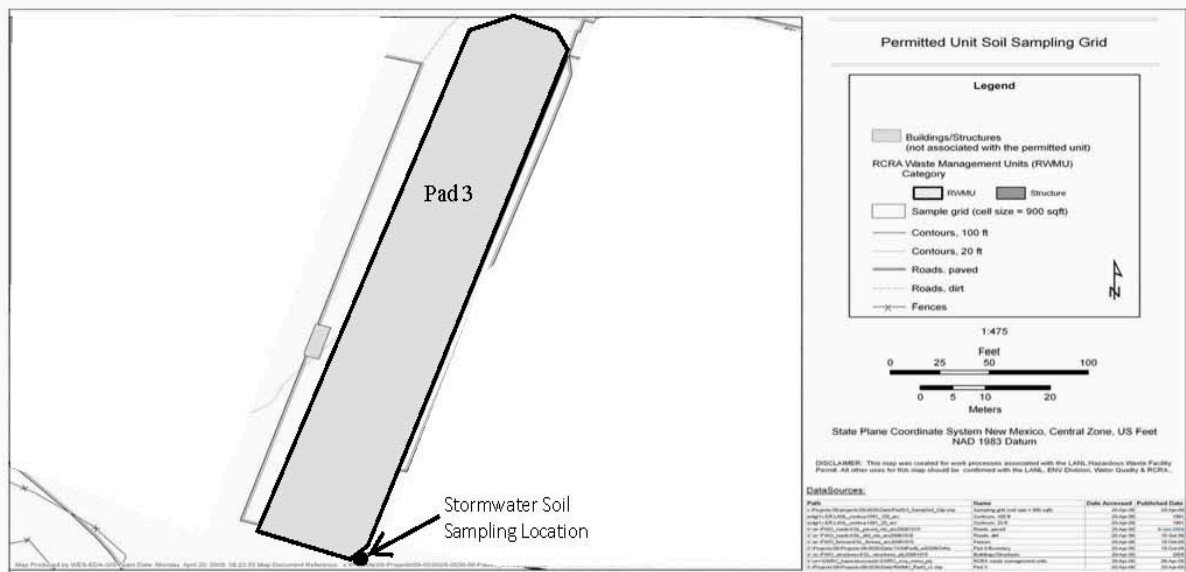


Figure G.7-1: Technical Area 54, Area G, Pad 3 Outdoor Container Storage Unit Sampling Grid Locations

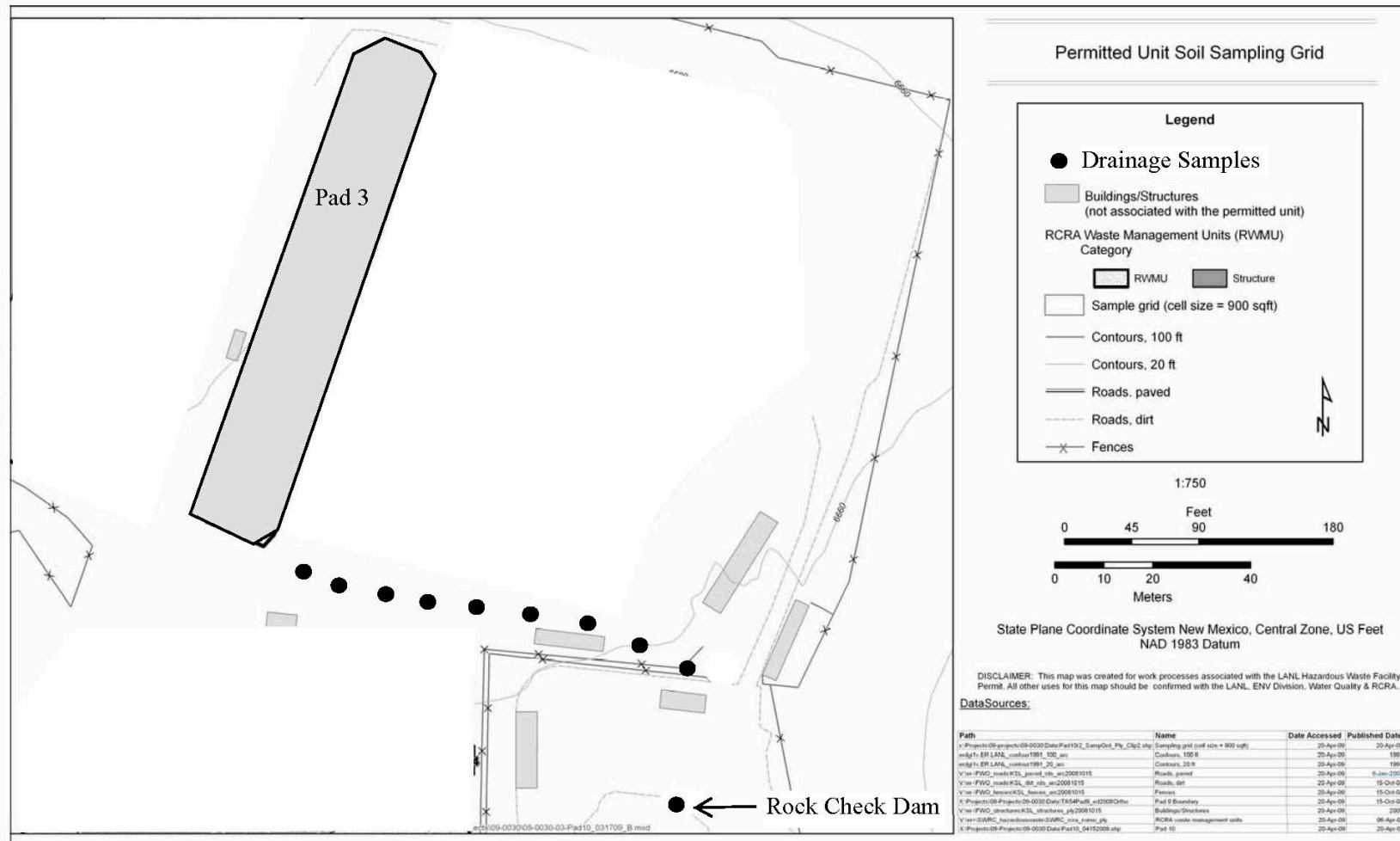


Figure G.7-2: Technical Area 54, Area G, Pad 3 Outdoor Container Storage Unit Drainage Sampling Locations

ATTACHMENT G.8
TECHNICAL AREA 54, AREA G, PAD 5
OUTDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

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<u>FIGURE NO.</u>	<u>TITLE</u>
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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 5 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 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 measures 850 feet long and 224 feet wide, is located in the western portion of Area G. It is four inches thick, is sloped 1-2%, and is comprised of three asphalt pads (Pad 5 and older Pads 7 and 8). There are ten structures associated with the permitted unit: two domes (Domes 224 and 49) and eight sheds (sheds 144, 145, 146, 177, 1027, 1028, 1030, and 1041). Rainwater flow at the permitted unit is directed across the pad by slope and drainage structures (*i.e.*, supplemental check berm, culvert, and sediment traps).

Storage Domes 49 and 224 are used for the storage of hazardous waste. They are built of an aluminum framework of trusses covered with tension-fitted ultraviolet resistant, fire-retardant coated, polyester fabric and are anchored to the permitted unit with drift pins and anchor bolts.

Dome 49 is 440 ft long and 60 ft wide, and has a peak height of approximately 26 ft. The dome is equipped with a double-panel rolling door at its north end and has six personnel doors to allow for adequate access both by vehicles and by personnel. The interior perimeter of the dome is surrounded by a 6-inch-high, 8-inch-wide asphalt curb, which helps prevent run-on into, and run-off from, the dome.

Dome 224 is approximately 110 ft long and 60 ft wide, with a peak height of 26 ft and was built of an aluminum framework of trusses covered with tension-fitted ultraviolet resistant, fire-retardant coated, polyester fabric and was anchored to the permitted unit with drift pins and anchor bolts. It is equipped with a single-panel roll-up door at the north end and four personnel doors to allow adequate access by vehicles and by personnel. A 1-ft, 8-inch wide by 2-ft, 4-inch deep concrete ring wall originally designed for secondary containment of liquids surrounding the interior of Dome 224. The asphalt floor is sloped 0.5% towards a concrete sump in the center of the dome. The floor, sump, and curbs are lined with a double layer of HDPE to contain any liquids that might accumulate.

Storage sheds 144, 145, 146, and 177 are prefabricated sheds constructed of steel each measuring six foot long, five foot wide and nine foot high and are elevated by design to prevent run-on. Access to each shed

is obtained through a single door where each shed is equipped with a single compartment. Each shed is constructed with a liquid-tight sump to prevent runoff and to contain any potential leaks or spills. The floor of each shed is constructed of steel coated with chemically-resistant epoxy paint and has a metal grate that covers the entire sump area. Containers are placed directly on the metal grates.

Storage Sheds 1027, 1028, 1029, and 1041 are prefabricated sheds constructed of steel each measuring approximately 23 ft long, nine foot wide and 8.5 ft high. Each shed is equipped with three sets of double doors on one side of the shed for ease of access and have liquid-tight sumps to prevent runoff and contain any potential leaks or spills. The floor of each shed is constructed of a metal grate that covers the sump areas. Containers are placed directly on the metal grates, which prevents contact with liquids that may have accumulated in the sumps. The interior of each shed and sump is coated with chemically-resistant epoxy paint.

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

Approximately 2,993,000 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 3,741,000 gallons of hazardous waste will be stored.

4.0 GENERAL CLOSURE REQUIREMENTS

4.1 Closure Performance Standards

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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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, 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 the 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.8-1 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 sampling activities will be conducted to demonstrate that soils beneath the permitted unit and structures and equipment related to 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 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 structures and equipment associated with the permitted unit; verification that the closure performance standards in Permit Section 9.2 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 waste 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. 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 potential 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 Inspections 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 in the sheds and inspecting 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 disposed of in accordance with Permit Section 9.4.5 and Section 7.0 of this closure plan.

The following structures and related equipment will be removed before the assessment: the tensioned-fabric membranes on the dome structures and the aluminum beams, trusses, and ancillary equipment supporting the domes. The asphalt pad, the materials associated with the asphalt pad (*e.g.*, concrete ringwall, sump structures, and any HDPE liners), and a minimum of six inches of the base course and soil

underlying the asphalt pad shall be removed after the assessment. If after 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. 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 Structures and Related Equipment

All structures and related equipment that will be reused by the Facility will be decontaminated in accordance with Permit Section 9.4.3.1. This includes: all eight storage sheds; the portable air monitors; all electronic devices and tools; and spill cleanup equipment containers from within the domes (*see* Table G.8-6). This list of equipment requiring decontamination may be revised during the review and assessment which would result in an amendment to this closure plan.

Equipment and operating machinery that is not sensitive to water intrusion, such as the storage sheds and equipment cabinets, will be decontaminated by pressure washing or steam cleaning with a solution consisting of a surfactant detergent (*e.g.*, Alconox®) and water and mixed in accordance with the manufacturer's recommendation. All other equipment at the permitted unit that is sensitive to water intrusion (*i.e.* portable air monitors, electronic devices or tools, 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 closure decontamination activities will be cleaned with a wash water solution. Residue, disposable equipment, and small reusable equipment that cannot be decontaminated will be containerized and managed as waste as summarized in Table G.8-2 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 Sampling Activities

Soil sampling and decontamination verification sampling activities will be conducted at the permitted unit in order to verify that soils at the permitted unit, that structures, such as the storage sheds situated on the permitted unit, and equipment related to 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 related to 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 the following areas in each of the eight storage sheds:

- a. every wall;
- b. each floor;
- c. each ceiling; and
- d. each sump.

A total of 56 wipe samples will be collected. If there is liquid found in any of the sumps at the time of sample collection, liquid samples will be collected in accordance with Section 6.2.1 of this closure plan.

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

- e. one soil sample in front of each of the storage sheds for a total of eight samples (*see* Permit Section 9.4.7.1.ii(1));
- f. one soil sample every 900 square feet of the permitted unit for a total of 95 samples (*see* Permit Section 9.4.7.1.ii(2));
- g. one sample at the sump located in Dome 224 (*see* Permit Section 9.4.7.1.ii(5)); and
- h. nine samples to address stormwater runoff (*see* Permit Section 9.4.7.1.ii(3) and discussion below for rationale of sample locations).

Figure G.8-1 illustrates these sampling locations.

Dome 224 is anticipated to be removed from the permitted unit prior to final closure of the unit. If there is liquid found in the sump in Dome 224 at the time of assessment, a liquid sample shall be collected in accordance with Section 6.2.1 of this closure plan. Additionally, one soil sample shall be collected at the sump location in Dome 224 (*see* Permit Section 9.4.7.1.ii(5)). Documentation of these samples and analysis shall be kept as part of the Facility Operating Record and shall be reviewed as part of closure of the permitted unit.

At the time of sampling, the precise locations of the grid samples will be selected randomly from within each 900 square foot sampling box (*see* Figure G.8-1). 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 within the area of the sampling box (*e.g.*, at asphalt cracks), these sample locations will be in addition to the grid sample locations.

Individual sample locations to address stormwater runoff have been sited by the specific drainage conditions at the permitted unit and are numbered from '1-9' on Figure G.8-1. Sample numbers '1' and '2' are situated to intercept water drainage from former Pad 7; '1' is located at a small supplemental check berm while '2' is at the main culvert draining from former Pad 7. Sample numbers '3', '8', and '9' address drainage from former Pad 8; '3' is located in the area in front of the main door of Dome 224 while 8 and 9 address the drainage from the rest of former Pad 8 on the east side where it is directed by the slope of that pad. Sample numbers '4', '5', '6', and '7' address the potential discharge points for drainage from the permitted unit (Pad 5) and Dome 49; '4' is located on the north side of the main door of Dome 49, '5' and '6' are situated in sediment traps located in the drainage from the west side of the permitted unit; and '7' is located in a combined drainage area for the east side of the permitted unit and west side of former '7.'

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 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

Liquids will be collected and analyzed to determine if residual hazardous constituents remain in the sumps in the storage sheds 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

Wipe samples will be collected and analyzed to determine if residual hazardous constituents remain on structures or related 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 and Sediment Sampling

Soil and sediment samples will be collected and analyzed to determine if hazardous constituents are present in the soils and sediment at the permitted unit. 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.8-4.

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

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

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

- 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 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.8-5 presents the requirements in *SW-846* (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE 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 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.8-3. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.8-3. 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 of this closure plan. 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.8-4 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 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.8-5 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.8-2 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.8-2, 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.8-1

Closure Schedule for the Technical Area 54, Pad 5, Outdoor Container Storage Unit

Activity	Maximum Time Required
Notify the Department of intent to close.	-45 days
	-20 days
Final receipt of waste.	Day 0
Complete waste removal.	Day 90
Complete records review and structural assessment.	10 days after completed waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.8-2
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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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)

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.8-3
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	
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.8-4
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	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide-Mouth-Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO ₃ to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4°C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days

	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Solid Media: Cool to 4°C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	
<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.8-5

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.8-6
List of Permitted Unit Equipment

Equipment	Decontamination	Disposal
Equipment and spill kit cabinets	X	X
Container pallets	X	X
Communication equipment	X	X
Access barriers and chains	X	X

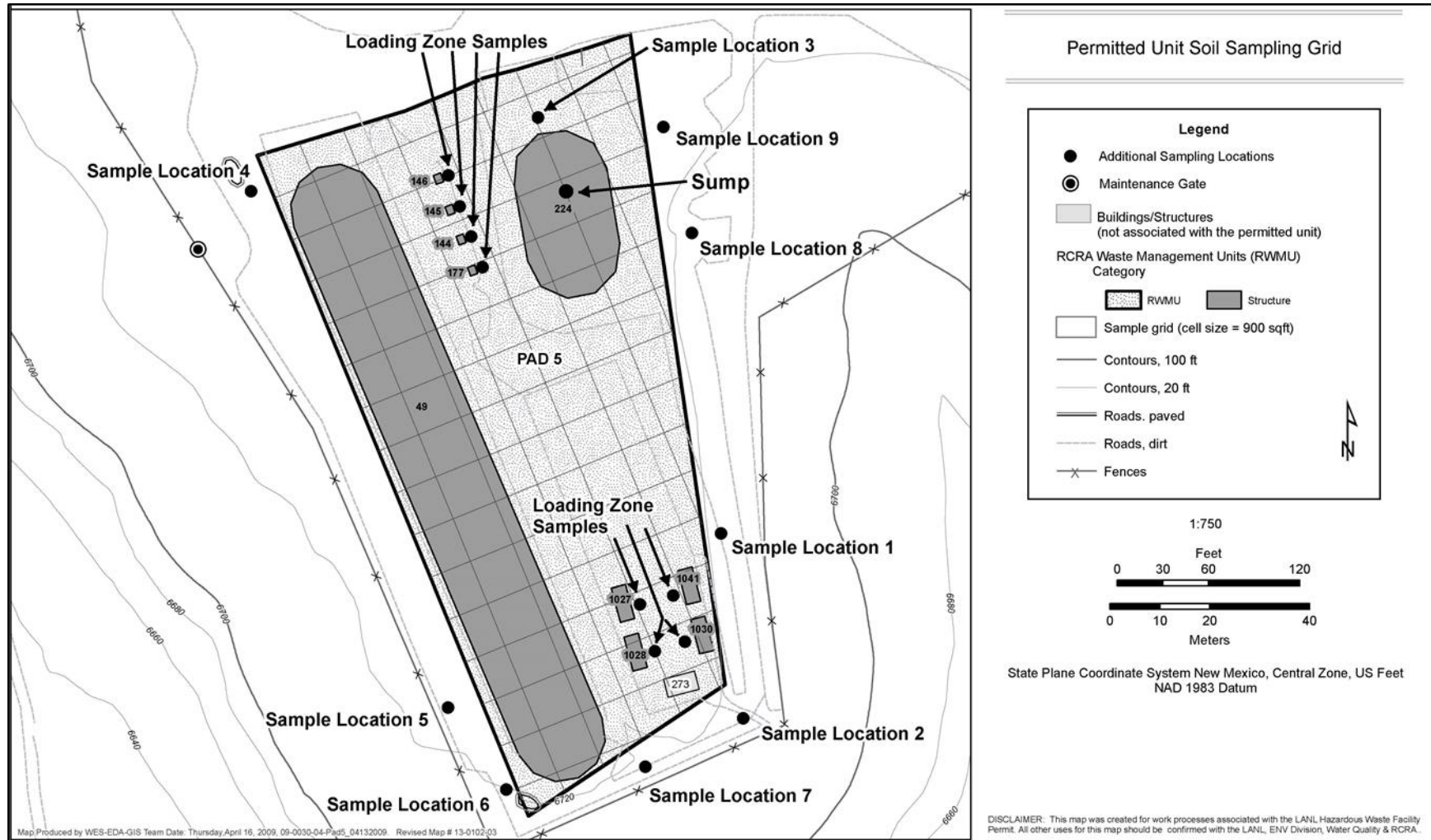


Figure G.8.1 Technical Area 54, Area G, Pad 5, Outdoor Container Storage Unit Soil Sampling Grid and Additional Sampling Locations

ATTACHMENT G.9
TECHNICAL AREA 54, AREA G, PAD 6
OUTDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

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<u>FIGURE NO.</u>	<u>TITLE</u>
G.9-1	Technical Area 54, Area G, Pad 6 Outdoor Container Storage Unit Sampling Grid and Additional Sampling Locations

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 6 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 with the Permit are described below.

The permitted unit is comprised of Pad 6 and is located in the north-central portion of Area G. The pad measures 633 feet long and 99 feet wide or approximately 62,700 square feet. The pad consists of a four to six inch layer of asphalt over the underlying base course overlying fill (minimum six inches of tuff). The pad is sloped from 1% to 1.5% to the south and east for drainage. Additional drainage is directed to the north and east. Rainwater flow at the permitted unit is directed primarily across the pad by the southward slope and into a ditch that runs parallel to the south side of the pad and then drains to the south side of Area G. Secondary rainwater flow is directed to the north/northeast portion of the pad.

Hazardous waste in both liquid and solid form is stored in Domes 153 and 283 on the pad and within transportainer 491 on the south end of the permitted unit; none of these structures are equipped with sumps. The two storage domes (an aluminum framework of trusses covered with tension-fitted ultraviolet resistant, fire-retardant coated, polyester fabric) on the permitted unit vary in size. Dome 153 is 326 feet long by 60 feet wide, covers a surface area of approximately 19,600 square feet, has a double-panel rolling door located at the west end, and has ten personnel doors located approximately every 40 to 125 feet along its length. Dome 283 is 260 feet long by 60 feet wide, covers an area of approximately 15,600 square feet, has a double-panel rolling door located at the east end, and has ten personnel doors located approximately every 50 feet along its length. The base of each dome is secured with standard drift pins. A 6-inch by 8-inch high asphalt curb surrounds the interior floor perimeter of both domes and provides run-on and run-off protection. The curb is designed to retain any liquids that may accumulate within the domes. An asphalt ramp is located at the vehicle entrance (*i.e.*, double-panel rolling door) to each dome which allows vehicles and container handling equipment to pass safely over the curb. Dome 283 also contains a Conex structure that serves as a control room. The control room is approximately 8 feet wide, 20 feet long and 8 feet high.

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

Approximately 2,867,000 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 3,584,000 gallons of hazardous waste will be stored.

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, 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.9-1 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 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 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 structures and equipment associated with the permitted unit; verification that the closure performance standards in Permit Section 9.2 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. Appropriate shipping documentation will accompany the wastes during transport. Containers holding hazardous wastes 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 inspecting the floor, walls, and ceiling in the transportainer (491) as well as inspecting 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 (SAP) (*see* Section 6.0 of this closure plan) to add these sampling locations and 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 in order 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 tensioned-fabric membranes on the dome structure as well as the aluminum beams, trusses, and ancillary equipment supporting the domes will be removed before the structural assessment. The asphalt pad, the materials associated with the asphalt pad (curbing and ramps), and a minimum of 6 inches of the base course and soil underlying the asphalt pad will 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. 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 Structures and Equipment

All structures and related equipment that will be reused by the Facility will be decontaminated (*see* Table G.9-6) in accordance with Permit Section 9.4.3.1. This includes: the transportainer; 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 (*see* Section 5.2 of this closure plan).

Equipment and operating machinery that is not sensitive to water intrusion, such as the transportainer and 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) 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 closure 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.9-2, 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 of 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

Soil sampling and decontamination verification wipe sampling activities will be conducted at the permitted unit in order to verify that soils, surfaces, 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 one wipe sample from each wall, floor, and ceiling of the transportainer (491) for a minimum of 6 wipe samples.

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 soil sample in front of the transportainer (491) (*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 68 samples (*see* Permit Section 9.4.7.1.ii.a(2)); and
- c. three soil samples to address stormwater runoff (*see* Permit Section 9.4.7.1.ii.a(3) and discussion below for rationale of sample locations).

Figure G.9-1 illustrates these sampling locations.

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.9-1). 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.

Individual sample locations to address stormwater runoff have been sited by the specific drainage conditions at the permitted unit and are numbered from '1-3' on Figure G.9-1. Sample number '1' will be collected just off the southern portion of the pad in the ditch. Sample number '2' will be collected just off the northern portion of the pad. Sample number '3' will be collected at the sediment trap located northeast of the permitted unit.

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 Wipe Sampling

Surface wipe samples will be collected and analyzed used to determine if residual hazardous constituents remain on the structures and related 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 Sampling

Soil samples will be collected and analyzed to determine if hazardous constituents are present in soils at and in the vicinity of 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.9-5.

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

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

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

- 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.9-5 presents the requirements in *SW-846* (EPA, 1986) for sample containers, preservation techniques, and

holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE 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.9-3. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.9-3. 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/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.9-3 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.9-5 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.9-2 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.9-2, 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.9-1

Closure Schedule for the Technical Area 54, Area G, Pad 6 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.9-2
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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
Verification 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	RLWTF

Table G.9-2
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.

Table G.9-2
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Table G.9-2
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.

Table G.9-3
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	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 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.9-4
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, EPA, 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.9-5

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.9-6

List of Equipment at the Technical Area 54, Area G, Pad 6 Outdoor Container Storage Unit

Equipment	Decontamination	Disposal
Any storage transportainers on Pad 6	X	X
Equipment and spill kit cabinets	X	X
Container pallets	X	X
Communication equipment	X	X
Access barriers and chains	X	X

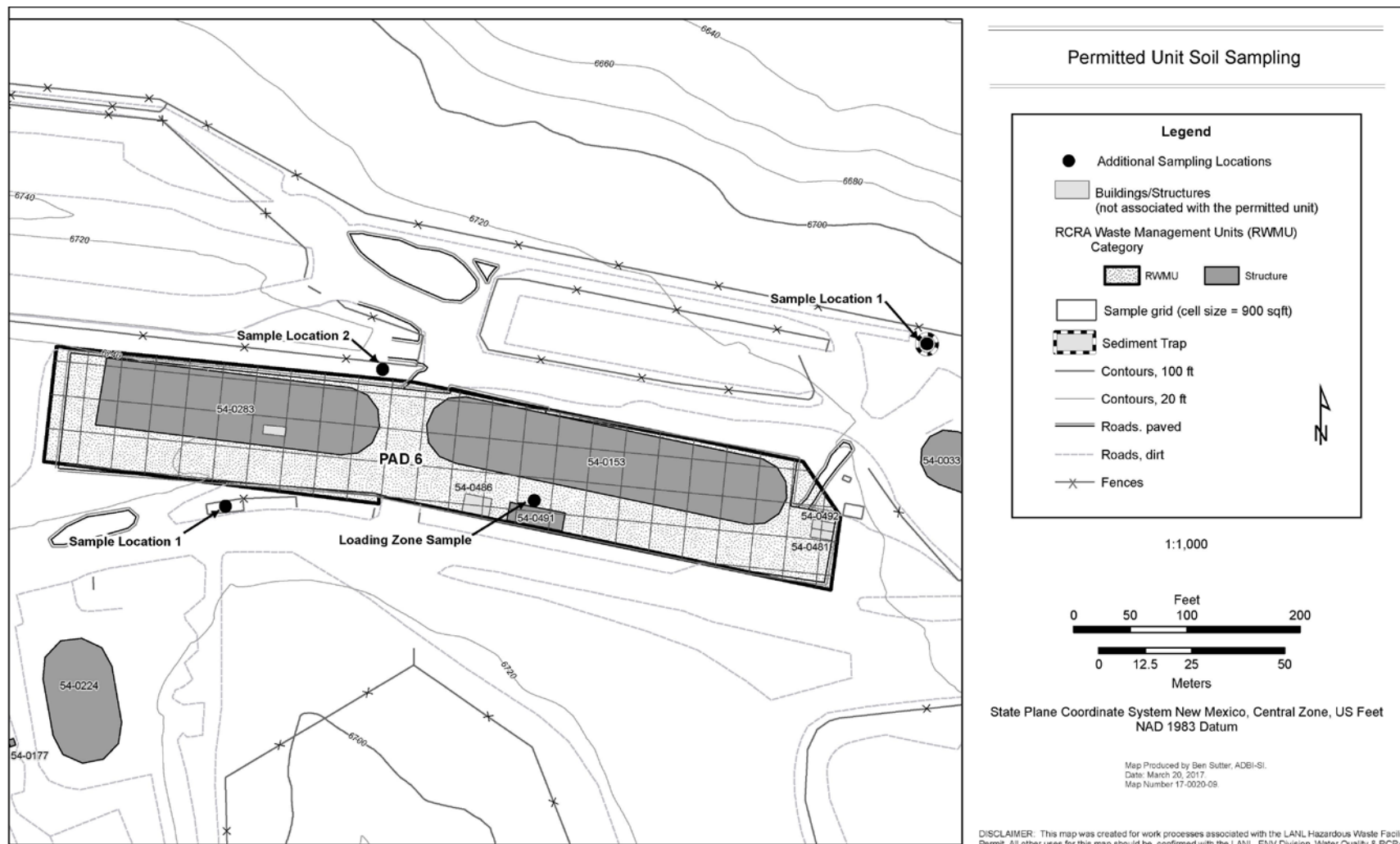


Figure G.9-1: Technical Area 54, Area G, Pad 6 Outdoor Container Storage Unit Sampling Grid and Additional Sampling Locations

ATTACHMENT G.10
TECHNICAL AREA 54, AREA G, PAD 9
OUTDOOR CONTAINER STORAGE AND TREATMENT UNIT
CLOSURE PLAN

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<u>FIGURE NO.</u>	<u>TITLE</u>
G.10-1	Technical Area 54, Area G, Pad 9 Outdoor Container Storage/Treatment Unit Grid Sampling and Additional Sampling Locations

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 9, and the storage/treatment unit at Dome 231 Perma-Con 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 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

Specific descriptions 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 is comprised of an asphalt pad which is located in the eastern end of Area G. It was constructed in 1993, consists of a four to six inch layer of asphalt over the underlying base course overlying fill (minimum six inches of tuff), and measures 570 feet long and 275 feet wide, or approximately 158,000 square feet. It is constructed with curbing on the west and east sides and is sloped from 1% to 1.5% to the east and south-east for drainage. Rainwater flow is directed across the pad by the eastward slope and through small PVC drains spaced at 55 foot intervals in the curbing along the east side of the pad. The slope below the curbing is protected with rock and concrete. Concrete curbing also extends along the west and partially the south sides of the pad and ends at a concrete and rock drainage structure. The remainder of the south side of the pad is uncurbed. Four domes (Domes 229, 230, 231, 232), are situated on it (see Figure G.10-1).

The permitted storage unit has stored the following waste types: 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 information regarding waste management procedures and hazardous waste constituents stored at the permitted unit.

The permitted treatment process within the Perma-Con in Dome 231 was used to treat mixed transuranic waste (MTRU) from the S3000 waste matrix (homogenous solids) to deactivate the RCRA hazardous waste characteristics of ignitability (D001), corrosivity (D002), and reactivity (D003). Permit Attachment A (*Technical Area [TA] Unit Descriptions*), Permit Attachment B (*Part A Application*), and Permit Attachment C (*Waste Analysis Plan*) include information regarding waste treatment practices and hazardous waste constituents treated at this permitted unit.

Within the enclosure of the Perma-Con unit, glove bags have been used to enclose a contaminated item and from a small work area to confine the spread of the contamination. Use of glove bags allowed work to be performed on potentially contaminated items, protect personnel, and to allow access to waste within the containment using gloved sleeves which enable repacking or manipulations without directly contacting contaminated surfaces.

2.1 Permitted Unit Domes

The four storage domes at the permitted unit have been used for the storage of hazardous waste in both liquid and solid form since 1994. The domes (an aluminum framework of trusses covered with tension-fitted ultraviolet resistant, fire-retardant coated, polyester fabric) are 246 feet long by 89 feet wide and cover a surface area of approximately 20,400 square feet each. The base of each dome is secured with anchor bolts to a concrete ring wall that surrounds the interior floor perimeter and provides run-on and run-off protection. The ring wall is designed to retain any liquids that may accumulate within the domes. Each dome has several personnel doors around the perimeter of the dome and a larger vehicle access door and ramp on the west end.

Dome 231 contains a Perma-Con® modular panel containment structure (68 feet long x 28 feet wide) used for the treatment of MTRU waste prior to shipment to the Waste Isolation Pilot Plant. Domes 229 and 232 have been used only for the storage of non-liquid hazardous waste and Dome 230 and 231 have been used for the storage of both liquid and non-liquid hazardous waste.

2.1.1 Domes 229, 231, and 232 Fire Water Collection System

The permitted unit has a fire water collection system that collects water from Domes 232, 231, and Dome 226 on Pad 1. The system was designed to provide an augmented fire water collection capability to limit run-off of fire suppression waters from the domes if the volume of water during a fire exceeded their collection capacity. Fire suppression water from the domes is collected via a pipeline that runs from Pad 1 and down the east side of the permitted unit below the asphalt. The pipeline is sloped to provide gravity flow. The southeast portions of Domes 231 and 232 have three drain inlets each and Dome 226 has two drain inlets on the south end that connect to this pipeline. The pipeline terminates in the concrete walled semi-circular collection sump (lined with high density polyethylene plastic) in the east end of Dome 229. The semi-circular sump, which measures 70 feet by 28 feet and 26 inches in depth, is not intended for secondary containment of liquid waste and has not been used as such based on review of the permitted unit's Operating Record.

2.1.2 Dome 230 Secondary Containment

Dome 230 has a concrete walled semi-circular sump (lined with high density polyethylene plastic) at the east end of the dome and double high density polyethylene layers under the pad that act as secondary containment for liquid waste. The design of the sump is similar to that of Dome 229 as described above except that the sump in Dome 230 is not connected to an external drain system. The maximum capacity of accumulated liquids within the concrete sump and the curbed area of the dome are approximately 48,000 gallons.

3.0 ESTIMATE OF MAXIMUM WASTE STORED AND TREATED

Approximately 6,400,000 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 9,000,000 gallons of hazardous waste

will be stored. It is estimated that approximately 99,000 gallons of hazardous waste will be treated and repackaged in the Perma-Con in Dome 231 over its active life.

4.0 GENERAL CLOSURE REQUIREMENTS

4.1 Closure Performance Standards

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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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. 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;
- e. minimize the need for further maintenance;
- f. 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
- g. 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 related 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 the 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.10-1 of 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 structures and related equipment.

Soil sampling and decontamination verification 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 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 in Permit Section 9.2 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 waste 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 be prepared for 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 inspecting the floors, walls, and ceilings in the PermaCon[®], as well as inspecting 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 (SAP) (*see* Section 6.0 of this closure plan) to add these sampling locations and applicable sampling 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 PermaCon[®] and the tensioned-fabric membranes on the domes (as well as the aluminum beams, trusses, and ancillary equipment supporting the domes) will be removed before the assessment. The asphalt pad, the materials associated with the asphalt pad (*e.g.*, concrete ringwall, sumps, liner) and a minimum of six inches of the base course and soil underlying the asphalt pad will 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. 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 in accordance with Permit Section 9.4.3.1. This includes: the portable air monitors; all electronic devices and tools; and the spill cleanup equipment containers from within the domes (*see* Table G.10-6). This list of equipment requiring decontamination will be revised, if necessary, during the review and assessment.

Equipment and operating machinery that is not sensitive to water intrusion, such as the equipment cabinets in Dome 231, will be decontaminated by pressure washing or steam cleaning with a solution consisting of a surfactant detergent (*e.g.*, Alconox®) and water mixed in accordance with the manufacturer's recommendations. All other equipment at the permitted unit that is sensitive to water intrusion (*i.e.*, portable air monitors, electronic devices or tools, PPE, portable eyewashes, 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. The fire suppression water drains in domes 229, 231 and 232 will be plugged so as to not allow wash water to enter.

5.4 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during closure 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.10-2 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 Sampling Activities

Soil sampling and decontamination verification 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.

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

- a. two samples in front of where structure 362 was located (*see* Permit Section 9.4.7.1.ii(1));

- b. one sample every 900 square feet of the permitted unit for a total of 170 samples (*see* Permit Section 9.4.7.1.ii(2));
- c. one sample to the south of the permitted unit at the stormwater discharge drainage location ('sample location 1') (*see* Permit Section 9.4.7.1.ii(3));
- d. one sample at the discharge point in the sump in Dome 229 for the fire water collection system ('sample location 2') (*see* Permit Section 9.4.7.1.ii(4));
- e. one sample at each location (eastern portion of the permitted unit) where the slope of the permitted unit ends in soil below each PVC drain for a total of ten samples (*see* Permit Section 9.4.7.1.ii(4));
- f. one sample at each drain in Domes 232 and 231 and one sample at each sump in Dome 229 and 230 for a total of eight samples (*see* Permit Section 9.4.7.1.ii(5));
- g. one sample at the joints and intersections of the fire water collection system piping (*see* Permit Section 9.4.7.1.ii(7)); and
- h. one sample, at 30 foot intervals, just off the southern end of the permitted unit along the uncurbed portion of the drainage structure for a total of five samples (*see* Permit Section 9.4.7.1.ii(8)).

All soil sample locations are illustrated on Figure G.10-1.

If liquid is present in any of the drains, sumps, or piping at the time of the assessment, a liquid sample will be collected in accordance with Section 6.2.1 of this closure plan.

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.10-1). 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 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 are present in the drains, sumps, or pipes 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 the structures and related 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 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.10-4.

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

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

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

- 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 analytical laboratory will return the completed 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.10-4 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.10-3. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.10-3. 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 of this closure plan. 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.10-3 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 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.10-5 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.10-2 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.10-2, 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.10-1
Closure Schedule for the Technical Area 54, Area G, Pad 9 Outdoor Container
Storage/Treatment 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.	10 days after completed waste removal 100 or days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.10-2
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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	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.

Potential Waste Materials	Waste Types	Disposal Options
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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

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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.10-3
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	8260B	GC/MS	10 mg/L	Determine the VOCs concentration in the samples.

identified 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
ug/L = micrograms per liter.

Table G.10-4
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP 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	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide-Mouth- Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO ₃ to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4°C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon- Lined Septa	Solid Media: Cool to 4°C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	
Semi-Volatile Organic Compounds			

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

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

^b Information obtained from “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” SW-846, 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.10-5

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.10-6
List of Equipment at the Technical Area 54, Area G, Pad 9 Outdoor Container
Storage/Treatment Unit

Equipment	Decontamination	Disposal
PermaCon® in Dome 231 and associated equipment	X	
Equipment and spill kit cabinets	X	
Air pallets	X	
Container pallets	X	X
Communication equipment	X	X
Access barriers and chains	X	X

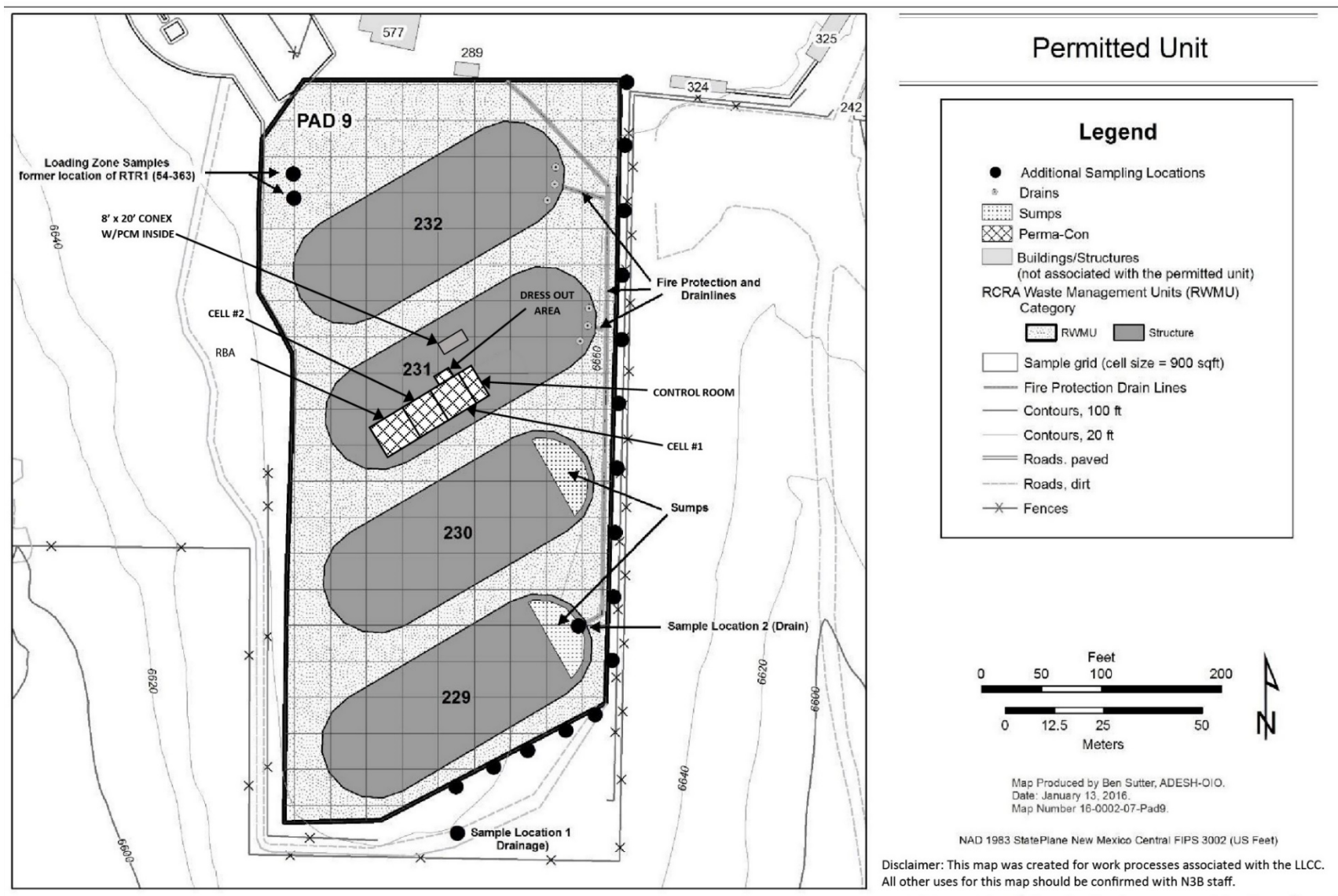


Figure G.10-1: Technical Area G, Pad 9 Outdoor Container Storage/Treatment Unit Grid Sampling and Additional Sampling Locations

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

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FIGURE NO.	TITLE
G.11-1	Technical Area 54, Area G, Pad 10 Outdoor Container Storage Unit Sampling Grid and Additional Sampling Locations

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 transporters and metal boxes also occurs on the permitted unit. Two non-intrusive transuranic waste characterization structures, TA-54-0497, Real-Time Radiography (RTR) system #2 (RTR2) and the TA-54-0506 MCS High Efficiency Neutron Counter (MCS HENC) were removed from TA-54 Pad 10 in 2016. The waste characterization performed in these two waste containers did not involve opening waste containers. The current hazardous waste storage activities at the permitted unit include the following structures:

TA-54-0498, 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.

TA-54-0547, Super High Efficiency Neutron Coincidence (SuperHENC) counter - Trailer TA-54-0547 houses a high efficiency neutron counter designed to handle large waste containers. It is designed to provide a passive neutron and gamma measurement of large transuranic waste containers like standard

waste boxes. The SuperHENC will support the Facility's Transuranic Waste Characterization Project and Central Characterization Project operations beginning in 2010.

TA-54-0545 and -0546, 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:

TA-54-0365, 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.

TA-54-0483, Source Storage Trailer - TA54-0483 serves as a storage area for calibration sources needed by the NDA systems.

TA-54-0609, Real-Time Radiography Unit

The Real-Time Radiography (RTR) Unit is mounted on a flatbed trailer 52 feet in length by 9 feet wide. Radiography is a non-destructive examination (NDE) technique used to examine waste containers. The NDE equipment in the RTR unit is designed to provide X-ray examination of the contents of TRU waste containers, including drums and standard waste boxes, to verify the physical form of the waste, and to detect items prohibited for WIPP disposal (e.g., liquids greater than 1%). The RTR unit will support the Facility's waste management and CCP operations at Pad 10.

Additional support structures, TA54-484 and two storage trailers, server as storage for supplies and equipment.

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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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 the 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 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 RTR2, the LANL HENC, the MCS HENC, the SuperHENC, 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 RTR2, the LANL HENC, the MCS HENC, the SuperHENC, 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 transporters (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 RTR2, the LANL HENC, the MCS HENC, the SuperHENC, 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, 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(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(2));
- c. eight samples along the swale between the permitted unit and Pad 9 (*see* Permit Section 9.4.7.1.ii(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(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(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

- 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.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.	10 days after completed waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.

Potential Waste Materials	Waste Types	Disposal Options
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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
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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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
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	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
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

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 Rinse Blank ^b	VOC/SVOC, metals	One sample daily	Not Applicable

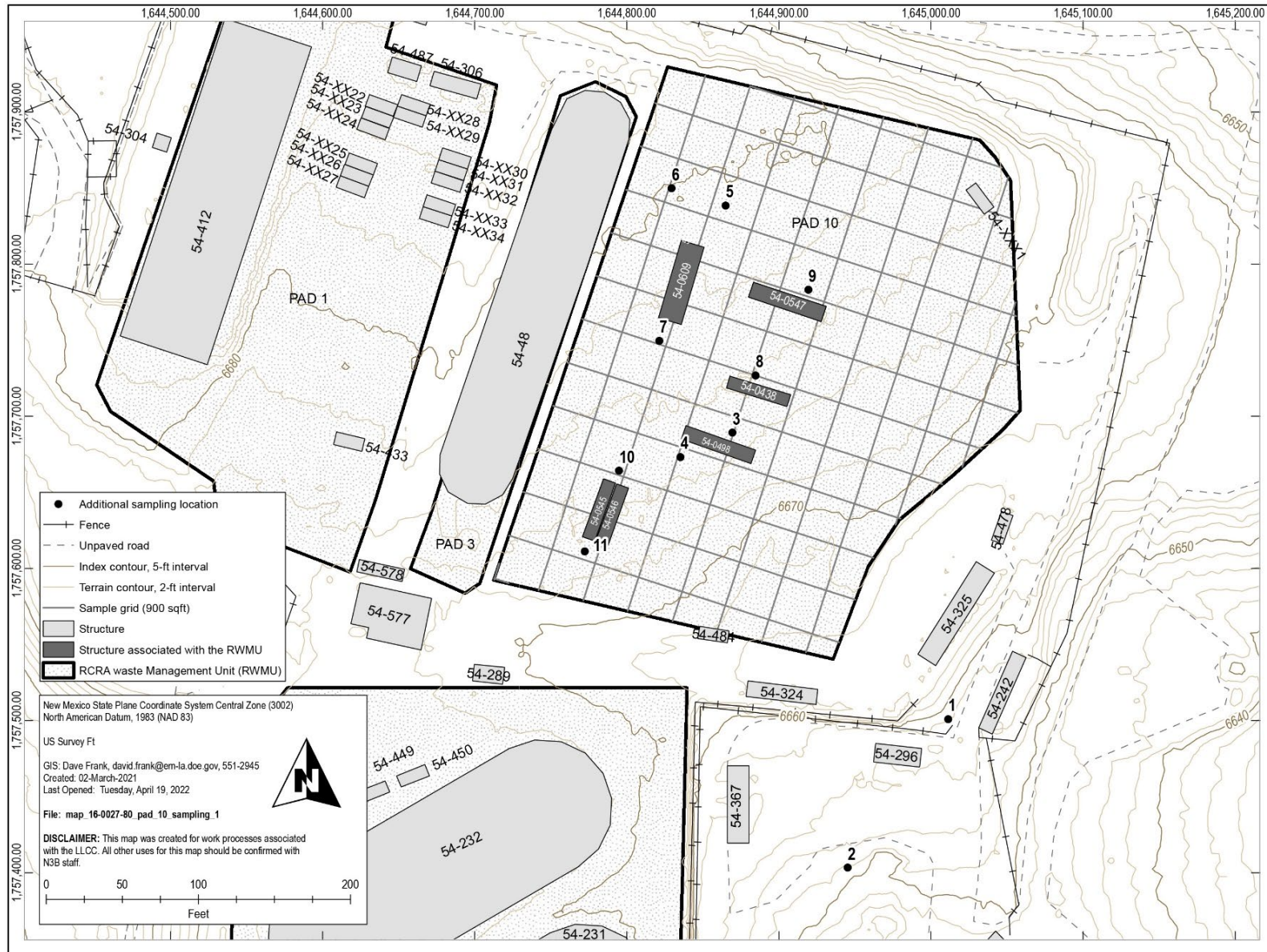
^a For VOC and SVOC analysis, if blank shows detectable levels of any common laboratory contaminant (e.g., methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all 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 trailers 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



G.11-1: Technical Area 54, Area G, Pad 10 Outdoor Container Storage Unit Sampling Grid and Additional Sampling Locations

ATTACHMENT G.12
TECHNICAL AREA 54, AREA G, PAD 11
OUTDOOR CONTAINER STORAGE AND TREATMENT UNIT
CLOSURE PLAN

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<u>FIGURE NO.</u>	<u>TITLE</u>
G.12-1	Technical Area 54, Area G, Pad 11 Outdoor Container Storage/Treatment Unit Grid Sampling and Additional Sampling Locations

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the outdoor hazardous waste container storage unit and Dome 375 Treatment Unit at Technical Area (TA)-54, Area G, Pad 11 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

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

The permitted unit, which was constructed in 1998, is located in the western portion of Area G and consists of an asphalt pad that measures 478 feet long and 137 feet wide or approximately 65,500 square feet. It consists of four inches of asphalt built over underlying base course which overlies a minimum of six inches of tuff fill. It also has a dome (Dome 375).

The permitted unit is sloped from 1% to 2% to the south/southeast for drainage and has curbing on the south and east sides as well. Drainage is directed to a series of four 5 inch-wide by 27 foot-long drains, all connected to two underground 8-inch diameter polyvinyl chloride pipes which discharge to a concrete lined ditch located near the southeast corner of the pad.

The permitted unit stores hazardous waste in both liquid and solid form in Dome 375. The dome, which is an aluminum framework of trusses covered with tension-fitted ultraviolet resistant, fire-retardant coated, polyester fabric, is 300 feet long by 100 feet wide and covers a surface area of approximately 30,000 square feet. It is anchored with anchor bolts to the interior concrete ring wall and is equipped with two double-panel rolling doors, one at the east end of the dome and the other on the west end. It also has 14 personnel doors located approximately every 31 to 57 feet along the dome's length. These doors allow for adequate access both by vehicles and by personnel. The interior perimeter of the dome is surrounded by a concrete ring wall, which helps prevent run-on into and runoff from the dome. Asphalt ramps located at the vehicle entrances allow vehicles and container handling equipment to pass safely over the curb. Dome 375 contains a PermaCon® (approximately 120 feet long x 60 feet wide) used for size reduction, decontamination, segregation, waste assay, reclassification activities, and repackaging of transuranic waste prior to shipment offsite.

Dome 375 and the PermaCon® were used for size reduction and repackaging of the corrugated metal pipes (CMPs). During the size-reduction and repackaging, one CMP at a time was removed from a flatbed truck or from storage within Dome 375 with a forklift or other lifting device. The forklift moved the CMP into Dome 375 and placed it on pipe rollers and pipe racks at the loading dock of the PermaCon®. The pipe rollers/pipe racks and a winch system were used to move the CMP into the PermaCon® via room 124. The pipe rollers/pipe racks moved the CMP through room 124 and into room 123 where a hydraulic shear and gantry cranes were used to cut the CMP into approximately 4-ft sections and then

placed the cut sections into standard waste boxes (SWBs) (see Figure 36). A containment tray was installed under the shear and under the cutting location on the CMP to collect the small amounts of debris and dust that resulted from the shearing operation. Room 121 was used to temporarily stage SWBs for shipment to permitted on-site storage where they awaited characterization prior to shipment for off-site disposal. This process was repeated for all 158 CMPs. Structure 124 C was connected to the PermaCon®. The external dimensions of the structure was approximately 20 feet long, by 8 feet wide and 8.5 feet high. 124C was a refrigeration unit, electrically driven, and is constructed of stainless steel internal and external panels. The structure 124 C was connected to the roll-up door opening for the PermaCon® with the doors facing into the PermaCon®. .

The permitted treatment process within the PermaCon® within Dome 375 was used to treat mixed transuranic waste from the S3000 (homogenous solids), S4000 (Soil/Gravel) and S5000 (Debris) waste matrices to deactivate the RCRA hazardous waste characteristics of D001, D002, and D003. Treatment occurred within the PermaCon® for 55-gallon and 85-gallon drums. The PermaCon® was equipped with high-efficiency particulate air filtration and was under negative pressure during waste processing activities. Permit Attachment A (Technical Area [TA] Unit Descriptions), Permit Attachment B (Part A Application), and Permit Attachment C (Waste Analysis Plan) include information regarding waste treatment practices and hazardous waste constituents treated at the permitted unit.

Dome 375 also contains four structures that served as an office area, a control area, and rooms for donning and doffing anti-contamination clothing. These structures were support structures and were not used to store hazardous waste. A single non-intrusive waste characterization structure, TA-54-0362, Real-Time Radiography (RTR) system #1 (RTR1) was removed from TA-54 Pad 11 in 2016.

The RTR1 design provided X-ray examination of waste drum contents without opening waste containers.

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 projected lifespan of the permitted unit is 1,501,000 gallons.

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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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, 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 the 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.12-1 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 sampling activities will be conducted to demonstrate that the 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 cannot proceed according to schedule, the Permittees will notify the Department in accordance with the extension request 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 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 waste 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 wastes 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 decontamination and sampling activities, the 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 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 inspection of the floors, walls, and ceilings of the RTR1 and the modular containment structure, as well as inspecting 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 (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 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*) 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 disposed of in accordance with Permit Section 9.4.5 and Section 7.0 of this closure plan.

The modular containment structure and the tensioned-fabric membranes on the dome structure, the aluminum beams, trusses, and ancillary equipment supporting the dome will be removed before the assessment. 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 will 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. 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 Structures and Related Equipment

All equipment and operating machinery that is not sensitive to water intrusion, such as the equipment cabinets, will be decontaminated by steam cleaning using water or pressure washing with a solution consisting of a surfactant detergent (*e.g.*, Alconox[®]) and water. Other equipment that is sensitive to water intrusion such as the portable air monitors, electronic devices and tools, and spill cleanup equipment containers in the dome, will be cleaned with a wipe-down wash with a solution consisting of a surfactant detergent (*e.g.*, Alconox[®]) and water. Table G.12-6 in this closure plan lists the equipment needing decontamination. This list will be revised during the review and assessment as necessary.

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 closure 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.12-3 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 Sampling Activities

Soil samples and decontamination verification sampling activities will be conducted at the permitted unit in order to verify that soils and equipment at the permitted 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 related to the permitted unit. In compliance with Permit Section 9.4.7.1.ii, this closure plan will ensure the collection of soil samples from the following locations:

- a. one sample at the loading zone area (*see* Permit Section 9.4.7.1.ii(1));

- b. one sample every 900 square feet of the permitted unit for a total of 80 samples (*see* Permit Section 9.4.7.1.ii(2));
- c. one sample at the discharge points (in the concrete-lined ditch) of the two 80 foot long underground pipes that collect run-off at Pad 11 for a total of four samples (*see* Permit Section 9.4.7.1.ii(4)); and
- d. one sample at all joints and intersections of the two 80 foot long underground pipes that collect run-off at Pad 11 for a total of 16 samples (*see* Permit Section 9.4.7.1.ii(7)).

Figure G.12-1 illustrates these proposed soil sampling locations.

If liquid is present in any of the drains or piping at the time of the assessment, liquid samples will be collected in accordance with Section 6.2.1 of this closure plan.

At the time of sampling, the precise locations of the grid sample will be randomly selected within each 900 square foot sampling box (*see* Figure G.12-1). 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 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 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 drains or piping at the permitted unit. Liquid sampling will be conducted 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 used to determine if residual hazardous constituents remain on surfaces, 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 or in the vicinity of 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.12-4.

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

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

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

- 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 chain-of-custody form to the Facility and it 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.12-4 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 hazardous constituents listed in 40 CFR Part 261 Appendix VIII 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.12-3. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.12-3. 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.12-5 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 constituents 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.12-5 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.12-2 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.12-2, 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.12-1

Closure Schedule for the Technical Area 54, Area G, Pad 11 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.	10 days after completed waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.12-2
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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.

Table G.12-2
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Table G.12-2
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.12-3
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.
<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

ug/L = micrograms per liter.

Table G.12-4
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

L = Liter

HNO₃ = nitric acid

mL = milliliter

HCl = hydrochloric acid

TCLP = Toxicity Characteristic Leaching Procedure

Table G.12-5
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.12-6

List of Equipment at the Technical Area 54, Area G, Pad 11 Outdoor Container Storage Unit

Equipment	Decontamination	Disposal
Waste-handling equipment (e.g., conveyance system, hydraulic shear, winch, and gantry crane)	X	X
Equipment and spill kit cabinets	X	X
Container pallets	X	X
Communication equipment	X	X
Access barriers and chains	X	X

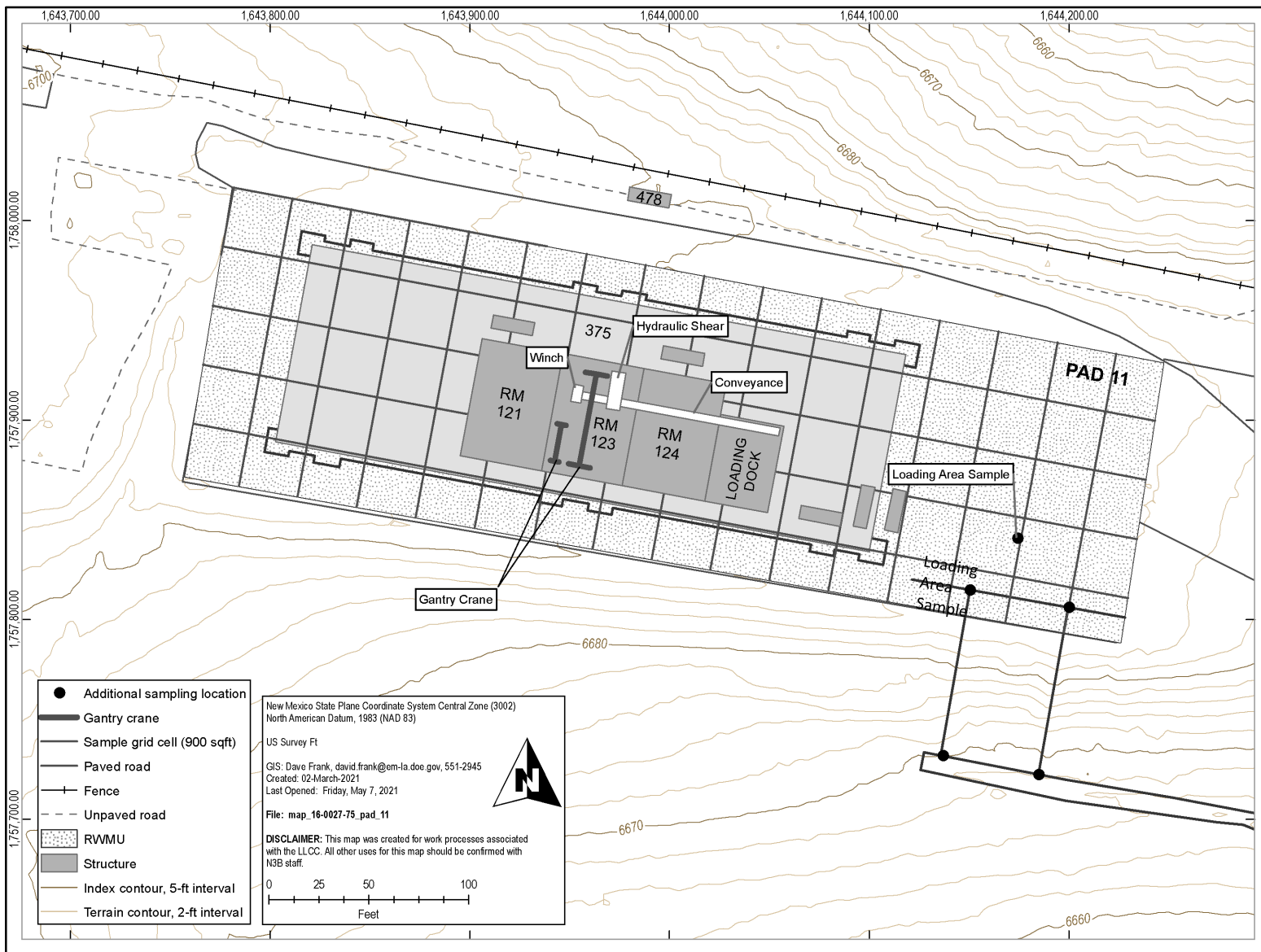


Figure G.12-1: Technical Area 54, Area G, Pad 11 Outdoor Container Storage Unit Grid Sampling and Additional Sampling Locations

ATTACHMENT G.13
TECHNICAL AREA 54, AREA G, STORAGE SHED 8
INDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

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G.13-1	Technical Area 54, Area G, Storage Shed 8, Indoor Container Storage Unit Dimension and Sump Sampling Location

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the indoor hazardous waste container storage unit called Storage Shed 8 which is located at Technical Area 54 (TA-54-8) Area G 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, 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, 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 is a steel-framed building with a concrete floor located on the north-central side of Technical Area 54, Area G which sits on a concrete supporting pad. It is rectangular-shaped and measures 40 feet (ft) by 16 ft, or approximately 640 square ft. The permitted unit is completely enclosed except for two garage-type, roll-up metal doors and a personnel door on the south wall. Along the inside perimeter of the permitted unit is a 2 inch (in)-high metal barrier on the floor along the west, north, and east walls and a rounded concrete barrier along the south wall. Centered between the two roll-up doors and 6 inches from the south wall is a sump in the floor with a wire mesh covering which measures 27.5 square inches. In the northwest inside corner of the permitted unit is a 6 in high by 6 in wide concrete barrier enclosing a rectangular area that measures 15 ft 5 in by 5 ft 11 in. This area contains a cabinet labeled "Lead-Acid Batteries for Recycle" which has batteries to be recycled as well as fire extinguishers in it.

The waste typically stored at the permitted unit includes mixed waste in solid and liquid form. The permitted unit was constructed in 1979 and has been subject to hazardous waste management regulations under RCRA since July 25, 1990. Specific hazardous waste constituents that have been stored at the permitted unit are included in Table G.13-1 of this closure plan. 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 regarding waste management procedures and hazardous waste constituents stored at the permitted unit.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

Approximately 57,000 gallons of waste has been stored in the permitted unit. Throughout the life of this Permit it is estimated that a total of 71,300 gallons of waste will be stored in 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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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 for container storage units.

Closure of the permitted unit will be deemed complete when: 1) all 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 is intended to address the 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 13-2 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 sampling activities will be conducted to demonstrate that surfaces, related equipment, and soils 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 structures and equipment associated with the permitted unit; verification that the closure performance standards in Permit Section 9.2 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. Appropriate shipping documentation will accompany the wastes during transport. Containers holding hazardous wastes 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 a structural assessment will be conducted to determine any previous finding(s) or action(s) that may influence closure activities or potential sampling locations.

5.2.1 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 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 floor and walls of the permitted unit for any existing 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 Structures and Related Equipment

In accordance with Permit Section 9.4.3, the unit's surfaces and related equipment will be decontaminated, or removed, or both and managed according to Section 7.0 of this closure plan. Decontamination activities will ensure the removal of all hazardous waste residues and hazardous constituents from the permitted unit to meet the closure performance standards.

All surfaces and related equipment that are removed and not intended for recycle will not require decontamination, will be considered solid and potentially hazardous waste when removed, and will be disposed of in accordance with Section 7.0.

5.3.1 Removal of Structures and Related Equipment

The metal walls and the metal roof will be removed before the structural assessment. The materials making up the concrete floor, the sump, the concrete supporting pad, as well as any materials associated with the concrete pad (*e.g.*, asphalt, curbing, base course) will be removed after the structural assessment.

5.3.2 Decontamination of Surfaces, Structures, and Related Equipment

At this time, there is no equipment located at the permitted unit that is expected to be left in place; however, if equipment is identified during the assessment that is expected to be left in place, it will be decontaminated.

5.4 Equipment Used During Decontamination Activities

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

6.0 SAMPLING AND ANALYSIS PLAN

This sampling and analysis plan addresses the specific closure sampling and analysis requirements in Permit Section 9.4.7 and describes the sampling, analysis, and quality assurance/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 Sampling Activities

Soil sampling and decontamination verification sampling activities will be conducted at the permitted unit in order to verify that surfaces, related equipment and soils 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.

If there is liquid found in the sump at the time of the assessment at least one liquid sample will be collected in accordance with Section 6.2.1 of this closure plan.

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

- a. immediately off the concrete pad in front of each roll-up door (*see* Permit Section 9.4.7.1.ii(1));
- b. every 900 square feet beneath the permitted unit after it, and the concrete pad, are removed (*see* Permit Section 9.4.7.1.ii(2)); and
- c. one sample directly beneath the location of where the sump was located (*see* Permit Section 9.4.7.1.ii(5)).

These sample locations are illustrated in Figures G.13-1 and G.13-2.

6.2 Sample Collection Procedures

Samples will be collected in accordance with Permit Section 9.4.7.1 and the procedures identified in this sampling and analysis plan which incorporates guidance from the United States Environmental Protection Agency (USEPA) (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 sump 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 surfaces and related 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.10-5.

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. Residue, disposable decontamination equipment, and reusable decontamination equipment that cannot be decontaminated will be containerized and managed appropriately at an approved on-site facility.

6.3 Sample Management Procedures

The following sections provide a description of sample documentation, handling, preservation, storage, packaging, and transportation requirements that will be followed during the sampling activities associated with 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 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 will 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 chain-of-custody form to the Facility and it will become part of the permanent sampling record documenting the sampling efforts.

6.3.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- a. 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 and 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.13-5 presents the requirements in *SW-846* (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE Orders, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate Facility documents establish the requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, wastes, 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 the packaging and transportation 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.13-4. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.13-4. 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 7.4.2. The analytical laboratory will have:

- a. a documented comprehensive QA/QC program;
- b. technical analytical expertise;
- c. a document control/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.13-4 is 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 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. QA/QC samples will be collected in accordance with the most recent and appropriate Facility sampling plan incorporating guidance from the EPA (EPA, 2002), DOE (DOE, 1995), or other Department-approved procedures.

6.4.2.1 Field Quality Control

The field QC samples that will be collected include trip blanks, field blanks, field duplicates, and equipment rinsate blanks. Table G.13-6 presents a summary of QC sample types, applicable analyses, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample.

6.4.2.2 Analytical Laboratory 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, which are listed with potential disposal options in Table G.13-3 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.13-3, 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, DC.
- LANL, 2003a. "Los Alamos National Laboratory General Part B Permit Renewal Application, Revision 2.0" LA-UR-03-5923, 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.

Table G.13-1

**Hazardous Waste Constituents of Concern at the Technical Area 54, Area G, Storage Shed 8,
Indoor Container Storage Unit**

Category	EPA Hazardous Waste Numbers	Specific Constituents ^a
Toxic Metals	D008	Lead
Volatile Organic Compounds	F001	Trichloroethylene

^a Based on the permitted unit's Operating Record

Table G.13-2
Closure Schedule for the Technical Area 54, Area G, Storage Shed 8, Indoor 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.	10 days after waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.13-3

Potential Waste Materials, Waste Types, and Disposal Options

Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Table G.13-3

Waste Materials, Waste Types, and Disposal Options

Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded concrete	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	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.
Sampling equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.13-3
Waste Materials, Waste Types, and Disposal Options

Waste Materials	Waste Types	Disposal Options
	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.

Table G.13-4
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method ^a	Test Methods/ Instrumentation	Target Detection Limit ^b	Rationale
<i>Metal Analysis</i>				
Lead	7420 ^d , 7421 ^c	FLAA, GFAA	5 ug/L	Determine the metal concentration in the samples.
<i>Organic Analysis</i>				
Target compound list VOCs plus ten tentatively identified compounds (TIC)	8260B	GC/MS	10 mg/L	Determine the VOCs concentration in the samples.

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

^b Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.

^c Method being integrated into Method 7010, per the May 1998 *SW-846* Draft Update IVA.

^d Method being integrated into Method 7000B, per the May 1998 *SW-846* Draft Update IVA.

FLAA = Flame atomic absorption spectroscopy

GC/MS = Gas chromatography/mass spectrometry

GFAA = Graphite furnace atomic absorption spectroscopy

mg/L = milligrams per liter

ug/L = micrograms per liter.

Table G.13-5
Sample Containers^a, Preservation Techniques, and Holding Times^b

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

^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

mL = milliliter

TCLP = Toxicity Characteristic Leaching Procedure

Table G.13-6

Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Type	Sample	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, 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, metals	One sample daily	Not Applicable

^a For VOC analysis, if blank shows detectable levels of any common laboratory contaminant (*e.g.*, methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

^b Collected only if reusable sampling equipment used

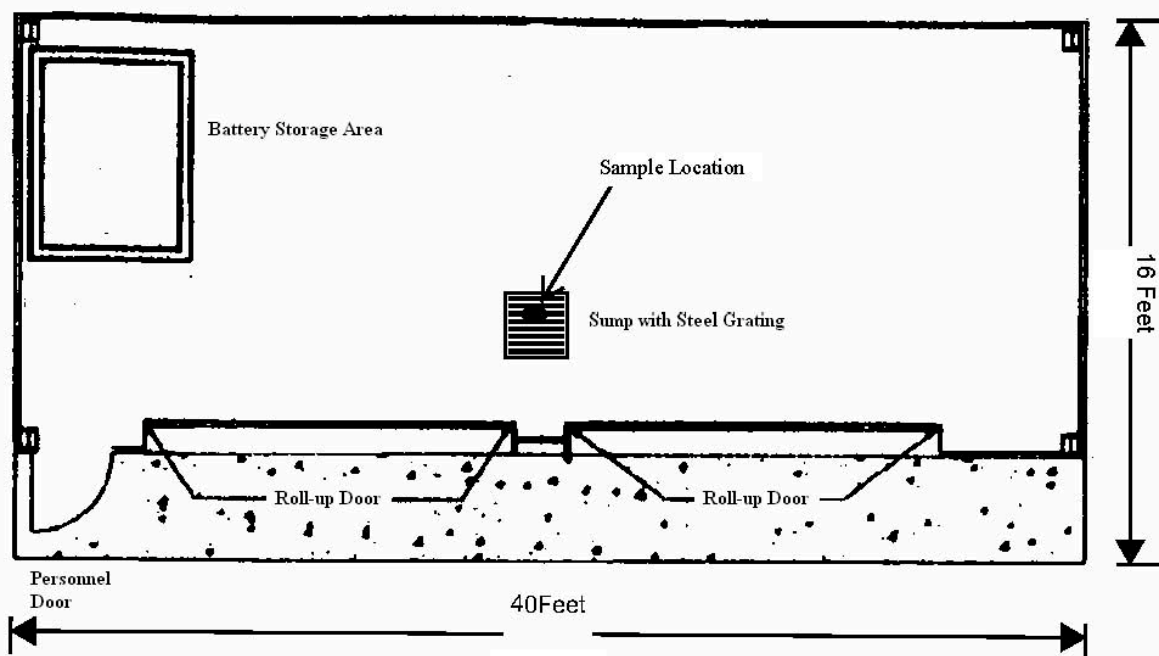


Figure G.13-1: Technical Area 54, Area G, Storage Shed 8, Indoor Container Storage Unit Dimension and Sump Sampling Location

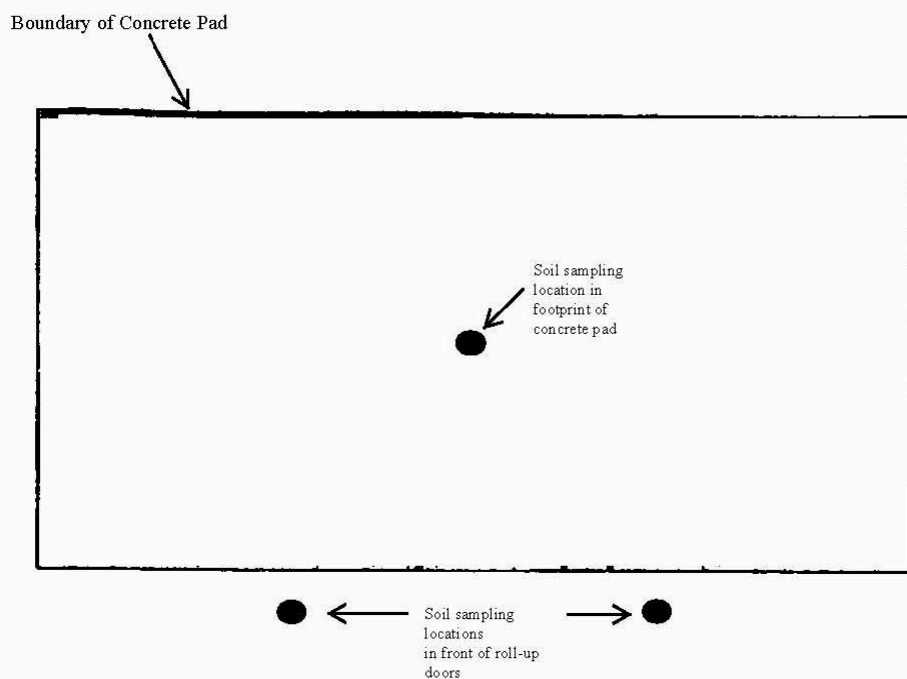


Figure G.13-2: Technical Area 54, Area G, Storage Shed 8, Indoor Container Storage Unit Soil Sampling Locations

ATTACHMENT G.14
TECHNICAL AREA 54, AREA G, BUILDING 33
INDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

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<u>FIGURE NO.</u>	<u>TITLE</u>
G.14-1	Technical Area 54, Area G, Building 33, Indoor Container Storage Unit Grid Sampling and Additional Sampling Locations

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the indoor hazardous waste container storage unit at Technical Area (TA)-54, Area G, Building 33 (Drum Preparation Facility) 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 a specific unit, this closure plan may be amended in accordance with Permit Section 9.4.8 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 located in the north-central portion of Area G, consists of a storage dome with an attached concrete-block building (Building 33) both of which are situated on an eight inch thick concrete pad surrounded on the south central portion by an asphalt apron. The concrete pad overlies six inches of base course. The permitted unit is used for waste storage and preparation activities for transuranic and mixed transuranic waste destined for shipment to the Waste Isolation Pilot Plant for disposal.

The dome, which is 157 feet (ft) long and 50 ft wide, with a peak height of 24 ft, is built of an aluminum framework of trusses covered with tension-fitted ultraviolet resistant, fire-retardant coated, polyester fabric. The dome's aluminum frame is directly connected to Building 33, which extends approximately five ft into the dome. The concrete-block building attached to the dome is approximately 40 ft long and 34 ft wide. Two personnel doors are located in Building 33; one on the west side and one on the east side. Two overhead doors are located on the north side of the building to allow free movement of personnel and container-handling equipment between the building and the dome. The area of the dome and the building totals approximately 8,570 square ft.

The interior perimeter of the dome is surrounded with a 6-inch-high, 8-inch-wide concrete curb to prevent run-on and runoff. The concrete pad in the dome is also sloped to a 6-inch-wide centralized concrete drainage trench that is covered with 12-inch-wide steel grating. The trench slopes toward a steel sump located at the east end of the dome. The rooms in the attached building contain drains that are connected to this main drainage system. Two additional trenches located in the two storage rooms in Building 33 are perpendicular to, and drain into, the main trench. The concrete floors of these rooms also slope inward to prevent runoff.

The central drainage trench in the dome connects to a sump in the eastern end of the dome. The steel sump is located within a concrete basin and is approximately 14 ft long by 6.5 ft wide by 5 ft deep with a capacity of 3,473 gallons. A primary holding tank, associated with the sump, is located in a concrete basin that is 15 ft long by 12 ft wide by 5.5 ft deep and has a capacity of approximately 7,405 gallons. A secondary holding tank associated with the sump is located in a separate concrete basin that is 12 ft long by 12 ft wide by 5.5 ft deep and has a capacity of approximately 5,924 gallons. The basins are designed to contain any spills or leaks resulting from potential overflow or breach of the holding tanks.

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 regarding waste management procedures and hazardous waste constituents stored at the permitted unit.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

Approximately 515,550 gallons of waste has been stored in the permitted unit. Throughout the life of this Permit it is estimated that a total of 649,500 gallons of waste will be stored in 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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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 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 is intended to address the 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.14-1 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 a modified closure plan, if applicable, the Permittees will decontaminate unit surfaces and related equipment.

Soil sampling and decontamination verification sampling activities 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 cannot proceed according to schedule, the Permittees will notify the Department in accordance with the extension request 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 structures and equipment associated with the permitted unit; verification that the closure performance standards in Permit Section 9.2 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 be prepared for the wastes during transport. Containers holding hazardous wastes 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 previous finding(s) or action(s) that may influence closure activities or potential 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 inspecting the floor and walls of the concrete-block room as well as the floor in the dome 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 (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 surfaces 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 surfaces 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 related equipment will be removed before the assessment: the dome; the aluminum beams, trusses, and ancillary equipment supporting the dome; and the walls and metal roof of the attached concrete-block building. The following structures and related equipment will be removed after the structural assessment: the concrete pad; any materials associated with the concrete pad (*e.g.*, concrete ringwall, sump structures, asphalt, curbing, base course, soil underlying pad); the floor of the attached building; and any surrounding asphalt.

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. 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 Surfaces, Structures, and Related Equipment

All surfaces and related equipment that will be reused by the Facility will be decontaminated in accordance with Permit Section 9.4.3.1. Decontamination of the permitted unit's surfaces will include all features located within the unit. This includes: the tanks; the equipment cabinets; the drum venting equipment; the portable air monitors; the electronic devices or tools; and spill cleanup equipment containers. The list of equipment requiring decontamination may be revised during the review and assessment which would result in an amendment to this closure plan.

Equipment and operating machinery that is not sensitive to water intrusion, such as the tanks and equipment cabinets, will be decontaminated by pressure washing or steam cleaning with a solution consisting of a surfactant detergent (*e.g.*, Alconox®) and water and mixed in accordance with the manufacturer's recommendation. All other equipment at the permitted unit that is sensitive to water intrusion (*i.e.*, drum venting equipment, portable air monitors, electronic devices or tools, 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 closure 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.14-2 and in accordance with Permit Section 9.4.5 and Section 7.0 of this closure plan.

6.0 SAMPLING AND ANALYSIS PLAN

This sampling and analysis plan addresses the specific requirements in Permit Section 9.4.7 and describes the sampling, analysis, and quality assurance/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 Sampling Activities

Soil sampling and decontamination verification sampling activities will be conducted at the permitted unit in order to verify that the soils, surfaces, 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 related to the permitted unit. In compliance with Permit Section 9.4.7.1.ii, this closure plan will ensure the collection of soil samples at the permitted unit at the following locations:

- a. one sample every 900 square feet beneath the permitted unit after the pad is removed for a total of eleven samples (*see* Permit Section 9.4.7.1.ii(2));
- b. five soil samples to address stormwater runoff (*see* Permit Section 9.4.7.1.ii(3)):
 - i. one from the northwest end of the permitted unit identified as ‘sample location 1’;
 - ii. one from the north end of the permitted unit identified as ‘sample location 2’;
 - iii. one from the southeast end of the permitted unit identified as ‘sample location 3’; and
- c. two from each of the areas immediately off the concrete in front of each roll-up door identified as ‘sample location 4’ and ‘sample location 5’ (*see* Permit Section 9.4.7.1.ii(1));
- d. one sample at each of the drainage points in the concrete-block building for a total of four samples (*see* Permit Section 9.4.7.1.ii(5));
- e. one sample beneath the sump at the southeast end of the permitted unit (*see* Permit Section 9.4.7.1.ii(5));
- f. one sample at all joints and intersections of the underground drainage system (*see* Permit Section 9.4.7.1.ii(7)); and
- g. one sample every 30 ft beneath the axis of the trench that runs the length of the dome for a total of five samples (*see* Permit Section 9.4.7.1.ii(8)).

A total of 24 samples will be collected from soils beneath the permitted unit as illustrated in Figure G.14-1.

If there is liquid found in the trench drains or the dome sump at the time of the assessment, liquid samples will be collected in accordance with Section 6.2.1 of this closure plan.

At the time of sampling, the precise location of the grid samples will be randomly selected within each 900 square foot sampling box (*see* Figure G.14-1). 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 eleven samples taken from the soils beneath the permitted unit. If the review or assessment determines the need to obtain additional samples within the area of the sampling box (*e.g.*, at concrete or asphalt cracks), these sample locations will be in addition to the grid sampling locations.

6.2 Sample Collection Procedures

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

6.2.1 Liquid Sampling

Liquids will be collected and analyzed to determine if residual hazardous constituents remain in the drain lines or sumps 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 the surfaces or related 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 methods 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. Samples will be collected using a spade, scoop, auger, trowel, or other equipment as specified in the 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.14-4.

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

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

Chain-of-custody forms will be maintained by sampling personnel until the samples are relinquished to the analytical laboratory. This will ensure the integrity of the samples and provide for an accurate and defensible written record of the sampling possession and handling from the time of collection until laboratory analysis. One chain-of-custody form will 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 analytical laboratory will return the completed 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 and 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.14-4 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.14-3. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.14-3. 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 Permit Section 7.5.2. The analytical laboratory will have:

- a. a documented comprehensive QA/ QC program;
- b. technical analytical expertise;
- c. a document control/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.14-3 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).

6.4.1.1 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.

6.4.1.2 Field Quality Control

The field QC samples that will be collected include trip blanks, field blanks, field duplicates, and equipment rinsate blanks. Table G.14-5 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.

6.4.1.3 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.

6.4.2 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.

6.4.3 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.14-2 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.14-2, will be containerized and managed as waste.

8.0 CLOSURE CERTIFICATION REPORT

Upon completion of the closure activities at the permitted unit, a final 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.14-1

Closure Schedule for the Technical Area 54, Area G, Building 33, Indoor 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.	10 days after completed waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.14-2
Potential Waste Materials, Waste Types, and Disposal Options

Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.

Waste Materials	Waste Types	Disposal Options
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.14-3
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.
<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

ug/L = micrograms per liter

Table G.14-4
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 preparative extraction. 40 days from preparative extraction to determinative analysis.
	Solid Media: 250-mL Glass	Solid Media: Cool to 4°C	

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

^b Information obtained from “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” SW-846, 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.14-5

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.14-6

List of Equipment at the Technical Area 54, Area G, Building 33 Indoor Container Storage Unit

Equipment	Decontamination	Disposal
Drum venting and associated equipment	X	X
Electrical infrastructure	X	X
Equipment and spill kit cabinets	X	X
Container pallets	X	X
Communication equipment	X	X
Access barriers and chains	X	X

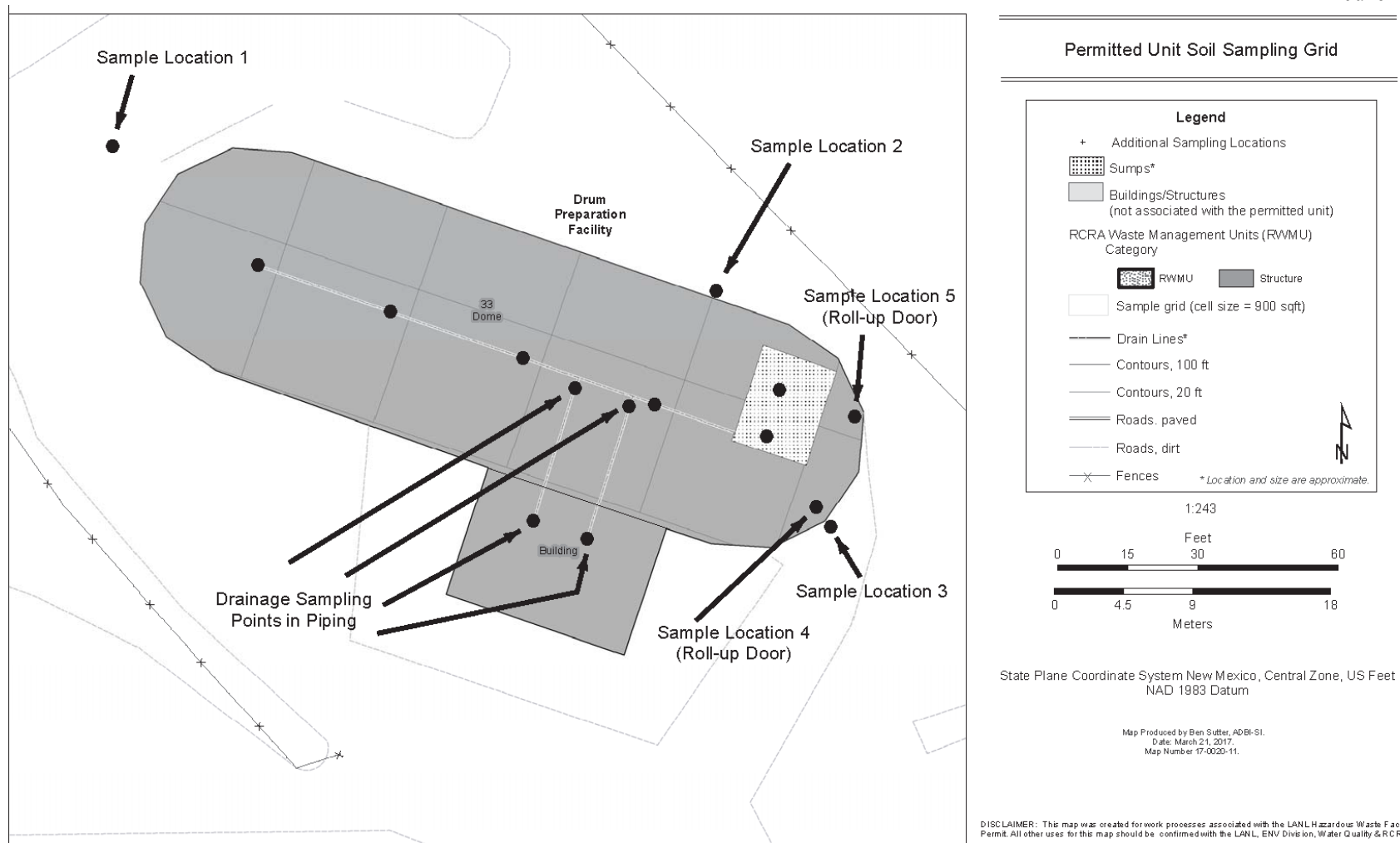


Figure G.14-1: Technical Area 54, Area G, Building 33, Indoor Container Storage Unit Grid Sampling and Additional Sampling Locations

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

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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 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 (ft²) 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); 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 ft². 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, decommissioned in March 2010, was 33 ft wide by 120 ft long with an area of approximately 3,960 ft². The canopy consisted of a rigid aluminum frame anchored to a sloped asphalt pad which supported a tensioned membrane. All waste containers that were stored in Canopy 216, including gas cylinders, were stored on pallets or were otherwise elevated (*e.g.*, metal supports, wooden

timbers, baskets) to prevent contact with accumulated liquids. All liquid wastes were 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 ft². 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 ft². 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 ft². 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 ft². 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 Perma-Con®, once located on the pad, was removed and disposed. 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 ft². 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 ft². 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 ft² 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 Standards

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; and
- 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 clean-up levels shall be established based on residential use. The Permittees must also demonstrate that there is no potential to contaminate groundwater.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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 the 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 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, where Canopy 216 was located, 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; 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 Sampling Activities

Soil sampling and decontamination verification 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, 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(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(2));
- c. one sample to address stormwater runoff identified as ‘sample location 1’ (*see* Permit Section 9.4.7.1.ii(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(4));

- e. one sample at the sump located in Dome 215 (*see* Permit Section 9.4.7.1.ii(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(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 the assessment, 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.	10 days after completed waste removal or 100 days after final receipt of waste
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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.

Potential Waste Materials	Waste Types	Disposal Options
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
<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

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

HNO₃ = 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	



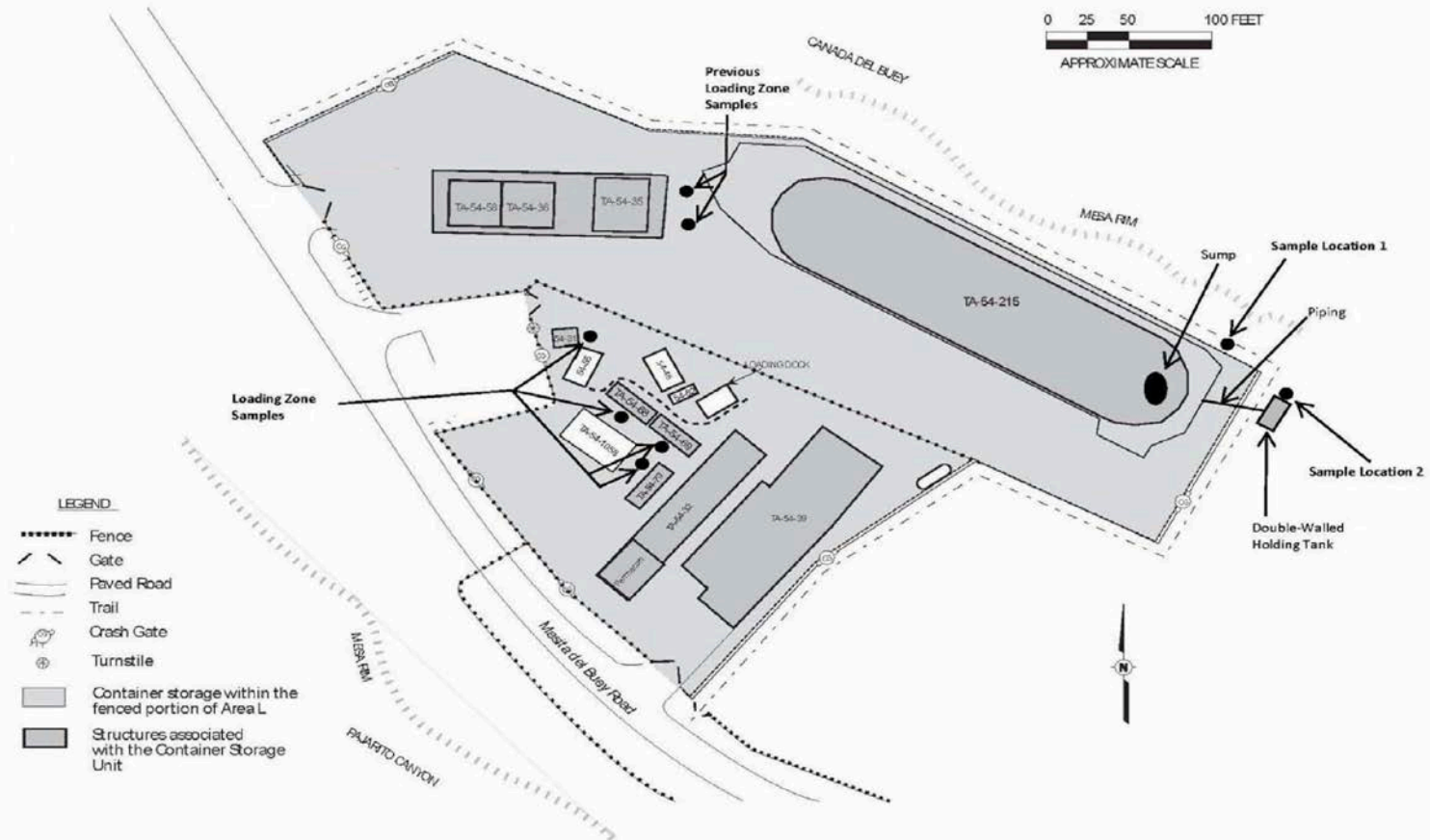


Figure G.15-2: Technical Area 54, Area L, Outdoor Container Storage Unit Additional Soil Sampling Locations

ATTACHMENT G.16
TECHNICAL AREA 54 WEST, BUILDING 38
INDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

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G.16-1	Technical Area 54, Building 38 (High Bay and Low Bay Sampling Locations)

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the indoor hazardous waste container storage unit that is comprised of the High Bay and Low Bay rooms located at Technical Area 54 West, Building 38 (TA-54-38) 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, 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, 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 is comprised of the entire High Bay (Room 101) and the entire Low Bay (Room 102). Access between the two bays is provided through a 2.4 meter (m) wide by 3.8 m high roll-up door.

The High Bay has been used to store fiberglass-reinforced plywood boxes, standard waste boxes (SWBs), B25 boxes, and drums of various sizes, is 40 feet (ft) wide and 80 ft long. It is equipped with a 5-ton capacity bridge crane system and back-up crane, a truck-axle weighing scale, loading platforms, and TRUPACT-II and HalfPACT lid stands. The floor is a 6-inch, reinforced, epoxy-coated, concrete slab which gently slopes toward a central 50-ft trench and a sump. The sump is locked out and a pipe plug has been installed. The floor has a grated drain (approximately five (5) inches (in.) wide by 57 ft long) that runs down the center of the bay which collects melting snow and water from the trucks that enter the bay. The permitted container storage area within the High Bay is used as a transuranic (TRU) waste payload-container assembly area and TRUPACT-II/HalfPACT shipper-container loading area. Its primary function is the preparation of waste packages for transport to the Waste Isolation Pilot Plant (WIPP). The TRU waste packaged in the High Bay is predominantly radioactive, but can include mixed waste.

The Low Bay, where waste drums of various sizes are stored, is 40 ft long by 34 ft wide; it was once used for staging hazardous solid and liquid waste while nondestructive radioassay waste characterization activities were performed. The floor is a 6-inch reinforced concrete slab coated with industrial grade enamel paint.

The permitted unit began hazardous waste operations in 1995 when testing of radioassay equipment occurred. Shipments of waste packages from the facility to the WIPP began in 1999. The building was constructed in 1989 and 1990. Specific hazardous waste constituents stored at the permitted unit are included in Tables G.16-1 and G.16-2.

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.

2.1 Water Collection System

The permitted unit has a fire water collection system that collects water from TA-54-38. The system was designed to collect firefighting and fire suppression water releases from TA-54-38 and discharge the fire water directly to the fire water retention pond. A collection trench around the perimeter of TA-54-38 captures the fire suppression water and firefighting water released from the building, and conveys the fire water in an underground pipeline that discharges into a fire water retention pond. The pipeline is sloped to provide gravity flow.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

Approximately 612,755 gallons of waste has been stored at the permitted unit since 1995. Throughout the life of this permit, it is estimated that an additional 440,000 gallons of waste will be stored at the permitted unit. The maximum inventory of hazardous waste that will be stored at the unit at any given time is 4,950 gallons as required by Permit Attachment J (*Hazardous Waste Management Units*).

4.0 GENERAL CLOSURE INFORMATION

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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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 for container storage units.

Closure of the permitted unit will be deemed complete when: 1) all 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 the 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 explains the schedule of closure activities (*see also* Table G.16-3 of 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 conduct 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.

Decontamination verification sampling activities, and soil sampling if applicable, will be conducted to demonstrate that surfaces, related equipment, and media, if applicable, 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 hazardous 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 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 surfaces and equipment associated with the permitted unit; verification that the closure performance standards in Permit Section 9.2 have been achieved; and submittal of a final closure certification report. The following sections describe the 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 flatbed trucks, trailers, or other appropriate vehicles for transport. Appropriate shipping documentation will accompany the wastes

during transport. Containers holding hazardous wastes 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 previous finding(s) or action(s) that may influence closure activities or potential 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. 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 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 and walls of the permitted unit 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 (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 Structures and Related Equipment

In accordance with Permit Section 9.4.3, the unit's surfaces and related equipment will be decontaminated, or removed, or both and managed appropriately. Decontamination activities will ensure the removal of all hazardous waste residues and hazardous waste constituents from the permitted unit to meet the closure performance standards.

All surfaces and related equipment that are removed and not intended for recycle will not require decontamination, will be considered solid and potentially hazardous waste when removed, and will be disposed of in accordance with Section 7.0.

5.3.1 Removal of Structures and Related Equipment

At this time, there is no equipment identified for removal from the unit; however, if equipment is identified during the assessment it will be decontaminated, removed, and disposed of in accordance with the appropriate sections of this closure plan.

5.3.2 Decontamination of Structures and Related Equipment

Decontamination of the permitted unit's surfaces and equipment will include all features located within the unit (*e.g.*, drain grates, ladders). The following equipment located at the permitted unit is expected to be left in place and therefore decontaminated: the man lift; the lid stands; the drum wrapper; the portion of the bridge cranes that comes into contact with waste containers; and the floor scales.

The permitted unit's floors and walls (up to 11 ft) will be decontaminated. Decontamination of the permitted unit will be conducted by first removing loose material (*e.g.*, dust, dirt) through sweeping followed by pressure washing or steam cleaning with a solution consisting of a surfactant detergent (*e.g.*, Alconox®) and water mixed in accordance with the manufacturer's recommendations.

Ceilings of the permitted unit, walls above 11 ft, and the areas outside of the permitted unit will be presumed to be free of contamination unless there is some physical indication of contamination (*e.g.*, staining), the records review reveals that large amounts of liquid volatile or semi-volatile organic hazardous waste was stored in the permitted unit, or a spill or release occurred within the permitted unit that could have affected the ceiling or the walls above 11 ft.

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 floor drain in the High Bay will be plugged before decontamination activities begin to ensure that none of the wash water solution enters the drain located on the floor.

5.4 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during closure decontamination activities will be cleaned with a wash water solution. Residue, disposable equipment, and small reusable equipment that cannot be decontaminated will be containerized and managed as waste as summarized in Table G.16-4 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 requirements in Permit Section 9.4.7 and describes the sampling, analysis, and quality assurance/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 Decontamination Verification Sampling Activities

Decontamination verification sampling activities, and soil sampling if applicable, will be conducted at the permitted unit in order to verify that surfaces 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:

- a. nine wipe samples from the High Bay (*see* Figure G.16-1):

1. four from the floor;
 2. one from each wall; and
 3. one from the sump;
- b. six wipe samples from the Low Bay (*see* Figure G.16-1):
1. two from the floor; and
 2. one from each wall
- c. The captured fire suppression and firefighting water released from the building conveys in an underground pipeline that discharges into a fire water retention pond. In compliance with Permit Section 9.4.7.1.ii, this closure plan will ensure the collection of soil samples in the following location:
1. One sample at the joints and intersections of the fire water collection system piping

If liquid is found in the sump in the High Bay at the time of the assessment, liquid samples will be collected in accordance with Section 6.2.1 of this closure plan.

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit.

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, 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 drain at the permitted unit. Liquid samples will be collected using glass or plastic tubes, a composite liquid sampler, a bacon bomb, a bailer, or by pouring liquid in sample containers.

6.2.2 Wipe Sampling

Surface wipe samples will be collected and analyzed to determine if residual hazardous constituents remain on the surfaces and related 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 Solid Chip Sampling

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit. Any non-porous inclusions from the sampling location will be removed by brushing or wiping. Using a chisel, drill, hole saw, or similar tool, a minimum 100 grams of the sample will be collected to a depth of 2 cm, or to an alternate depth specified in the assessment and transferred to an appropriate sampling container. The holding time and the preservation techniques to be used for each analysis will be determined from Table G.16-5.

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

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

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

- 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 analytical laboratory will return the completed original chain-of-custody form to the Facility and it will become part of the permanent sampling record documenting the sampling efforts.

6.3.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- a. 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.16-5 presents the requirements in SW-846 (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE Orders, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate Facility documents establish the requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, wastes, 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 the packaging and transportation organization to independently tender shipments to common motor or air carriers.

6.4 Sample Analysis Requirements

Samples will be analyzed for all hazardous constituents listed in 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 (*see* Tables G.16-1 and G.16-2). Tables G.16-1 and G.16-2 will be modified, as necessary, to incorporate changes as a result of the permitted unit's records review. Samples will be analyzed by an independent laboratory using the methods outlined in Table G.16-6. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.16-6. 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/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.16-6 is based on the following considerations:

- e. the capability to perform data reduction, validation, and reporting;
- f. the physical form of the waste;
- g. constituents of concern;
- h. required detection limits (*e.g.*, regulatory thresholds); and
- i. 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.16-7 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 and 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 sample preparations that occur during 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.16-4 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.16-4, 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.

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

Table G.16-1

Hazardous Waste Constituents of Concern at the Technical Area 54, Building 38 High Bay^a

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Metals	D003, D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
Organic Compounds	D018, D019, D021, D022, D028, D035, D038, D039, D040, D043 F001, F002, F003, F004, F005, U080	Benzene, Carbon Tetrachloride, Chlorobenzene, Chloroform, 1,2 – Dichloroethane, Methyl ethyl ketone, Pyridine, Tetrachloroethylene, Vinyl Chloride Tetrachloroethylene, Trichloroethylene, Methylene Chloride, 1,1,1-trichloroethane, Chlorinated Fluorocarbons, Trichloroethylene, 1,1,2- Trichloro-1,1,2-Trifluoroethane, Ortho-dichlorobenzene, Trichlorofluoromethane, 1,1,2-Trichloroethane, Xylene, Acetone, Ethyl acetate, Ethyl benzene, Ethyl ether, Methyl Isobutyl Ketone, n-Butyl alcohol, Cyclohexanone, Methanol, Cresols, Cresylic acid, Nitrobenzene, Toluene, Carbon disulfide, Isobutanol, Benzene, 2-Ethoxyethanol, 2-Nitropropane, Dichloromethane

^a Based on the permitted unit's Operating Record

Table G.16-2

Hazardous Waste Constituents of Concern at the Technical Area 54, Building 38 Low Bay^a

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Metals	D003, D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
Organic Compounds	D018, D019, D021, D022, D028, D035, D038, D039, D040, D043 F001, F002, F003, F004, F005, U080	Benzene, Carbon Tetrachloride, Chlorobenzene, Chloroform, 1,2 – Dichloroethane, Methyl ethyl ketone, Pyridine, Tetrachloroethylene, Vinyl Chloride Tetrachloroethylene, Trichloroethylene, Methylene Chloride, 1,1,1-trichloroethane, Chlorinated Fluorocarbons, Trichloroethylene, 1,1,2- Trichloro-1,1,2-Trifluoroethane, Ortho-dichlorobenzene, Trichlorofluoromethane, 1,1,2-Trichloroethane, Xylene, Acetone, Ethyl acetate, Ethyl benzene, Ethyl ether, Methyl Isobutyl Ketone, n-Butyl alcohol, Cyclohexanone, Methanol, Cresols, Cresylic acid, Nitrobenzene, Toluene, Carbon disulfide, Isobutanol, Benzene, 2-Ethoxyethanol, 2-Nitropropane, Dichloromethane

^a Based on the permitted unit's Operating Record.

Table G.16-3
Closure Schedule for the TA-54 West, Building 38, Indoor 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.	10 days after waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.16-4
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste

Figure G.16-4 (cont.)

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
		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.
Discarded concrete	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	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.
Sampling equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Figure G.16-4 (cont.)

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	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.

Table G.16-5
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP/Total Metals: 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	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide Mouth- Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO ₃ to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon- Lined Septa	Solid Media Cool to 4 °C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	

<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

HCl = hydrochloric acid

mL = milliliter

HNO₃ = nitric acid

L = Liter

TCLP = Toxicity Characteristic Leaching Procedure

Table G.16-6
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method ^a	Test Methods/ Instrumentation	Target Detection Limit ^b	Rationale
<i>Metal Analysis</i>				
Arsenic	7060A ^c , 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A ^d , 7081 ^c	FLAA, GFAA	200 ug/L	
Cadmium	7130 ^d , 7131A ^c	FLAA, GFAA	2 ug/L	
Chromium	7190 ^d , 7191 ^c	FLAA, GFAA	10 ug/L	
Lead	7420 ^d , 7421 ^c	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A ^e	CVAA	0.2 ug/L	
Selenium	7740 ^e , 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A ^d , 7761 ^c	FLAA, GFAA	10 ug/L	
<i>Organic Analysis</i>				
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 ^c	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.

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

^b Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.

^c Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.

^d Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.

^e Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy; GFAA = Graphite furnace atomic absorption spectroscopy
FLAA = Flame atomic absorption spectroscopy; GC/MS = Gas chromatography/mass spectrometry;
mg/L = milligrams per liter; ug/L = micrograms per liter

Table G.16-7

Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis ^a	Frequency	Acceptance Criteria
Trip Blank	VOC	One set per shipping cooler containing samples to be analyzed for VOCs	Not Applicable
Field Blank	VOC/SVOC, metals	One sample daily per analysis	Not Applicable
Field Duplicate	Chemical	One for each sampling sequence	Relative percent difference less than or equal to 20 percent
Equipment Rinsate Blank ^b	VOC/SVOC, metals	One sample daily	Not Applicable

^a For VOC and SVOC analysis, if blank shows detectable levels of any common laboratory contaminant (*e.g.*, methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

^b Collected only if reusable sampling equipment used.

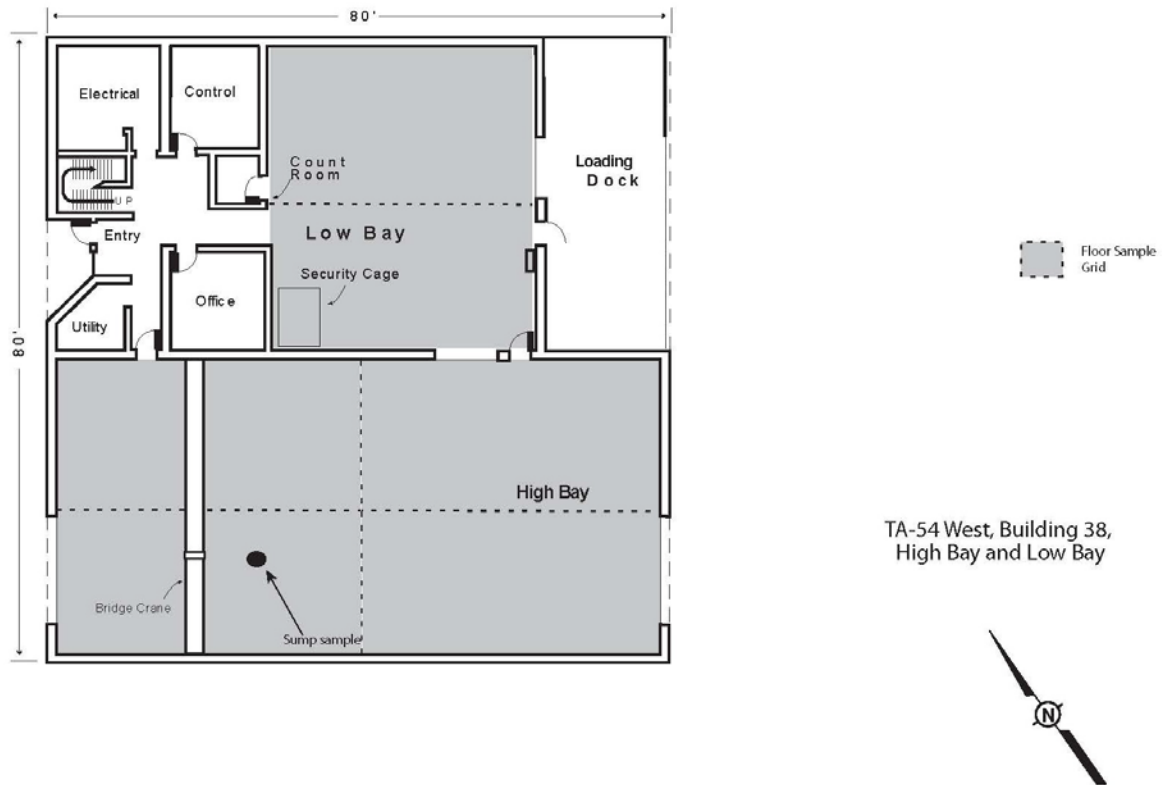


Figure G.16-1: Technical Area 54, Building 38 (High, Low Bay, and Loading Dock Sampling Locations)

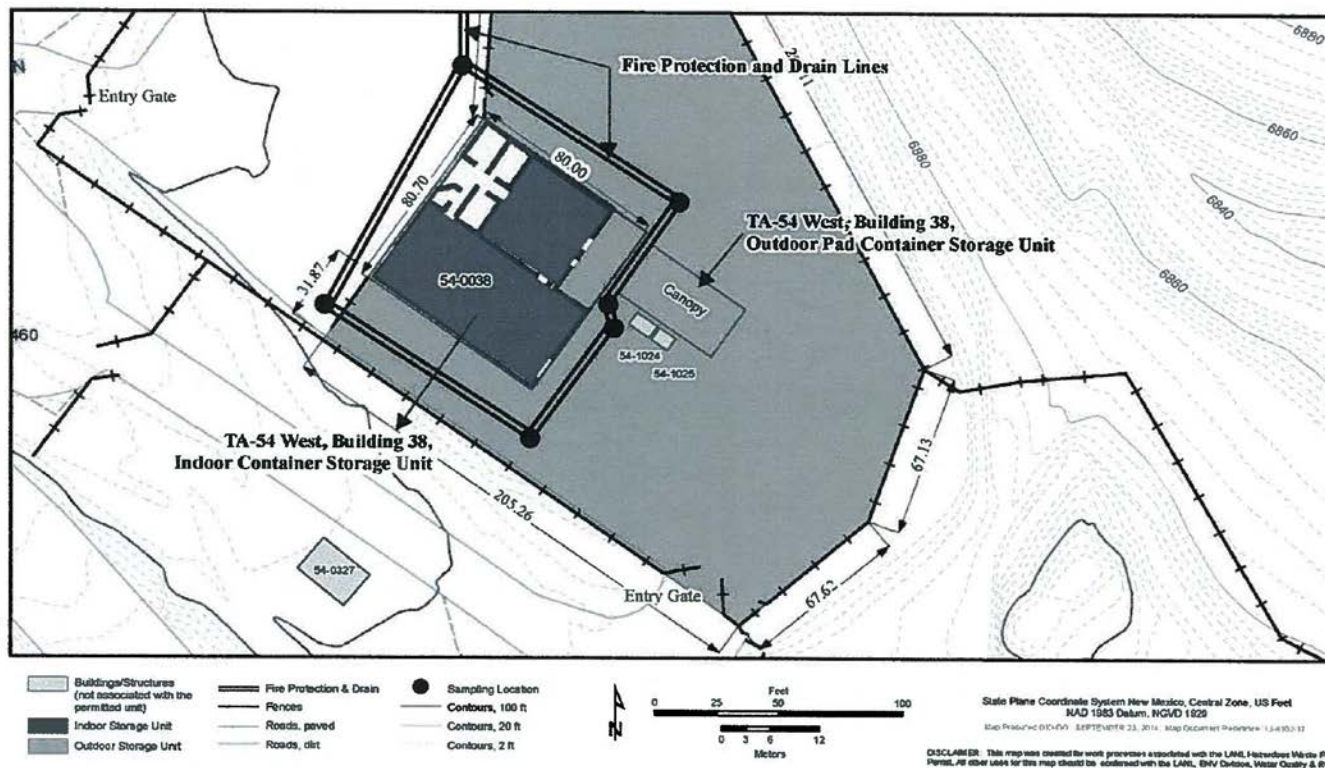


Figure G.16-2: Technical Area 54, Building 38 (High and Low Bay) Additional Sampling Locations

ATTACHMENT G.17
TECHNICAL AREA 54, WEST
OUTDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

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G.17-1	Technical Area 54 West Outdoor Container Storage Unit Grid Sampling and Additional Sampling Locations

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the outdoor hazardous waste container storage unit at Technical Area 54 West, Building 38 (TA-54-38) 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 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, 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 is located on the north and east sides of TA-54-38 and consists of an asphalt pad (which slopes toward the north and east and has a thickness of approximately four inches) and a loading dock which measures 16 ft wide by 38 ft, 10 inches long. The loading dock is constructed of six inch cast-in-place concrete, is approximately 4 inches above grade, and is covered by a metal roof awning. Small storage sheds (1024 and 1025) for supplies and equipment and not for the storage of hazardous waste, are also located on the permitted unit. The entire permitted unit measures approximately 37,900 square feet.

The slope of the asphalt pad allows for storm water to run off the pad into a one inch wide trench drain that runs along the north edge of the pad. The eastern edge of the pad consists of an asphalt swale that collects storm water and conveys it to a single discharge point at the northeast corner of the site. An asphalt berm running from the extreme northern corner of Building 38 to the drain flanks the northern side of the permitted unit and an asphalt curb flanks the southern side.

The waste typically stored at the permitted unit consists of hazardous and mixed waste in both solid and liquid form. The permitted unit was constructed in 1993, became operational in 1998, and has been subject to waste management regulations under RCRA since its construction. In 2007, the boundaries of the permitted unit were expanded to include the current configuration. The stored wastes include corrosive liquids, sludge, debris, and chemical wastes with metals and volatile and semi-volatile organic constituents.

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.

The loading dock, located just east of the low bay, is approximately 16 ft wide and 39 ft long and is constructed of cast-in-place concrete. A canopy runs perpendicular to the loading dock platform. Waste drums of various sizes are stored in the loading dock.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

To date, approximately 612,755 gallons of waste has been stored in the permitted unit. Throughout the life of this Permit it is estimated that an additional 1,870,000 gallons of waste will be stored in the permitted unit. The maximum inventory of hazardous waste that will be stored at the unit at any given time is 42,570 gallons as required by Permit Attachment J (*Hazardous Waste Management Units*).

4.0 GENERAL CLOSURE INFORMATION

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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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 the 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.17-2 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 be according to 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 at the same time as notification of closure (*see* Permit Section 9.4.6.2).

Within 90 days after the final receipt of 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, whichever comes first, 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 sampling activities will be conducted to demonstrate that soils, structures, 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 cannot proceed according to schedule, the Facility will notify the Department in accordance with the extension request 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. Appropriate shipping documentation will accompany the wastes during transport. Containers holding hazardous wastes 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 a structural assessment will

be conducted to determine any previous finding(s) or action(s) that may influence closure activities or potential sampling locations.

5.2.1 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 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 asphalt pad and the loading dock 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 (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 Structures and 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 (*see* Table G.17-3). Decontamination activities will ensure the removal of all hazardous waste residues and hazardous waste constituents from the permitted unit to meet the closure performance standards as outlined in Permit Section 9.2.

5.3.1 Removal of Structures and Related Equipment

All surfaces, 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.

At this time, there is no equipment identified for removal from the unit; however, if equipment is identified during the assessment, it will be removed and disposed of in accordance with Permit Section 9.4.3.2. The canopy, asphalt pad, the materials associated with the asphalt pad (*e.g.*, the berm around the pad), 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 (*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.*, locations of spills or stains) 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 in accordance with Permit Section 9.4.3.1. The following structures and equipment located at the permitted unit is expected to be left in place and will therefore be decontaminated: the loading dock and the metal awning.

Water-resistant structures and equipment (*i.e.*, the loading dock, the awning) at the permitted unit and not sensitive to water intrusion will be decontaminated by steam cleaning, or pressure washing, with a solution consisting of a surfactant detergent (*e.g.*, Alconox®) and water and mixed in accordance with the manufacturer's recommendation. All other equipment at the permitted unit that is sensitive to water intrusion (*e.g.*, electronic devices or tools) will be decontaminated by washing using a wipe-down method with a solution consisting of a surfactant detergent (*e.g.*, Alconox®) and water and mixed in accordance with the manufacturer's recommendation.

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 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 small reusable equipment that cannot be decontaminated will be containerized and managed as waste as summarized in Table G.17-3 and in accordance with Facility waste management procedures, depending on the regulated constituents present.

6.0 SAMPLING AND ANALYSIS PLAN

This SAP addresses the specific requirements in Permit Section 9.4.7 and describes the sampling, analysis, and quality assurance/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 at the permitted unit in order to verify that the soils beneath the permitted unit as well as the unit's surfaces and related equipment 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 related to the permitted unit (*e.g.*, the awning). In compliance with Permit Section 9.4.7.1.i, this closure plan will ensure the collection of wipe samples from the floor and walls of the loading dock for a total of four verification samples.

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

- a. one sample from a known past loading zone area ('sample location 1') identified in the permitted unit's records (*see* Permit Section 9.4.7.1.ii(1));
- b. one sample every 900 square feet of the permitted unit for a total of 46 samples (*see* Permit Section 9.4.7.1.ii(2));
- c. two samples from the swale in the eastern portion of the permitted unit (*see* Permit Section 9.4.7.1.ii(3)); and
- d. one sample every 30 feet along the drain line on the northern boundary of the permitted unit for a total of four samples (*see* Permit Section 9.4.7.1.ii(8)).

An additional two wipe samples are required from the loading dock areas identified as 'Sample Area 1' and 'Sample Area 2.' Figure G.17-1 illustrates the sampling locations discussed in this section.

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 Environmental Protection Agency (USEPA) (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 to determine if residual hazardous constituents remain on the surfaces and related 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 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 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.10-5.

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

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

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

- 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 chain-of-custody form to the Facility and it will become part of the permanent sampling record documenting the sampling efforts.

6.3.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- a. 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.17-5 presents the requirements in *SW-846* (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3.3 Packaging and Transportation of Samples

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

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

Off-site transportation of samples will occur via private, contract, or common motor carrier, air carrier, or freight. All off-site transportation will be processed through 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 hazardous constituents listed in Appendix VIII of 40 CFR Part 261 and in Appendix IX of 40 CFR Part 264 that have been managed at the permitted unit over its operational history (*see* Table G.17-1). Table G.17-1 will be modified, as necessary, to incorporate changes as a result of the permitted unit's records review. Samples will be analyzed by an independent laboratory using the methods outlined in Table G.17-4. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.17-4. 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.17-4 is based on the following considerations:

- e. constituents of concern;
- f. the physical form of the waste;
- g. constituents of concern;
- h. required detection limits (*e.g.*, regulatory thresholds); and
- i. 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.17-6 presents a summary of QC sample types, applicable analyses, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample.

6.4.2.2 Analytical Laboratory 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 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.17-3 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 small reusable equipment that cannot be decontaminated, as summarized in Table G.17-3, 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, DC.

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

Table G.17-1
Hazardous Waste Constituents of Concern at the Technical Area 54, West Outdoor
Container Storage Unit^a

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Metals	D003, D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
Organic Compounds	D018, D019, D021, D022, D026, D027, D028, D029, D030, D035, D036, D037, D038, D039, D040, D043 F001, F002, F003, F004, F005	Benzene, Carbon tetrachloride, Chlorobenzene, Chloroform, Cresol, 1,4-Dichlorobenzene, 1,2-Dichloroethylene, 2,4-Dinitrotoluene, Methyl ethyl ketone, Nitrobenzene, Pentachlorophenol, Pyridine, Tetrachloroethylene, Trichloroethylene, Vinyl Chloride Acetone, Methyl ethyl ketone, , Methylene Chloride, Toluene, MIBK, DBCP, Tetrachloroethylene, 1,1,1-trichloroethane, Chlorinated Fluorocarbons, 1,1,2- trichloro-1,1,2-trifluoroethane, ortho-dichlorobenzene, Trichlorofluoromethane, 1,1,2-trichloroethane, Xylene, Ethyl acetate, Ethyl benzene, Ethyl ether, n-butyl alcohol, Cyclohexanone, Methanol, Cresols, Cresylic acid, Nitrobenzene, Carbon disulfide, Isobutanol, Pyridine, 2-ethoxyethanol, 2-nitropropane

^a Based on the unit Operating Record

MIBK = methyl isobutyl ketone or 4-methyl-2-pentanone

DBCP = 1,2-dibromo-3-chloropropane

Table G.17-2

Closure Schedule for Technical Area 54, West Outdoor Container Storage Unit

Activity	Maximum Time Required
Notify the Department of intent to close and conduct structural assessment.	-45 Days
Final receipt of waste.	Day 0
Complete waste removal.	Day 90
Complete records review and structural assessment.	10 days after completed waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.17-3
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste

Potential Waste Materials	Waste Types	Disposal Options
	waste	disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.17-4
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method ^a	Test Methods/Instrumentation	Target Detection Limit ^b	Rationale
Metal Analysis				
Barium	6010, 7010	ICP-AES,GFAA	200 ug/L	Determine the metals concentration in the samples.
Cadmium	6010, 7010	ICP-AES, GFAA	2 ug/L	
Chromium	6010, 7010	ICP-AES, GFAA	10 ug/L	
Lead	6010, 7010	ICP-AES, GFAA	5 ug/L	
Mercury	6010, 7470A, 7471B	ICP-AES, CVAA	0.2 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.

^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

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.17-5
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP/Total Metals: Barium, Cadmium, Chromium, Lead	Aqueous Media: 500-mL Wide Mouth-Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO ₃ to pH <2 Cool to 4 °C	180 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide Mouth-Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO ₃ to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Solid Media Cool to 4 °C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	

^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

mL = milliter

TCLP = Toxicity Characteristic Leaching Procedure

Table G.17-6

Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis ^a	Frequency	Acceptance Criteria
Trip Blank	VOC	One set per shipping cooler containing samples to be analyzed for VOCs	Not Applicable
Field Blank	VOC, 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, metals	One sample daily	Not Applicable

^a For VOC analysis, if blank shows detectable levels of any common laboratory contaminant (*e.g.*, methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

^b Collected only if reusable sampling equipment used.

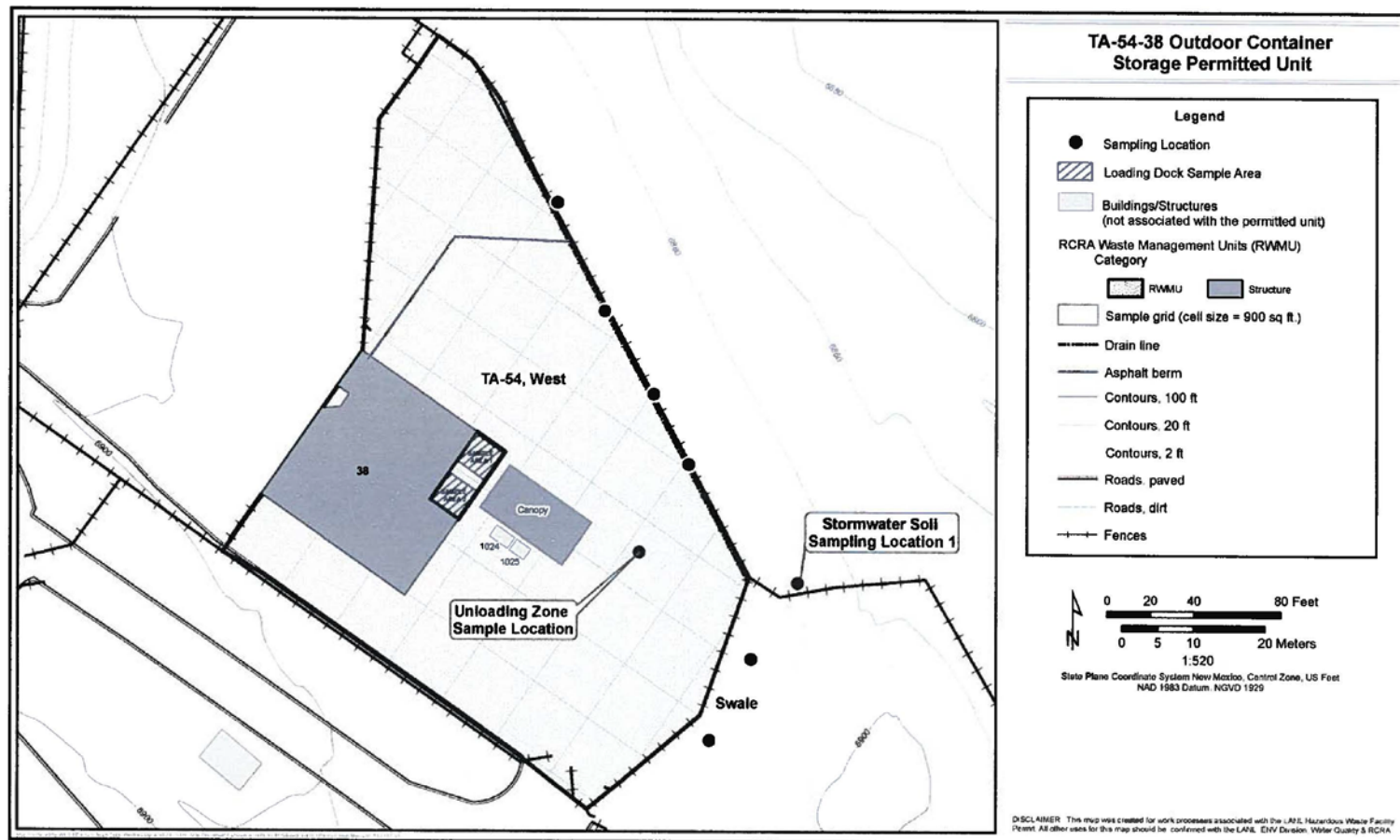


Figure G.17-1: Technical Area 54, West Outdoor Container Storage Unit Grid Sampling and Additional Sampling Locations

ATTACHMENT G.18
TECHNICAL AREA 55, BUILDING 4 ROOM B40
INDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

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<u>FIGURE NO.</u>	<u>TITLE</u>
G.18-1	Technical Area 55, Building 4, Room B40, Indoor Container Storage Unit

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the indoor hazardous waste container storage unit which is located in Room B40 in the basement of Technical Area 55, Building 4 (TA-55-4) 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, 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, 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 entire floor of the permitted unit has been used for storage of hazardous waste. The permitted unit is L-shaped and has long (outside) dimensions of 61 feet (ft), 5 inches (in.) and 54 ft., 10 in., and short (inside) dimensions of 40 ft, 9 in. and 28 ft. The unit is 27 ft. wide on one end and 20 ft, 8 in. wide on the other. The floor space also includes a vestibule, which has four walls, that is completely enclosed except for two access doorways.

The waste stored at the permitted unit consists of hazardous and mixed waste in both solid and liquid form. The permitted unit was constructed in 1979 and has been subject to hazardous waste management regulations under RCRA since July 25, 1990. Due to the scope of process operations at the permitted unit, the wastes stored include sludge, debris, oils, and chemical wastes with metals and volatile and semi-volatile organic constituents. 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 regarding waste management procedures and hazardous waste constituents stored at the permitted unit.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

Approximately 649 cubic meters of waste have been stored in the permitted unit. Throughout the life of this Permit, it is estimated that an additional 360 cubic meters of waste will be stored in 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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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 for container storage units.

Closure of the permitted unit will be deemed complete when: 1) all 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 the 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.18-2 of 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.

Decontamination verification sampling activities, and soil sampling if applicable, will be conducted to demonstrate that surfaces, related equipment, and media, if applicable, 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 submitted to the Department 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 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 surfaces and equipment associated with the permitted unit; verification that the closure performance standards in Permit Section 9.2 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. Appropriate shipping documentation will accompany the wastes during transport. Containers holding hazardous wastes 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 previous finding(s) or action(s) that may influence closure activities or potential 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 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 floor and walls of the permitted unit 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 (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 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 surfaces and related equipment will be decontaminated, or 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 surfaces 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 four metal cabinets will be removed after the structural assessment.

5.3.2 Decontamination of Structures and Related Equipment

All surfaces, structures, and related equipment that will be left in place or reused by the Facility will be decontaminated in accordance with Permit Section 9.4.3.1. Decontamination of the permitted unit's surfaces will include all features located within the unit (*e.g.*, pillars). There is currently no equipment located at the permitted unit that is expected to be left in place; however, if equipment identified during the assessment is expected to be left in place, it will be decontaminated in accordance with this section.

Decontamination of the permitted unit will be conducted by first removing loose material (*e.g.*, dust, dirt) through sweeping followed by washing using a manual wipe-down method with a solution consisting of a surfactant detergent (*e.g.*, Alconox[®]) and water mixed in accordance with the manufacturer's recommendations.

Wipe-down washing will be utilized because of the need to minimize the potential for exposure to workers and the migration of cleaning solution to other areas of the basement outside the permitted unit's boundary. Migration of the wash solution (in the form of splashing, condensation, or drainage) from steam cleaning or pressure washing may potentially contaminate or otherwise negatively affect ongoing operations within the basement. Migration can potentially be mitigated using plastic barriers taped to surfaces to enclose the area. However, areas enclosed in this manner will require workers to use additional personal protective equipment (PPE). This PPE will include fully enclosed protective wear and supplied air because of the increased risk of exposure to personnel due to potential release of radiological materials and organic compounds and concentration within the enclosure. Enclosure of the

area increases the risk of personnel exhaustion, because of the additional PPE, and the potential for workers to reach radiological work exposure limits. . Therefore, wipe-down washing, rather than steam cleaning or pressure washing, will be utilized because of the need to minimize the potential for exposure to workers and the migration of cleaning solution to other areas of the basement outside the permitted unit's boundary.

The entirety of the unit's floors will be decontaminated. Hazardous waste containers at the permitted unit are stacked. Including the height of any pallets that may have been used, two stacked 55-gallon drums and two stacked standard waste boxes measure just over eight feet high. Therefore, to ensure that decontamination of the walls is conducted to a sufficient height, all walls in the permitted unit will be decontaminated to a height of 11 feet.

Ceilings of the permitted unit, walls above 11 feet, and the areas outside of the permitted unit will be presumed to be free of contamination unless there is some physical indication of contamination (*e.g.*, staining), the records review reveals that large amounts of liquid volatile or semi-volatile organic waste was stored in the permitted unit, or a spill or release occurred within the permitted unit that could have affected the ceiling or the walls above the height of 11 feet.

Cloths, or other absorbent cleaning devices, will not be reused to wipe down the surfaces after being wetted in the wash solution or after spraying solution onto the surfaces. Only one cloth or absorbent cleaning device will be used at a time in a single area to prevent cross-contamination. To minimize the amount of liquid waste generated as a result of decontamination activities, the wash solution will be dispersed from buckets, spray bottles, or other types of small containers.

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 small reusable equipment that cannot be decontaminated will be containerized and managed as waste as summarized in Table G.18-3 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/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 Decontamination Verification Sampling Activities

Decontamination verification sampling activities will be conducted at the permitted unit in order to verify that surfaces 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 the floor and from each wall (up to 11 feet) of the permitted unit. Verification wipe samples will be collected from random locations within each of the sample areas indicated on Figure G.18-1 (provided under separate cover) of this closure plan. A total of 18 wipe samples will be collected: five from the floor; one from each of the four walls; one from each of the four pillars; and five from the vestibule (one from the floor and one from each of the four walls).

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit.

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, 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 the surfaces and related 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 Solid Chip Sampling

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit. Any non-porous inclusions from the sampling location will be removed by brushing or wiping. Using a chisel, drill, hole saw, or similar tool, a minimum 100 grams of the sample will be collected to a depth of 2 cm, or to an alternate depth specified in the assessment and transferred to an appropriate sampling container. The holding time and the preservation techniques to be used for each analysis will be determined from Table G.18-5.

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

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

Chain-of-custody forms will be maintained by sampling personnel until 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 chain-of-custody form to the Facility and it will become part of the permanent sampling record documenting the sampling efforts.

6.3.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- a. 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.18-5 presents the requirements in *SW-846* (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE Orders, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate Facility documents establish the requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, wastes, 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 the packaging and transportation organization to independently tender shipments to common motor or air carriers.

6.4 Sample Analysis Requirements

Samples will be analyzed for all hazardous constituents listed in 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 (*see* Table G.18-1). Table G.18-1 will be modified, as necessary, to incorporate changes as a result of the permitted unit's records review. Samples will be analyzed by an independent laboratory using the methods outlined in Table G.18-4. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.18-4. 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.18-4 is 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.18-6 presents a summary of QC sample types, applicable analyses, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample.

6.4.2.2 Analytical Laboratory 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 sample preparations that occur during 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.18-3 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.18-7, 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, DC.
- NIOSH, 1994. The National Institute for Occupational Health and Safety (NIOSH) *Manual of Analytical Methods*, 4th ed. Issue 1. 1994.

Table G.18-1

**Hazardous Waste Constituents of Concern at the Technical Area 55, Building 4, Room B40, Indoor
Container Storage Unit^a**

[illegible]

^a Based on the permitted unit's Operating Record

Table G.18-2

Closure Schedule for the Technical Area 55, Building 4, Room B40, Indoor 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.	10 days after completed waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.18-3
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste

Table G.18-3
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
		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.
Discarded concrete	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	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.
Sampling equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Table G.18-3
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	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.

Table G.18-4
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method ^a	Test Methods/ Instrumentation	Target Detection Limit ^b	Rationale
Metal Analysis				
Arsenic	7060A ^c , 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A ^d , 7081 ^c	FLAA,GFAA	200 ug/L	
Cadmium	7130 ^d , 7131A ^c	FLAA, GFAA	2 ug/L	
Chromium	7190 ^d , 7191 ^c	FLAA, GFAA	10 ug/L	
Lead	7420 ^d , 7421 ^c	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A ^e	CVAA	0.2 ug/L	
Selenium	7740 ^c , 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A ^d , 7761 ^c	FLAA, GFAA	10 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 ^c	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.

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

^b Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.

^c Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.

^d Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.

^e Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy; GFAA= Graphite furnace atomic absorption spectroscopy;
FLAA = Flame atomic absorption spectroscopy; mg/L = milligrams per liter;
GC/MS = Gas chromatography/mass spectrometry; ug/L = micrograms per liter.

Table G.18-5
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP/Total Metals: 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	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide Mouth- Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO ₃ to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon- Lined Septa	Solid Media Cool to 4 °C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	

<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 preparative extraction. 40 days from preparative extraction to determinative analysis.
	Solid Media: 250-mL Glass	Solid Media: Cool to 4 °C	

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

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

°C = degrees Celsius

HCl = hydrochloric acid

mL = milliter

HNO₃ = nitric acid

L = Liter

TCLP = Toxicity Characteristic Leaching Procedure

Table G.18-6

Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis^a	Frequency	Acceptance Criteria
Trip Blank	VOC	One set per shipping cooler containing samples to be analyzed for VOCs	Not Applicable
Field Blank	VOC/SVOC, metals	One sample daily per analysis	Not Applicable
Field Duplicate	Chemical	One for each sampling sequence	Relative percent difference less than or equal to 20 percent
Equipment Rinsate Blank ^b	VOC/SVOC, metals	One sample daily	Not Applicable

^a For VOC and SVOC analysis, if blank shows detectable levels of any common laboratory contaminant (*e.g.*, methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

^b Collected only if reusable sampling equipment used.

Figure G.18-1

**THIS FIGURE CONTAINS UNCLASSIFIED CONTROLLED NUCLEAR
INFORMATION (UCNI) AS DEFINED BY SECTION 148 OF THE ATOMIC ENERGY
ACT**

ATTACHMENT G.19
TECHNICAL AREA 55, BUILDING 4 ROOM K13
INDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

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<u>FIGURE NO.</u>	<u>TITLE</u>
G.19-1	Technical Area 55, Building 4, Room K13 Indoor Container Storage Unit

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the indoor hazardous waste container storage unit which is located in Room K13 in the basement of Technical Area 55, Building 4 (TA-55-4) 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, 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, 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 is rectangular shaped, is open on three sides, and measures 16 feet (ft) long by 13 ft wide. There is a pillar on one of the open sides. Equipment within the permitted unit used for hazardous waste management is identified on Figure G.19-1 (provided under separate cover). The waste stored at the permitted unit consists of hazardous and mixed waste in both solid and liquid form.

The permitted unit was constructed in 1979 and has been subject to waste management regulations under RCRA since July 25, 1990. Due to the scope of process operations at TA-55-4, the wastes stored include corrosive, reactive, and ignitable liquids, sludge, debris, and chemical wastes with metals and volatile and semi-volatile organic constituents.

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 regarding waste management procedures and hazardous waste constituents stored at the permitted unit.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

Approximately five cubic meters of waste have been stored in the permitted unit. Throughout the life of this Permit it is estimated that an additional ten cubic meters of waste will be stored in 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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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 for container storage units.

Closure of the permitted unit will be deemed complete when: 1) all 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 the 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.19-2 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 if necessary. Upon approval of the modified closure plan, if applicable, the Permittees will decontaminate unit surfaces and related equipment.

Decontamination verification sampling activities, and soil sampling if applicable, will be conducted to demonstrate that surfaces, related equipment, and soils, if applicable, 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 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 structures and equipment associated with the permitted unit; verification that the closure performance standards in Permit Section 9.2 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. Appropriate shipping documentation will accompany the wastes during transport. Containers holding hazardous wastes 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 previous finding(s) or action(s) that may influence closure activities or potential 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 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 floor and walls of the permitted unit 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 (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 Structures and Related Equipment

In accordance with the procedures in Permit Section 9.4.3, all remaining hazardous waste and hazardous waste residues will be removed from the permitted unit. The permitted unit's structures and equipment will be decontaminated, or 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 waste 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 unit's three metal cabinets will be removed after the structural assessment.

5.3.2 Decontamination of Structures and Related Equipment

All surfaces, structures, and related equipment that will be left in place or reused by the Facility will be decontaminated in accordance with Permit Section 9.4.3.1. Decontamination of the permitted unit's surfaces will include all features located within the unit (*e.g.*, pillar). There is no equipment located at the permitted unit that is expected to be left in place; however, if there is equipment identified during the assessment that is expected to be left in place, it will be decontaminated in accordance with this section.

Decontamination of the permitted unit will be conducted by first removing loose material (*e.g.*, dust, dirt) through sweeping followed by washing using a manual wipe-down method with a solution consisting of a surfactant detergent (*e.g.*, Alconox[®]) and water mixed in accordance with the manufacturer's recommendations.

Wipe-down washing will be utilized because of the need to minimize the potential for exposure to workers and the migration of cleaning solution to other areas of the basement outside the permitted unit's boundary. Migration of the wash solution (in the form of splashing, condensation, or drainage) from steam cleaning or pressure washing may potentially contaminate or otherwise negatively affect ongoing operations within the basement. Migration can potentially be mitigated using plastic barriers taped to surfaces to enclose the area. However, areas enclosed in this manner will require workers to use additional personal protective equipment (PPE). This PPE will include fully enclosed protective wear and supplied air because of the increased risk of exposure to personnel due to potential release of radiological materials and organic compounds and concentration within the enclosure. Enclosure of the area increases the risk of personnel exhaustion, because of the additional PPE, and the potential for workers to reach radiological work exposure limits. Therefore, wipe-down washing, rather than steam cleaning or pressure washing, will be utilized because of the need to minimize the potential for exposure to workers and the migration of cleaning solution to other areas of the basement outside the permitted unit's boundary.

The entirety of the unit's floors will be decontaminated. Hazardous waste containers at the permitted unit are stacked. Including the height of any pallets that may have been used, two stacked 55-gallon drums and two stacked standard waste boxes measure just over eight feet high. Therefore, to ensure that

decontamination of the walls is conducted to a sufficient height, all walls in the permitted unit will be decontaminated to a height of 11 feet.

Ceilings of the permitted unit, walls above 11 feet, and the areas outside of the permitted unit will be presumed to be free of contamination unless there is some indication of contamination (*e.g.*, staining), the records review reveals that large amounts of liquid volatile or semi-volatile organic waste was stored in the permitted unit, or a spill or release occurred within the unit that could have affected the ceiling or the walls above 11 feet.

Cloths, or other absorbent cleaning devices, will not be reused to wipe down the surfaces after being wetted in the wash solution or after spraying solution onto the surfaces. Only one cloth or absorbent cleaning device will be used at a time in a single area to prevent cross-contamination. To minimize the amount of liquid waste generated as a result of decontamination activities, the wash solution will be dispersed from buckets, spray bottles, or other types of small containers.

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 small reusable equipment that cannot be decontaminated will be containerized and managed as waste as summarized in Table G.19-3 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/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 Decontamination Verification Sampling Activities

Decontamination verification sampling activities will be conducted at the permitted unit in order to verify that surfaces 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 the floor and from the walls (up to 11 feet) of the permitted unit. Verification wipe samples will be collected from random locations within each of the sample areas indicated on Figure G.19-1 (provided under separate cover) of this closure plan. A total of five wipe samples will be collected: two from the floor; two from the wall; and one from the pillar.

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit.

6.2 Sample Collection Procedures

Samples will be collected in accordance with Permit Section 9.4.7.1 and the procedures identified in this sampling and analysis plan which incorporates guidance from the United States Environmental Protection Agency (USEPA) (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 the surfaces and related 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 Solid Chip Sampling

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit. Any non-porous inclusions from the sampling location will be removed by brushing or wiping. Using a chisel, drill, hole saw, or similar tool, a minimum 100 grams of the sample will be collected to a depth of 2 cm, or to an alternate depth specified in the assessment and transferred to an appropriate sampling container. The holding time and the preservation techniques to be used for each analysis will be determined from Table G.19-5.

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 sections provide a description of sample documentation, sample 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 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 chain-of-custody form to the Facility and it will become part of the permanent sampling record documenting the sampling efforts.

6.3.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- a. 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.19-5 presents the requirements in *SW-846* (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE Orders, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate Facility documents establish the requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, wastes, 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 the packaging and transportation organization to independently tender shipments to common motor or air carriers.

6.4 Sample Analysis Requirements

Samples will be analyzed for all hazardous constituents listed in 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 (*see* Table G.19-1). Table G.19-1 will be modified, as necessary, to incorporate changes as a result of the permitted unit's records review. Samples will be analyzed by an independent laboratory using the methods outlined in Table G.19-4. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.19-4. 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.19-4 is 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.19-6 presents a summary of QC sample types, applicable analyses, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample.

6.4.2.2 Analytical Laboratory 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 and 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 sample preparations that occur during 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.19-3 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 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, DC.

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

Table G.19-1

Hazardous Waste Constituents of Concern at the Technical Area 55, Building 4, Room K13, Indoor Container Storage Unit

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Inorganics	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
	F006	Wastewater treatment sludge
	P015, P056, P073 P113, P120	Beryllium powder, Fluorine , Nickel carbonyl, Thallic oxide, Vanadium oxide
	U151	Mercury
Organic Compounds	D018, D019, D021, D022, D027, D028, D029, D030, D032, D033, D034, D035, D036, , D037, D038, D039, D040, D041, D042, D043	Benzene; Carbon tetrachloride; Chlorobenzene; Chloroform; 1,4-Dichlorobenzene; 1,2-Dichloroethane; 1,1-Dichloroethylene; 2,4-Dinitrotoluene; Hexachlorobenzene; Hexachlorobutadiene; Hexachloroethane; Methyl ethyl ketone; Nitrobenzene; Pentachlorophenol; Pyridine; Tetrachloroethylene; Trichloroethylene; 2,4,5-Trichlorophenol; 2,4,6-Trichlorophenol; Vinyl chloride
	F001, F002, F003, F005	1,1,1-Trichloroethane; Carbon tetrachloride; Chlorinated fluorocarbons; Methylene Chloride; Tetrachloroethylene; Trichloroethylene; Trichlorofluoroethane; 1,1,1-Trichloroethane; 1,1,2-Trichloro-1,2,2-trifluoroethane; 1,1,2-Trichloroethane; Chlorobenzene; Freon tf; Methyl chloride; Methylene chloride; Ortho-dichlorobenzene; Tetrachloroethylene; Trichloroethylene; Trichloroflouromethane; Acetone; Ethyl ether; Methanol; Methyl isobutyl ketone; n-Butyl alcohol; Xylene; 2-Ethoxyethanol; 2-Nitropropane; Benzene; Carbon disulfide; Isobutanol; Methyl ethyl ketone; Pyridine; Toluene
	U002, U003, U019, U044, U056, U075, U080, U108, U117, U121, U123, U134, U154, U159, U165, U196, U210, U211, U213, U216, U220, U225, U226, U227, U228, U239	Acetone; Acetonitrile; Benzene; Chloroform; Cyclohexane; Dichlorodifluoromethane; Methane,dichloro-; 1,4-Dioxane; Ethane, 1,1'-oxybis-; Methane, trichlorofluoro-; Formic acid; Hydrofluoric acid; Methhanol; Methyl ethyl ketone; Naphthalene; Pyridine; Tetrachloroethylene; Methane, tetrachloro-; Furan, tetrahydro-; Thallium chloride; Toluene; Bromoform; Ethane, 1,1,1-trichloro-; 1,1,2-Trichloroethane; Trichloroethylene; Xylene
Cyanides	F007, F009	Cyanide plating bath solutions, Cyanide stripping cleaning solutions
	P030	Soluble cyanide salts, unspecified

^a Based on the unit Operating Record

Table G.19-2

Closure Schedule for the Technical Area 55, Building 4, Room K13, Indoor 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.	10 days after completed waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.19-3
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
Discarded concrete	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.
	Mixed waste	Waste will be treated to meet LDR treatment standards,

Potential Waste Materials	Waste Types	Disposal Options
		if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	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.
Sampling equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	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.

Table G.19-4
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method ^a	Test Methods/ Instrumentation	Target Detection Limit ^b	Rationale
Metal Analysis				
Arsenic	7060A ^c , 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A ^d , 7081 ^c	FLAA,GFAA	200 ug/L	
Cadmium	7130 ^d , 7131A ^c	FLAA, GFAA	2 ug/L	
Chromium	7190 ^d , 7191 ^c	FLAA, GFAA	10 ug/L	
Lead	7420 ^d , 7421 ^c	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A ^e	CVAA	0.2 ug/L	
Selenium	7740 ^c , 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A ^d , 7761 ^c	FLAA, GFAA	10 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 ^c	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.

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

^b Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.

^c Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.

^d Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.

^e Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy

FLAA = Flame atomic absorption spectroscopy

GC/MS = Gas chromatography/mass spectrometry

GFAA = Graphite furnace atomic absorption spectroscopy

mg/L = milligrams per liter

ug/L = micrograms per liter.

Table G.19-5
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP/Total Metals: 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	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide Mouth- Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO ₃ to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon- Lined Septa	Solid Media Cool to 4 °C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	
Semi-Volatile Organic Compounds			
Target Compound Semi-volatile Organic Compounds	Aqueous Media: Four 1-L Amber Glass with Teflon-Lined Lid	Aqueous Media: Cool to 4 °C	Seven days from field collection to preparative extraction. 40 days from preparative extraction to determinative analysis.
	Solid Media: 250-mL Glass	Solid Media: Cool to 4 °C	

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

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

°C = degrees Celsius

HCl = hydrochloric acid

mL = milliter

HNO₃=nitric acid

L = Liter

TCLP = Toxicity Characteristic Leaching Procedure

Table G.19-6
Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis^a	Frequency	Acceptance Criteria
Trip Blank	VOC	One set per shipping cooler containing samples to be analyzed for VOCs	Not Applicable
Field Blank	VOC/SVOC, metals	One sample daily per analysis	Not Applicable
Field Duplicate	Chemical	One for each sampling sequence	Relative percent difference less than or equal to 20 percent
Equipment Rinsate Blank ^b	VOC/SVOC, metals	One sample daily	Not Applicable

^a For VOC and SVOC analysis, if blank shows detectable levels of any common laboratory contaminant (*e.g.*, methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

^b Collected only if reusable sampling equipment used.

Figure G.19-1 has been provided under separate cover

ATTACHMENT G.20
TECHNICAL AREA 55, BUILDING 4, ROOM B05
INDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

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<u>FIGURE NO.</u>	<u>TITLE</u>
G.20-1	Technical Area 55, Building 4, Room B05 Indoor Container Storage Unit

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the indoor hazardous waste container storage unit which is located in Room B05 in the basement of Technical Area 55, Building 4 (TA-55-4) 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, 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, 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 entire floor of the permitted unit has been used for storage of hazardous waste. The permitted unit is rectangular shaped, measures 26 feet (ft) long by 10 ft wide, and is open on three sides as well as a portion of the fourth side. The room also contains two pillars and a chain link fence along the open sides.

The waste stored at the permitted unit consists of hazardous and mixed waste in solid form. The permitted unit was constructed in 1979 and has been subject to hazardous waste management regulations under RCRA since July 25, 1990. Due to the scope of process operations at the permitted unit, the wastes stored include sludge, debris, and chemical wastes with metals and volatile and semi-volatile organic constituents.

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 regarding waste management procedures and hazardous waste constituents stored at the permitted unit.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

Approximately 980 cubic meters of waste has been stored in the permitted unit. Throughout the life of this Permit it is estimated that an additional 544 cubic meters of waste will be stored in 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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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 for container storage units.

Closure of the permitted unit will be deemed complete when: 1) all 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 the 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.20-2 of 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.

Decontamination verification sampling activities, and soil sampling if applicable, will be conducted to demonstrate that surfaces, related equipment, and media, if applicable, 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 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 in Permit Section 9.2 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 waste 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. Appropriate shipping documentation will accompany the wastes during transport. Containers holding hazardous wastes 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 previous finding(s) or action(s) that may influence closure activities or potential 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 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 floor and walls 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 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 surfaces and related equipment will be decontaminated, or 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 related equipment 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 chain-linked fence will be removed before the structural assessment.

5.3.2 Decontamination of Structures and Related Equipment

All surfaces and related equipment that will be left in place or reused by the Facility will be decontaminated in accordance with Permit Section 9.4.3.1. Decontamination of the permitted unit's surfaces will include all features located within the unit (*e.g.*, pillars). There is no equipment located at the permitted unit that is expected to be left in place; however, if there is equipment identified during the assessment that is expected to be left in place, it will be decontaminated in accordance with this section.

Decontamination of the permitted unit will be conducted by first removing loose material (*e.g.*, dust, dirt) through sweeping followed by washing using a manual wipe-down method with a solution consisting of a surfactant detergent (*e.g.*, Alconox®) and water mixed in accordance with manufacturer recommendations.

Wipe-down washing will be utilized because of the need to minimize the potential for exposure to workers and the migration of cleaning solution to other areas of the basement outside the permitted unit's boundary. Migration of the wash solution (in the form of splashing, condensation, or drainage) from steam cleaning or pressure washing may potentially contaminate or otherwise negatively affect ongoing operations within the basement. Migration can potentially be mitigated using plastic barriers taped to surfaces to enclose the area. However, areas enclosed in this manner will require workers to use additional personal protective equipment (PPE). This PPE will include fully enclosed protective wear and supplied air because of the increased risk of exposure to personnel due to potential releases of radiological materials and organic compounds within the enclosure. Enclosure of the area increases the risk of personnel exhaustion, because of the additional PPE, and the potential for workers to reach radiological work exposure limits. Therefore, wipe-down washing, rather than steam cleaning or pressure washing, will be utilized because of the need to minimize the potential for exposure to workers and the migration of cleaning solution to other areas of the basement outside the permitted unit's boundary.

The entirety of the unit's floors will be decontaminated. Hazardous waste containers at the permitted unit are stacked. Including the height of pallets that may have been used, two stacked 55-gallon drums and

two stacked standard waste boxes measure just over eight feet high. Therefore, to ensure that decontamination of the walls is conducted to a sufficient height, all walls in the permitted unit will be decontaminated to a height of 11 feet.

Ceilings of the permitted unit, walls above 11 feet, and the areas outside of the permitted unit will be presumed to be free of contamination unless there is some physical indication of contamination (*e.g.*, staining), the records review reveals that large amounts of liquid volatile or semi-volatile organic waste was stored in the permitted unit, or a spill or release occurred within the permitted unit that could have affected the ceiling or the walls above the height of 11 feet.

Cloths, or other absorbent cleaning devices, will not be reused to wipe down the surfaces after being wetted in the wash solution or after spraying solution onto the surfaces. Only one cloth or absorbent cleaning device will be used at a time in a single area to prevent cross-contamination. The quantity of the wash solution will be minimized by dispensing from buckets, spray bottles, or other types of small containers.

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 small reusable equipment that cannot be decontaminated will be containerized and managed as waste as summarized in Table G.20-3 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/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 Decontamination Verification Sampling Activities

Decontamination verification sampling activities will be conducted at the permitted unit in order to verify that surfaces 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 the floor and from the wall (up to 11 ft) of the permitted unit. These verification wipe samples will be collected from random locations within each of the sample areas indicated on Figure G.20-1 (provided under separate cover) of this closure plan and analyzed for the hazardous waste constituents listed in Table G.20-1. A total of four wipe samples will be collected: one from the floor; one from each of the pillars; and one from the wall.

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit.

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, 2002), DOE (DOE, 1995), and other Department-approved procedures.

6.2.1 Wipe Sampling

Surface wipe samples will be used to determine if residual hazardous constituents remain on the surfaces and related 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 Solid Chip Sampling

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit. Any non-porous inclusions from the sampling location will be removed by brushing or wiping. Using a chisel, drill, hole saw, or similar tool, a minimum 100 grams of the sample will be collected to a depth of 2 cm, or to an alternate depth specified in the assessment and transferred to an appropriate sampling container. The holding time and the preservation techniques to be used for each analysis will be determined from Table G.20-5.

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

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

Chain-of-custody forms will be maintained by sampling personnel until 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 chain-of-custody form to the Facility and it will become part of the permanent sampling record documenting the sampling efforts.

6.3.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- a. 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.20-5 presents the requirements in *SW-846* (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE Orders, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate Facility documents establish the requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, wastes, 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 the packaging and transportation organization to independently tender shipments to common motor or air carriers.

6.4 Sample Analysis Requirements

Samples will be analyzed for all hazardous constituents listed in 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 (*see* Table G.20-1). Table G.20-1 will be modified, as necessary, to incorporate changes as a result of the permitted unit's records review. Samples will be analyzed by an independent laboratory using the methods outlined in Table G.20-4. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.20-4. 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.20-4 is 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.20-6 presents a summary of QC sample types, applicable analyses, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted

to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample.

6.4.2.2 Analytical Laboratory 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 sample preparations that occur during 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.20-3 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.4-3, 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, DC.
- NIOSH, 1994. The National Institute for Occupational Health and Safety (NIOSH) *Manual of Analytical Methods*, 4th ed. Issue 1. 1994.

Table G.20-1

**Hazardous Waste Constituents of Concern at the Technical Area 55, Building 4, Room B05, Indoor
Container Storage Unit^a**

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011 F006 P120	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver Wastewater treatment sludge Vanadium pentoxide
Organic Compounds	D018, D019, D021, D022, D027, D028, D030, D032, D033, D034, D035, D036, D037, D038, D039, D040, D042, D043 F001, F002, F003, F004, F005	Benzene, Carbon tetrachloride, Chlorobenzene, Chloroform, 1,4-Dichlorobenzene, 1,2-Dichloroethane, 2,4-Dinitrotoluene, Hexachlorobenzene, Hexachlorobutadiene, Hexachloroethane, Methyl ethyl ketone, Nitrobenzene, Pentachlorophenol, Pyridine, Tetrachloroethylene, Trichloroethylene, 2,4,6-Trichlorophenol, Vinyl chloride 1,1,1-Trichloroethane, Carbon tetrachloride, Chlorinated fluorocarbons, Methylene chloride, Tetrachloroethylene, Trichloroethylene, Trichlorofluoroethane, 1,1,1-Trichloroethane, 1,1,2-Trichloro-1,2,2-trifluoroethane, 1,1,2-Trichloroethane, Chlorobenzene, Freon tf, Methyl chloride, Methylene chloride, Ortho-dichlorobenzene, Tetrachloroethylene, Trichloroethylene, Trichlorofluoromethane, Acetone, Ethyl ether, Methanol, Methyl isobutyl ketone, n-Butyl alcohol, Xylene, Cresols, Cresylic acid, Nitrobenzene, 2-Ethoxyethanol, 2-Nitropropane, Benzene, Carbon disulfide, Isobutanol, Methyl ethyl ketone, Pyridine, Toluene Acetone, Acetonitrile, Benzene, Chloroform, Methylene chloride, Dimethyl sulfate, 1, 4 - Dioxane, Pyridine, Tetrahydrofuran, Toluene

	U002, U003, U019, U044, U080, U103, U108, U196, U213, U220	
Cyanides	F007, F009 P030, P098, P099, P106	Cyanide plating bath solutions, Cyanide stripping cleaning solutions Cyanides (Soluble salts and complexes), Potassium cyanide, Potassium silver cyanide, Sodium cyanide

^a Based on the permitted unit's Operating Record

Table G.20-2

Closure Schedule for the Technical Area 55, Building 4, Room B05, Indoor Container Storage Unit

Activity	Maximum Time Required ^a
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.	10 days after completed waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.20-3
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Table G.20-3
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
		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.
Discarded concrete	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	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.
Sampling equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Table G.20-3
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	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.

Table G.20-4
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method ^a	Test Methods/ Instrumentation	Target Detection Limit ^b	Rationale
Metal Analysis				
Arsenic	7060A ^c , 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A ^d , 7081 ^c	FLAA,GFAA	200 ug/L	
Cadmium	7130 ^d , 7131A ^c	FLAA, GFAA	2 ug/L	
Chromium	7190 ^d , 7191 ^c	FLAA, GFAA	10 ug/L	
Lead	7420 ^d , 7421 ^c	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A ^e	CVAA	0.2 ug/L	
Selenium	7740 ^c , 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A ^d , 7761 ^c	FLAA, GFAA	10 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 ^c	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.

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

^b Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.

^c Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.

^d Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.

^e Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy; GC/MS = Gas chromatography/mass spectrometry

FLAA = Flame atomic absorption spectroscopy; GFAA = Graphite furnace atomic absorption spectroscopy

mg/L = milligrams per liter; ug/L = micrograms per liter.

Table G.20-5
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP/Total Metals: 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	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide Mouth- Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO ₃ to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon- Lined Septa	Solid Media Cool to 4 °C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	

<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

HCl = hydrochloric acid

mL = milliliter

HNO₃ = nitric acid

L = Liter

TCLP = Toxicity Characteristic Leaching Procedure

Table G.20-6

Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis^a	Frequency	Acceptance Criteria
Trip Blank	VOC	One set per shipping cooler containing samples to be analyzed for VOCs	Not Applicable
Field Blank	VOC/SVOC, metals	One sample daily per analysis	Not Applicable
Field Duplicate	Chemical	One for each sampling sequence	Relative percent difference less than or equal to 20 percent
Equipment Rinsate Blank ^b	VOC/SVOC, metals	One sample daily	Not Applicable

^a For VOC and SVOC analysis, if blank shows detectable levels of any common laboratory contaminant (*e.g.*, methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

^b Collected only if reusable sampling equipment used.

Figure G.20-1 has been provided under separate cover

ATTACHMENT G.21
TECHNICAL AREA 55, BUILDING 4, ROOM B45
INDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

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<u>FIGURE NO.</u>	<u>TITLE</u>
G.21-1	Technical Area 55, Building 4, Room B45, Indoor Container Storage Unit Sampling Locations

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the indoor hazardous waste container storage unit which is located in Room B45 in the basement of Technical Area 55, Building 4 (TA-55-4) 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, 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, 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 entire floor of the permitted unit has been used for storage of hazardous waste. The permitted unit is rectangular shaped, measures 45 feet (ft), 1 inch (in) long by 17 ft, 7 in wide, and is open on three sides. The waste stored at the permitted unit consists of hazardous waste in solid form. The permitted unit was constructed in 1979 and has been subject to hazardous waste management regulations under RCRA since July 25, 1990. Due to the scope of process operations at TA-55-4, the wastes stored include sludge, debris, and chemical wastes with metals and volatile and semi-volatile organic constituents. 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 regarding waste management procedures and hazardous waste constituents stored at the permitted unit.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

Approximately 331 cubic meters of waste has been stored in the permitted unit. Throughout the life of this Permit it is estimated that an additional 184 cubic meters of waste will be stored in 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; and

- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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 for container storage units.

Closure of the permitted unit will be deemed complete when: 1) all 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 the 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 21-2 of 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.

Decontamination verification sampling activities, and soil sampling if applicable, will be conducted to demonstrate that surfaces, related equipment, and media, if applicable, 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 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. Appropriate shipping documentation will accompany the wastes during transport. Containers holding hazardous wastes 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 previous finding(s) or action(s) that may influence closure activities or potential 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 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 floor and wall at the permitted unit 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 (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 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 surfaces and related equipment will be decontaminated, or 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. At this time, there is no equipment identified for removal from the unit; however, if equipment is identified during the assessment, it will be removed and disposed of in accordance with Permit Section 9.4.3.2.

5.3.2 Decontamination of Structures and Related Equipment

All surfaces and related equipment that will be left in place or reused by the Facility will be decontaminated in accordance with Permit Section 9.4.3.1. At this time there is no equipment located at the permitted unit that is expected to be left in place; however, if there is equipment identified during the assessment, it will be decontaminated in accordance with this section.

Decontamination of the permitted unit will be conducted by first removing loose material (*e.g.*, dust, dirt) through sweeping followed by washing using a manual wipe-down method with a solution consisting of a surfactant detergent (*e.g.*, Alconox[®]) and water mixed in accordance with the manufacturer's recommendations.

Wipe-down washing will be utilized because of the need to minimize the potential for exposure to workers and the migration of cleaning solution to other areas of the basement outside the permitted unit's boundary. Migration of the wash solution (in the form of splashing, condensation, or drainage) from steam cleaning or pressure washing may potentially contaminate or otherwise negatively affect ongoing operations within the basement. Migration can potentially be mitigated using plastic barriers taped to surfaces to enclose the area. However, areas enclosed in this manner will require workers to use additional personal protective equipment (PPE). This PPE will include fully enclosed protective wear and supplied air because of the increased risk of exposures to personnel due to potential release of radiological materials and organic compounds within the enclosure. Enclosure of the area increases the risk of personnel exhaustion, because of the additional PPE, and the potential for workers to reach radiological work exposure limits. Therefore, wipe-down washing, rather than steam cleaning or pressure washing, will be utilized because of the need to minimize the potential for exposure to workers and the migration of cleaning solution to other areas of the basement outside the permitted unit's boundary.

The entirety of the unit's floor will be decontaminated. Hazardous waste containers at the permitted unit are stacked. Including the height of any pallets that may have been used, two stacked 55-gallon drums and two stacked standard waste boxes measure just over eight feet high, respectively. Therefore, to ensure that decontamination of the wall is conducted to a sufficient height, it will be decontaminated to a height of 11 feet.

Ceilings of the permitted unit, walls above 11 feet, and the areas outside of the permitted unit will be presumed to be free of contamination unless there is some indication of contamination, the records review reveals that large amounts of liquid volatile or semi-volatile organic waste was stored in the permitted unit, or a spill or release occurred within the permitted unit that could have affected the ceiling or the walls above the height of 11 feet.

Cloths, or other absorbent cleaning devices, will not be reused to wipe down the surfaces after being wetted in the wash solution or after spraying solution onto the surfaces. Only one cloth or absorbent cleaning device will be used at a time in a single area to prevent cross-contamination. To minimize the amount of liquid waste generated as a result of decontamination activities, the wash solution will be dispersed from buckets, spray bottles, or other types of small containers.

Portable berms or other such devices (*e.g.*, absorbent socks, plastic sheeting, wading pools, existing secondary containment) will collect excess 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 small reusable equipment that cannot be decontaminated will be containerized and managed as waste as summarized in Table G.21-3 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/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 Decontamination Verification Sampling Activities

Decontamination verification sampling activities will be conducted at the permitted unit in order to verify that surfaces 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 the floor and from the wall of the permitted unit. The verification wipe samples will be collected from random locations within each of the sample areas indicated on Figure G.21-1 (provided under separate cover) of this closure plan. A total of four wipe samples will be collected: two from the

floor; and two from the wall. The samples will be analyzed for the hazardous waste constituents listed in Table G.18-1.

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit.

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 incorporates guidance from the United States Environmental Protection Agency (USEPA) (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 the surfaces, structures, and related 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 Solid Chip Sampling

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit. Any non-porous inclusions from the sampling location will be removed by brushing or wiping. Using a chisel, drill, hole saw, or similar tool, a minimum 100 grams of the sample will be collected to a depth of 2 cm, or to an alternate depth specified in the assessment and transferred to an appropriate sampling container. The holding time and the preservation techniques to be used for each analysis will be determined from Table G.21-5.

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

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

Chain-of-custody forms will be maintained by sampling personnel until 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 chain-of-custody form to the Facility and it will become part of the permanent sampling record documenting the sampling efforts.

6.3.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- a. 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.21-5 presents the requirements in *SW-846* (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE Orders, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate Facility documents establish the requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, wastes, 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 the packaging and transportation 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 (*see* Table G.21-1). Table G.21-1 will be modified, as necessary, to incorporate changes as a result of the permitted unit's records review. Samples will be analyzed by an independent laboratory using the methods outlined in Table G.21-4. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.21-4. 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.21-4 is 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.21-6 presents a summary of QC sample types, applicable analyses, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample.

6.4.2.2 Analytical Laboratory 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.21-3 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.21-3, 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, DC.
- NIOSH, 1994. The National Institute for Occupational Health and Safety (NIOSH) *Manual of Analytical Methods*, 4th ed. Issue 1. 1994.

Table G.21-1
Hazardous Waste Constituents of Concern at the Technical Area 55, Building 4, Room B45, Indoor
Container Storage Unit^a

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011 F006 P120	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver Wastewater treatment sludge Vanadium pentoxide
Organic Compounds	D018, D019, D021, D022, D027, D028, D030, D032, D033, D034, D035, D036, D037, D038, D039, D040, D042, D043 F001, F002, F003, F004, F005	Benzene, Carbon tetrachloride, Chlorobenzene, Chloroform, 1,4-Dichlorobenzene, 1,2-Dichloroethane, 2,4-Dinitrotoluene, Hexachlorobenzene, Hexachlorobutadiene, Hexachloroethane, Methyl ethyl ketone, Nitrobenzene, Pentachlorophenol, Pyridine, Tetrachloroethylene, Trichloroethylene, 2,4,6-Trichlorophenol, Vinyl chloride 1,1,1-Trichloroethane, Carbon tetrachloride, Chlorinated fluorocarbons, Methylene chloride, Tetrachloroethylene, Trichloroethylene, Trichlorofluoroethane, 1,1,1-Trichloroethane, 1,1,2-Trichloro-1,2,2-trifluoroethane, 1,1,2-Trichloroethane, Chlorobenzene, Freon tf, Methyl chloride, Methylene chloride, Ortho-dichlorobenzene, Tetrachloroethylene, Trichloroethylene, Trichlorofluoromethane, Acetone, Ethyl ether, Methanol, Methyl isobutyl ketone, n-Butyl alcohol, Xylene, Cresols, Cresylic acid, Nitrobenzene, 2-Ethoxyethanol, 2-Nitropropane, Benzene, Carbon disulfide, Isobutanol, Methyl ethyl ketone, Pyridine, Toluene Acetone, Acetonitrile, Benzene, Chloroform, Methylene chloride, Dimethyl sulfate, 1, 4 -Dioxane, Pyridine, Tetrahydrofuran, Toluene

	U002, U003, U019, U044, U080, U103, U108, U196, U213, U220	
Cyanides	F007, F009 P030, P098, P099, P106	Cyanide plating bath solutions, Cyanide stripping cleaning solutions Cyanides (Soluble salts and complexes), Potassium cyanide, Potassium silver cyanide, Sodium cyanide

^aBased on the permitted unit's Operating Record

Table G.21-2

Closure Schedule for the Technical Area 55, Building 4, Room B45, Indoor 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.	10 days after completed waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.21-3
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste

Potential Waste Materials	Waste Types	Disposal Options
		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.
Discarded concrete	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	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.
Sampling equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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

Potential Waste Materials	Waste Types	Disposal Options
		or WIPP, as appropriate.
	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.

Table G.21-4
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method ^a	Test Methods/ Instrumentation	Target Detection Limit ^b	Rationale
Metal Analysis				
Arsenic	7060A ^c , 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A ^d , 7081 ^c	FLAA,GFAA	200 ug/L	
Cadmium	7130 ^d , 7131A ^c	FLAA, GFAA	2 ug/L	
Chromium	7190 ^d , 7191 ^c	FLAA, GFAA	10 ug/L	
Lead	7420 ^d , 7421 ^c	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A ^e	CVAA	0.2 ug/L	
Selenium	7740 ^c , 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A ^d , 7761 ^c	FLAA, GFAA	10 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 ^c	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.

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

^b Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.

^c Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.

^d Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.

^e Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy

FLAA = Flame atomic absorption spectroscopy; mg/L = milligrams per liter; ug/L = micrograms per liter

GC/MS = Gas chromatography/mass spectrometry; GFAA = Graphite furnace atomic absorption spectroscopy

Table G.21-5
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP/Total Metals: 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	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide Mouth- Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO ₃ to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon- Lined Septa	Solid Media Cool to 4 °C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	

<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

HCl = hydrochloric acid

mL = milliliter

HNO₃ = nitric acid

L = Liter

TCLP = Toxicity Characteristic Leaching Procedure

Table G.21-6

Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis ^a	Frequency	Acceptance Criteria
Trip Blank	VOC	One set per shipping cooler containing samples to be analyzed for VOCs	Not Applicable
Field Blank	VOC/SVOC, metals	One sample daily per analysis	Not Applicable
Field Duplicate	Chemical	One for each sampling sequence	Relative percent difference less than or equal to 20 percent
Equipment Rinsate Blank ^b	VOC/SVOC, metals	One sample daily	Not Applicable

^a For VOC and SVOC analysis, if blank shows detectable levels of any common laboratory contaminant (e.g., methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

^b Collected only if reusable sampling equipment used.

Figure G.21-1 has been provided under separate cover

ATTACHMENT G.22
TECHNICAL AREA 55, BUILDING 4, VAULT
INDOOR CONTAINER STORAGE UNIT
CLOSURE PLAN

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G.22-1	Technical Area 55, Building 4, Vault, Indoor Container Storage Unit Sampling Locations

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the indoor hazardous waste container storage unit which is located in the Vault in the basement of Technical Area 55, Building 4 (TA-55-4) 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, 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, 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 is irregularly shaped and has only one access door. It contains multiple rooms and each room has multiple lockers; hazardous waste has been stored only in Rooms A and H.

The waste stored at the permitted unit consists of hazardous waste in both solid and liquid form. The permitted unit was constructed in 1979 and has been subject to hazardous waste management regulations under RCRA since July 25, 1990. Due to the scope of process operations at TA-55-4, the wastes stored include corrosive liquids, debris, and chemical wastes with metals and volatile organic constituents. Specific hazardous waste constituents managed are included in Table G.22-1.

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 regarding waste management procedures and hazardous waste constituents stored at the permitted unit.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

Approximately six gallons of waste has been stored in the permitted unit. Throughout the life of this Permit it is estimated that an additional 60 gallons of waste will be stored in 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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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 for container storage units.

Closure of the permitted unit will be deemed complete when: 1) all 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 the 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.22-2 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 conduct 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.

Decontamination verification sampling activities, and soil sampling if applicable, will be conducted to demonstrate that surfaces, related equipment, and media, if applicable, 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 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 in Permit Section 9.2 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. Appropriate shipping documentation will accompany the wastes during transport. Containers holding hazardous wastes 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 previous finding(s) or action(s) that may influence closure activities or potential 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 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 floor and walls for any existing cracks or conditions that indicate a potential for release of constituents. Floors, walls, and equipment within the permitted unit will be assessed for evidence of release. 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 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 surfaces and related equipment will be decontaminated, or 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 surfaces 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 metal lockers located within the permitted unit will be removed before the structural assessment.

5.3.2 Decontamination of Structures and Related Equipment

All surfaces and related equipment that will be left in place or reused by the Facility will be decontaminated in accordance with Permit Section 9.4.3.1. There is no equipment located at the permitted unit that is expected to be left in place; however, if there is equipment identified during the assessment that is expected to be left in place, it will be decontaminated in accordance with this section.

Decontamination of the permitted unit will be conducted by first removing loose material (*e.g.*, dust, dirt) through sweeping followed by washing using a manual wipe-down method with a solution consisting of a surfactant detergent (*e.g.*, Alconox[®]) and water mixed in accordance with the manufacturer's recommendations.

Wipe-down washing will be utilized because of the need to minimize the potential for exposure to workers and the migration of cleaning solution to other areas of the basement outside the permitted unit's boundary. Migration of the wash solution (in the form of splashing, condensation, or drainage) from steam cleaning or pressure washing may potentially contaminate or otherwise negatively affect ongoing operations within the basement. Migration can potentially be mitigated using plastic barriers taped to surfaces to enclose the area. However, areas enclosed in this manner will require workers to use additional personal protective equipment (PPE). This PPE will include fully enclosed protective wear and supplied air because of the increased risk of exposure to personnel due to potential releases of radiological materials and organic compounds within the enclosure. Enclosure of the area increases the risk of personnel exhaustion, because of the additional PPE, and the potential for workers to reach radiological work exposure limits. Therefore, wipe-down washing, rather than steam cleaning or pressure washing, will be utilized because of the need to minimize the potential for exposure to workers and the migration of cleaning solution to other areas of the basement outside the permitted unit's boundary.

The entirety of the unit's floors will be decontaminated. To ensure that decontamination of the walls is conducted to a sufficient height, all walls in the permitted unit will be decontaminated to a height of 11 feet. Ceilings of the permitted unit, walls above 11 feet, and the areas outside of the permitted unit will

be presumed to be free of contamination unless there is some physical indication of contamination (*e.g.*, staining), the records review reveals that large amounts of liquid volatile and semi-volatile organic waste was stored in the permitted unit, or a spill or release occurred within the permitted unit that could have affected the ceiling or the walls above the height of 11 feet.

Cloths, or other absorbent cleaning devices, will not be reused to wipe down the surfaces after being wetted in the wash solution or after spraying solution onto the surfaces. Only one cloth or absorbent cleaning device will be used at a time in a single area to prevent cross-contamination. To minimize the amount of liquid waste generated as a result of decontamination activities, the wash solution will be dispersed from buckets, spray bottles, or other types of small containers.

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 small reusable equipment that cannot be decontaminated will be containerized and managed as waste as summarized in Table G.22-3 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/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 Decontamination Verification Sampling Activities

Decontamination verification sampling activities will be conducted at the permitted unit in order to verify that surfaces 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 18 wipe samples; eight wipe samples from the floor, one from each of the shorter walls (up to 11 feet), and four from each of the longer walls (up to 11 feet). Verification samples will be collected from random locations within each of the sample areas indicated on Figure G.22-1 (provided under separate cover).

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit.

6.2 Sample Collection Procedures

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

6.2.1 Wipe Sampling

Surface wipe samples will be used to determine if residual hazardous constituents remain on equipment and surfaces 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 Solid Chip Sampling

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit. Any non-porous inclusions from the sampling location will be removed by brushing or wiping. Using a chisel, drill, hole saw, or similar tool, a minimum 100 grams of the sample will be collected to a depth of 2 cm, or to an alternate depth specified in the assessment and transferred to an appropriate sampling container. The holding time and the preservation techniques to be used for each analysis will be determined from Table G.25-5.

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. Residue, disposable decontamination equipment, and reusable decontamination equipment that cannot be decontaminated will be containerized and managed appropriately at an approved on-site facility.

6.3 Sample Management Procedures

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

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

Chain-of-custody forms will be maintained by sampling personnel until 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 chain-of-custody form to the Facility and it will become part of the permanent sampling record documenting the sampling efforts.

6.3.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- a. 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(s) 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 and 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.22-5 presents the requirements in *SW-846* (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE Orders, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate Facility documents establish the requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, wastes, 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 the packaging and transportation organization to independently tender shipments to common motor or air carriers.

6.4 Sample Analysis Requirements

Samples will be analyzed for the appropriate 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 (*see* Table G.22-1). Table G.22-1 will be modified, as necessary, at the time of closure to incorporate changes based on the permitted unit's records review. Samples will be analyzed by an independent laboratory using the methods outlined in Table G.22-4. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.22-4

6.4.1 Analytical Laboratory Requirements

The analytical laboratory will perform the detailed qualitative and quantitative chemical analyses specified in Section 7.4.2. 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.22-4 is 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/analysis process, and is described in the following sections, along with information on calculations necessary to evaluate the QC results. QA/QC samples will be collected in accordance with the most recent and appropriate Facility sampling plan incorporating guidance from the EPA (EPA, 2002) and DOE (DOE, 1995), or other approved procedures.

6.4.2.1 Field Quality Control

The field QC samples that may be collected include trip blanks, field blanks, field duplicates, and equipment rinsate blanks. Table G.22-6 presents a summary of QC sample types, applicable analyses, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample.

6.4.2.2 Analytical Laboratory 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, which are listed with potential disposal options in Table G.22-3 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 small reusable equipment that cannot be decontaminated, as summarized in Table G.22-3, 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, DC.

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

Table G.22-1
Hazardous Waste Constituents of Concern at the Technical Area 55, Building 4, Vault Indoor
Container Storage Unit^a

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Metals	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
Organic Compounds	D018, D019, D021, D022, D035, D038, D039, D040 F001, F002, F005, F006	Benzene, Carbon Tetrachloride, Chlorobenzene, Chloroform, Methyl ethyl ketone, Pyridine, Tetrachloroethylene Trichloroethylene Tetrachloroethylene, Trichloroethylene, Methylene chloride, 1,1,1-Trichloroethane, Carbon tetrachloride, Chlorinated fluorocarbons, Chlorobenzene, Pyridine, 1,1,2-Trichloro- 1,2,2-trifluoroethane, Ortho-dichlorobenzene, Trichlorofluoromethane, and 1,1,2-Trichloroethane, Toluene, Methyl ethyl ketone, Carbon disulfide, Isobutanol, Benzene, 2-Ethoxyethanol, 2-Nitropropane

^aBased on the unit Operating Record

Table G.22-2

Closure Schedule for the Technical Area 55, Building 4, Vault Indoor 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.	10 days after completed waste removal or 100 days after final receipt of waste
Submit final report to the Department.	Day 180

Table G.22-3
Waste Materials, Waste Types, and Disposal Options

Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Table G.22-3

Waste Materials, Waste Types, and Disposal Options

Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded concrete	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	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.
Sampling equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.22-3

Waste Materials, Waste Types, and Disposal Options

Waste Materials	Waste Types	Disposal Options
	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.

Table G.22-4
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method ^a	Test Methods/ Instrumentation	Target Detection Limit ^b	Rationale
Metal Analysis				
Arsenic	7060A ^c , 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A ^d , 7081 ^c	FLAA,GFAA	200 ug/L	
Cadmium	7130 ^d , 7131A ^c	FLAA, GFAA	2 ug/L	
Chromium	7190 ^d , 7191 ^c	FLAA, GFAA	10 ug/L	
Lead	7420 ^d , 7421 ^c	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A ^e	CVAA	0.2 ug/L	
Selenium	7740 ^c , 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A ^d , 7761 ^c	FLAA, GFAA	10 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.

^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.

^c Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.

^d Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.

^e Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy

FLAA = Flame atomic absorption spectroscopy

GC/MS = Gas chromatography/mass spectrometry

GFAA = Graphite furnace atomic absorption spectroscopy

mg/L = milligrams per liter ; ug/L = micrograms per liter.

Table G.22-5
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP/Total Metals: 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	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide Mouth-Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO ₃ to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Solid Media Cool to 4 °C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	

^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

HCl = hydrochloric acid

mL = milliter

HNO₃ = nitric acid

L = Liter

TCLP = Toxicity Characteristic Leaching Procedure

Table G.22-6

Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis ^a	Frequency	Acceptance Criteria
Trip Blank	VOC	One set per shipping cooler containing samples to be analyzed for VOCs	Not Applicable
Field Blank	VOC, 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, metals	One sample daily	Not Applicable

^a For VOC analysis, if blank shows detectable levels of any common laboratory contaminant (*e.g.*, methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

^b Collected only if reusable sampling equipment used.

Figure G.22-1 has been provided under separate cover.

ATTACHMENT G.23
TECHNICAL AREA 55, BUILDING 4, ROOM 401
INDOOR STORAGE TANK UNIT
CLOSURE PLAN

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<u>FIGURE NO.</u>	<u>TITLE</u>
G.23-1	Technical Area 55, Building 4, Room 401, Indoor Tank Storage Unit Sampling Locations

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the indoor hazardous waste storage unit known as the 'Mixed Waste Storage Tank Unit' which is located in Room 401 of Technical Area 55, Building 4 (TA-55-4) 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, the Code of Federal Regulations (CFR), Title 40, Part 264, Subparts G and J 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, 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*). The permitted unit is a storage tank system that has been used for storage of hazardous waste in liquid form. Room 401 is recessed 2.5 inches and has a square footage of 4,500 square feet. The permitted unit is comprised of a glovebox and six tanks which consist of two waste storage tank components (*i.e.*, the Evaporator Glovebox Tank (one tank) and the Cementation Unit Pencil Tanks (five tanks)). This tank system, which is discussed in Permit Attachment A (*Technical Area Unit Descriptions*), shares a common piping and pumping system. The permitted unit has been in operation since 1989 and has been subject to waste management regulations under RCRA since July 25, 1990.

The permitted unit is used to store mixed transuranic evaporator bottoms solutions generated primarily from research and development activities and processing and recovery operations at TA-55 and the Chemistry and Metallurgy Research Building at TA-3. The liquid waste consists generally of concentrated nitric acid saturated with salts and metals and is stored in permitted unit prior to stabilization in the Mixed Waste Stabilization Treatment Unit (also located in TA-55-4, Room 401). The evaporator bottoms solutions exhibit the hazardous characteristics of corrosivity and toxicity (for metals) as defined in 20.4.1 NMAC §261.22 and 261.24 [6-14-00], respectively.

Permit Part 4 (*TA-55 Storage in Tanks and Treatment by Stabilization*), Permit Attachment A (*Technical Area Unit Descriptions*), Permit Attachment B (*Part A Application*), and Permit Attachment C (*Waste Analysis Plan*) include additional information regarding waste management procedures and hazardous waste constituents stored at the permitted unit.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

Approximately 27,824 liters of waste have been stored in the permitted unit. Throughout the life of this Permit it is estimated that an additional 11,000 liters of waste will be stored in 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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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 J for tank units.

Closure of the permitted unit will be deemed complete when: 1) all 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 the 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.23-2 of 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 conduct 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. Upon approval of the modified closure plan, if applicable, the Permittees will decontaminate unit surfaces and related equipment.

Decontamination verification sampling activities, and soil sampling if applicable, will be conducted to demonstrate that surfaces, related equipment, and media, if applicable, 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, 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 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 structures and equipment associated with the permitted unit; verification that the closure performance standards in Permit Section 9.2 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. Appropriate shipping documentation will accompany the wastes during transport. Containers holding hazardous wastes 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 previous finding(s) or action(s) that may influence closure activities or potential 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 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 glovebox, the Evaporator Glovebox Tank, the five Cementation Unit Pencil Tanks, as well as the floor and walls of Room 401 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 (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 Structures and Related Equipment

In accordance with Permit Section 9.4.3, all remaining hazardous waste and hazardous waste residues will be removed from the permitted unit. The permitted unit's structures and 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 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 storage tanks, piping and the glovebox and all materials associated with the permitted unit in Room 401 (tanks, ancillary equipment, glovebox, etc.) will be removed before the assessment.

5.3.2 Decontamination of Structures and Related Equipment

All surfaces, structures, and related equipment that will be left in place or reused by the Facility will be decontaminated in accordance with Permit Section 9.4.3.1. There is no equipment located at the permitted unit that is expected to be left in place; however, if equipment is identified during the assessment that is expected to be left in place, it will be decontaminated in accordance with this section.

Decontamination of the permitted unit and equipment related to the permitted unit will be conducted by first removing loose material (*e.g.*, dust, dirt) through sweeping followed by washing using a manual wipe-down method with a solution consisting of a surfactant detergent (*e.g.*, Alconox[®]) and water mixed in accordance with the manufacturer's recommendations.

Wipe-down washing of the equipment will be utilized because of the need to minimize potential for exposure to workers and the migration of cleaning solution to other areas outside of the permitted unit's boundary. Migration of the wash solution (in the form of splashing, condensation, or drainage) from steam cleaning or pressure washing may potentially contaminate or otherwise negatively affect ongoing operations within the basement. Migration can potentially be mitigated using plastic barriers taped to surfaces to enclose the area. However, areas enclosed in this manner will require workers to use additional personal protective equipment (PPE). This PPE will include fully enclosed protective wear and supplied air because of the increased risk of exposure to personnel due to potential release of radiological materials and organic compounds within the enclosure. Enclosure of the area increases the risk personnel

exhaustion, because of the PPE, and the potential for workers to reach radiological work exposure limits. Therefore, wipe-down washing, rather than steam cleaning or pressure washing, will be utilized because of the need to minimize the potential for exposure to workers and the migration of cleaning solution to other areas of the basement outside the permitted unit's boundary.

The entirety of the unit's floors will be decontaminated. To ensure that decontamination of the walls is conducted to a sufficient height, all walls in the permitted unit will be decontaminated to a height of 11 ft. Ceilings of the permitted unit, walls above 11 ft, and the areas outside of the permitted unit will be presumed to be free of contamination unless there is some physical indication of contamination (*e.g.*, staining), the records review reveals that large amounts of liquid volatile or semi-volatile organic waste was stored in the permitted unit, or a spill or release occurred within the permitted unit that could have affected the ceiling or the walls above 11 ft.

The quantity of the wash solution will be minimized by dispensing from buckets, spray bottles, or other types of small containers. Cloths, or other absorbent cleaning devices, will not be reused to wipe down the surfaces after being wetted in the wash solution or after spraying solution onto the surfaces. Only one cloth or absorbent cleaning device will be used at a time in a single area to prevent cross-contamination.

Portable berms or other such devices (*e.g.*, absorbent socks, plastic sheeting, wading pools, existing secondary containment) will collect excess 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 small reusable equipment that cannot be decontaminated will be containerized and managed as waste as summarized in Table G.23-3 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/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 Decontamination Verification Sampling Activities

Decontamination verification sampling activities will be conducted at the permitted unit in order to verify that surfaces 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 verification wipe sample from the floor and from each wall of the permitted unit. Verification wipe samples will be collected from random locations within each of the sample areas indicated on Figure G.23-1 (provided under separate cover) of this closure plan. A total of five wipe samples will be collected: one from the floor and one from each wall.

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit.

6.2 Sample Collection Procedures

Samples will be collected in accordance with Permit Section 9.4.7.1 and the procedures identified in this sampling and analysis plan which incorporates guidance from the United States Environmental Protection Agency (USEPA) (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 the surfaces and related 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 Solid Chip Sampling

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit. Any non-porous inclusions from the sampling location will be removed by brushing or wiping. Using a chisel, drill, hole saw, or similar tool, a minimum 100 grams of the sample will be collected to a depth of 2 cm, or to an alternate depth specified in the assessment and transferred to an appropriate sampling container. The holding time and the preservation techniques to be used for each analysis will be determined from Table G.23-5.

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

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

Chain-of-custody forms will be maintained by sampling personnel until 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 chain-of-custody form to the Facility and it will become part of the permanent sampling record documenting the sampling efforts.

6.3.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- a. 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.23-5 presents the requirements in *SW-846* (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE Orders, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate Facility documents establish the requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, wastes, 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 the packaging and transportation organization to independently tender shipments to common motor or air carriers.

6.4 Sample Analysis Requirements

Samples will be analyzed for all hazardous constituents listed in 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 (*see* Table G.23-1). Table G.23-1 will be modified, as necessary, to incorporate changes as a result of the permitted unit's records review. Samples will be analyzed by an independent laboratory using the methods outlined in Table G.23-4. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.23-4. 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.23-4 is 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.23-6 presents a summary of QC sample types, applicable analyses, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted

to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample.

6.4.2.2 Analytical Laboratory 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 sample preparations that occur during 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.23-3 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.4-7, 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, DC.
- NIOSH, 1994. The National Institute for Occupational Health and Safety (NIOSH) *Manual of Analytical Methods*, 4th ed. Issue 1. 1994.

Table G.23-1

Hazardous Waste Constituents of Concern at the Technical Area 55, Building 4, Room 401 Indoor Tank Storage Unit^a

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Metals	D006, D007, D008, D009	Cadmium, Chromium, Lead, Mercury

^a Based on the unit Facility Operating Record

Table G.23-2

Closure Schedule for the Technical Area 55, Building 4, Room 401 Indoor Tank 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.	10 days after completed waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.23-3

Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste

Table G.23-3
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
		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.
Discarded concrete	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	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.
Sampling equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Table G.23-3
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
	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.

Table G.23-4
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method ^a	Test Methods/ Instrumentation	Target Detection Limit ^b	Rationale
<i>Metal Analysis</i>				
Arsenic	7060A ^c , 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A ^d , 7081 ^c	FLAA, GFAA	200 ug/L	
Cadmium	7130 ^d , 7131A ^c	FLAA, GFAA	2 ug/L	
Chromium	7190 ^d , 7191 ^c	FLAA, GFAA	10 ug/L	
Lead	7420 ^d , 7421 ^c	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A ^e	CVAA	0.2 ug/L	
Selenium	7740 ^c , 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A ^d , 7761 ^c	FLAA, GFAA	10 ug/L	

^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. Actual detection limits may be higher depending on sample composition and matrix type.

^c Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.

^d Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.

^e Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy

FLAA = Flame atomic absorption spectroscopy

GFAA = Graphite furnace atomic absorption spectroscopy

ug/L = micrograms per liter.

Table G.23-5
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
<i>Metals</i>			
TCLP/Total 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	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide Mouth-Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO ₃ to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	

^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

mL = milliliter

HNO₃ = nitric acid

TCLP = Toxicity Characteristic Leaching Procedure

Table G.23-6

Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis	Frequency	Acceptance Criteria
Field Blank	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 ^a	Metals	One sample daily	Not Applicable

^a Collected only if reusable sampling equipment used

Figure G.23-1: Technical Area 55, Building 4, Room 401, Indoor Tank Storage Unit Sampling Locations

ATTACHMENT G.24
TECHNICAL AREA 55, BUILDING 4, ROOM 401
INDOOR MIXED WASTE STABILIZATION TREATMENT UNIT
CLOSURE PLAN

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G.24-1	Technical Area 55, Building 4, Room 401, Indoor Mixed Waste Tank Treatment

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the indoor hazardous waste treatment unit called the 'Mixed Waste Stabilization Unit' which is located in Room 401 at Technical Area 55, Building 4 (TA-55-4) 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 Section 9, the Code of Federal Regulations (CFR), Title 40, Part 264, Subpart G and X 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, 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 (as well as its components) can be found in Permit Attachment A (*Technical Area Unit Descriptions*). The permitted unit has been used for treatment of mixed waste and is located in Room 401 at TA-55-4. Room 401 is recessed 2.5 inches and has a square footage of 4,500 square feet. The permitted unit is located in glovebox GB-454 along the west wall of Room 401. It consists of a pH column, vacuum trap, two motor-driven mixers, four impellers, piping and the glovebox.

The waste typically treated at the permitted unit consists generally of mixed waste in liquid and solid form. The permitted unit has been in operation since 1987 and has been subject to waste management regulations under RCRA since July 25, 1990. The unit is used to treat liquid and solid mixed waste generated primarily from research and development activities and processing and recovery operations at TA-55 and at the Chemistry and Metallurgy Research Building at TA-3. The liquid wastes consist of evaporator bottoms solutions and laboratory solutions that exhibit the hazardous characteristics of corrosivity and toxicity (for metals) as defined in 20.4.1 NMAC §261.22 and 261.24 [6-14-00], respectively. The solid process wastes consist of process residue from the evaporator and filter cake. These waste streams exhibit the hazardous characteristics of toxicity (for metals) and corrosivity and are classified as mixed waste.

Permit Part 4 (*TA-55 Storage in Tanks and Treatment by Stabilization*), Permit Attachment A (*Technical Area Unit Descriptions*), Permit Attachment B (*Part A Application*), and Permit Attachment C (*Waste Analysis Plan*) include additional information regarding waste management procedures and hazardous waste constituents treated at the permitted unit.

3.0 ESTIMATE OF MAXIMUM WASTE TREATED

Approximately 27,824 liters of waste have been treated in the permitted unit. Throughout the life of this Permit it is estimated that an additional 11,000 liters of waste will be treated in 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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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 X for tank units.

Closure of the permitted unit will be deemed complete when: 1) all 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.24-1 of 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 conduct 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 if necessary. Upon approval of the modified closure plan, if applicable, the Permittees will decontaminate unit surfaces and related equipment.

Decontamination verification sampling activities, and soil sampling if applicable, will be conducted to demonstrate that surfaces, related equipment, and media, if applicable, 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 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 structures and equipment associated with the permitted unit; verification that the closure performance standards in Permit Section 9.2 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. Appropriate shipping documentation will accompany the wastes during transport. Containers holding hazardous wastes 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 units will be reviewed and an assessment will be conducted to determine any previous finding(s) or action(s) that may influence closure activities or potential 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 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 glovebox and the floor and walls of Room 401 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 (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 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 surfaces, structures, and 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 as 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 pH column, vacuum trap, two motor-driven mixers, four impellers, piping and the glovebox and all other materials in Room 401 associated with the permitted unit will be removed before the structural assessment.

5.3.2 Decontamination of Structures and Related Equipment

All structures and related equipment that will be left in place or reused by the Facility will be decontaminated in accordance with Permit Section 9.4.3.1. At this time there is no equipment located at the unit that is expected to be decontaminated; however, if equipment is identified during the assessment, it will be decontaminated in accordance with this section.

Decontamination of the surfaces of the permitted unit will include all features located directly below the unit. If a hazardous waste spill or release has occurred at the permitted unit, decontamination will be expanded to include all impacted surfaces within the room. The entirety of the unit's floors will be decontaminated. Walls up to 11 feet will be decontaminated; ceilings and walls above 11 feet will be presumed to be free of contamination unless there is some indication of contamination or a spill or release occurred that could have affected high on the walls or on the ceiling. Equipment and surfaces within the permitted unit will also be decontaminated.

Decontamination of the permitted unit will be conducted by first removing loose material (*e.g.*, dust, dirt) through sweeping followed by washing using a manual wipe-down method with a solution consisting of a

surfactant detergent (*e.g.*, Alconox[®]) and water mixed in accordance with the manufacturer's recommendations rather than steam cleaning or pressure washing.

Migration of the wash solution (in the form of splashing, condensation, or drainage) from steam cleaning or pressure washing may potentially contaminate or otherwise negatively affect ongoing operations in areas outside of TA-55-4 Room 401. Migration can potentially be mitigated using plastic barriers taped to surfaces to enclose the area. However, areas enclosed in this manner will require workers to use additional personal protective equipment (PPE). This PPE will include fully enclosed protective wear and supplied air because of the increased risk of exposure to personnel due to potential releases of radiological materials and organic compounds within the enclosure. Enclosure of the area increases the risk of personnel exhaustion, because of the additional PPE, and the potential for workers to reach radiological work exposure limits. Therefore, wipe-down washing, rather than steam cleaning or pressure washing will be utilized because of the need to minimize the potential for exposure to workers and the migration of cleaning solution to other areas outside of the permitted unit's boundary.

The quantity of the wash solution will be minimized by dispensing from buckets, spray bottles, or other types of small containers. Cloths, or other absorbent cleaning devices, will not be reused to wipe down the surfaces after being wetted in the wash solution or after spraying solution onto the surfaces. Only one cloth or absorbent cleaning device will be used at a time in a single area to prevent cross-contamination.

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 small reusable equipment that cannot be decontaminated will be containerized and managed as waste as summarized in Table G.24-2 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/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 Decontamination Verification Sampling Activities

Decontamination verification sampling activities will be conducted at the permitted unit in order to verify that surfaces 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 the floor and from the walls (up to 11 feet) of the permitted unit. Verification wipe samples will be collected from random locations within each of the sample areas indicated on Figure G.24-1

(provided under separate cover) of this closure plan. A total of eight wipe samples will be collected; four from the walls and four from the floor.

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit.

6.2 Sample Collection Procedures

Samples will be collected in accordance with Permit Section 9.4.7.1 and the procedures identified in this sampling and analysis plan which incorporates guidance from the United States Environmental Protection Agency (USEPA) (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 the surface and related 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 Solid Chip Sampling

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit. Any non-porous inclusions from the sampling location will be removed by brushing or wiping. Using a chisel, drill, hole saw, or similar tool, a minimum 100 grams of the sample will be collected to a depth of 2 cm, or to an alternate depth specified in the assessment and transferred to an appropriate sampling container. The holding time and the preservation techniques to be used for each analysis will be determined from Table G.24-4.

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 sections provide a description of sample documentation, sample 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 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 chain-of-custody form to the Facility and it will become part of the permanent sampling record documenting the sampling efforts.

6.3.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- a. 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.24-4 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 the requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, wastes, 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 the packaging and transportation organization to independently tender shipments to common motor or air carriers.

6.4 Sample Analysis Requirements

Samples will be analyzed for all hazardous constituents listed in Appendix VIII of 40 CFR Part 261 and in Appendix IX of 40 CFR Part 264 that have been treated at the permitted unit over its operational history. Samples will be analyzed by an independent laboratory using the methods outlined in Table G.24-3. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.24-3. 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.24-3 is 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.24-5 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 sample preparations that occur during 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.24-2 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.1-5, 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, DC.

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

Table G.24-1
Closure Schedule for the Technical Area 55, Building 4, Room 401 Indoor Mixed Waste Storage
Treatment 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.24-2
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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized off-site radioactive waste disposal facility.

Table G.24-2
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, or WIPP, as appropriate.
Discarded concrete	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	Non-regulated solid waste	Subtitle D landfill, recycled, or reused
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
Discarded waste management equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
	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.
Sampling equipment	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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

Table G.24-2
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
		or WIPP, as appropriate.
	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.

Table G.24-3
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method ^a	Test Methods/ Instrumentation	Target Detection Limit ^b	Rationale
<i>Metal Analysis</i>				
Arsenic	7060A ^c , 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A ^d , 7081 ^c	FLAA,GFAA	200 ug/L	
Cadmium	7130 ^d , 7131A ^c	FLAA, GFAA	2 ug/L	
Chromium	7190 ^d , 7191 ^c	FLAA, GFAA	10 ug/L	
Lead	7420 ^d , 7421 ^c	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A ^e	CVAA	0.2 ug/L	
Selenium	7740 ^c , 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A ^d , 7761 ^c	FLAA, GFAA	10 ug/L	

^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. Actual detection limits may be higher depending on sample composition and matrix type.

^c Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.

^d Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.

^e Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy

FLAA = Flame atomic absorption spectroscopy

GFAA = Graphite furnace atomic absorption spectroscopy

ug/L = micrograms per liter.

Table G.24-4
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
<i>Metals</i>			
TCLP/Total 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	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide Mouth-Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO ₃ to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	

^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

mL = milliliter

HNO₃ = nitric acid

TCLP = Toxicity Characteristic Leaching Procedure

Table G.24-5
Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis	Frequency	Acceptance Criteria
Field Blank	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 ^a	Metals	One sample daily	Not Applicable

^a Collected only if reusable sampling equipment used

Figure G.24-1: Technical Area 55, Building 4, Room 401, Indoor Mixed Waste Tank Treatment Sampling Locations

ATTACHMENT G.25
TECHNICAL AREA 55, 0355 PAD
CLOSURE PLAN

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G.25-1	Technical Area 55-0355 Pad, Sampling and Additional Sampling Locations

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the outdoor hazardous waste container storage unit at Technical Area (TA)-55-0355 Pad 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 the permitted unit and not discussed within the Permit are described below.

The TA-55-0355 Pad is located outside and south of the TA-55-4 Outdoor Pad and Building TA-55-4. It is a concrete pad with a variable thickness of 4 to 6 inches, a steel roof structure (canopy) with dimensions of 93 ft. long and 63 ft. wide. Two walls with roll-up doors for wind prevention are located on the south and west sides of the canopy. The Permitted unit boundary is approximately 130 ft. long and 103 ft. wide.

The TA-55-0355 Pad consists of one hazardous waste management unit that provides storage in containers for hazardous waste, including the hazardous component of mixed transuranic waste and potentially, mixed low level waste streams. The TA-55-0355 Pad may also be managed hazardous-only waste streams generated on site. A mobile High Efficiency Neutron Counter (HENC) system, three safes for the storage of calibration sources, and miscellaneous support equipment are currently located on the Pad.

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 further information about waste management procedures and hazardous waste constituents stored at the permitted unit.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

To date, no hazardous waste has been stored at the permitted unit. Throughout the life of this Permit, it is estimated that 1,000 cubic meters of waste will be stored in 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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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, 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 the 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.25-1 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.

After decontamination, soil sampling and decontamination verification sampling will be conducted to demonstrate that the media 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 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 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 waste 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 flatbed trucks, trailers, or other appropriate vehicles for transport. 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 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 (including 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 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 concrete pad; metal canopy; and the floors, walls, and ceiling of the mobile HENC system 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 (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 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 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*) 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 disposed of in accordance with Permit Section 9.4.5 and Section 7.0 of this closure plan. The entire concrete pad (including all materials associated with it such as any underlying base course or fill) will be removed after the structural assessment.

5.3.2 Decontamination of Structures and Related Equipment

All structures and equipment that will be reused by the Facility will be decontaminated in accordance with Permit Section 9.4.3.1. At this time there is no equipment that is expected to be reused; however, if equipment or structures are identified during the assessment they will be decontaminated in accordance with this section. Decontamination of structures and equipment will be cleaned using water of pressure washed with a solution consisting of a surfactant detergent (*e.g.*, Alconox®) and water. 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.

5.3.3 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during closure 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.25-2 and in accordance with Facility waste management procedures, in accordance with Permit section 9.4.5 and Section 7 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 Sampling Activities

Soil samples and decontamination verification sampling activities will be conducted at the permitted unit to verify that soils and equipment at the permitted 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 related to the permitted unit. In compliance with Permit Section 9.4.7.1.ii, this closure plan will ensure the collection of 30 soil samples from the following locations:

- a. sampling within the known loading area as illustrated in Figure G.25-1 (*see* Permit Section 9.4.7.1.ii (1));
- b. one sample every 900 square feet of the permitted unit for a total of 6 samples (*see* Permit Section 9.4.7.1.ii(2)); and
- c. three samples to address stormwater runoff (*see* Permit Section 9.4.7.1.ii(3)).

Figure G.25-1 illustrates these proposed soil sampling locations.

At the time of sampling, the precise locations of the grid sample will be randomly selected within each 900 square foot sampling box (*see* Figure G.25-1). 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 within the area of the sampling box (*e.g.*, at concrete 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 procedures identified in this SAP which incorporates guidance from the United States Environmental Protection Agency (US EPA) (EPA, 1986 and EPA, 2002), DOE (DOE, 1995), and other Department-approved procedures.

6.2.1 Soil and Sediment Sampling

Soil samples will be collected and analyzed to determine if hazardous constituents are present in soils beneath 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 (*i.e.*, EPA 1996 or 2002). Samples will be kept at their at-depth temperature or lower, protected from ultraviolet light, sealed tightly in the recommended container, and analyzed within the specific holding times listed in Table G.25-3.

6.2.2 Wipe Sampling

Surface wipe samples will be collected and analyzed used to determine if residual hazardous constituents remain on surfaces, 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 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 sections provide a description of sample documentation, handling, preservation, storage, packaging, and transportation requirements that will be followed during the sampling activities associated with the closure.

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

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

- 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 chain-of-custody form to the Facility and it 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;
- k. name(s) of personnel responsible for the observations; and
- l. any deviations and supporting information.

6.3.2 Sample Handling, Preservation, and Storage

Samples will be collected and containerized in appropriate pre-cleaned sample containers. Table G.25-3 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 hazardous constituents listed in 40 CFR Part 261 Appendix VIII 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.25-4. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.25-4. 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.25-4 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 constituents 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.25-5 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.25-5 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.25-2, 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.25-1
Closure Schedule for the Technical Area 55-0355 Pad

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.	10 days after completed waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.25-2
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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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)

Table G.25-2
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
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.

Table G.25-2
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.25-2
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill or WIPP, as appropriate.
Concrete	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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.25-3
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP/ Total Metals: 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 HNO₃ = nitric acid L = Liter mL = milliliter HCl = hydrochloric acid
TCLP = Toxicity Characteristic Leaching Procedure

Table G.25-4
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method ^a	Test Methods/ Instrumentation	Target Detection Limit ^b	Rationale
Metal Analysis				
Antimony	6010D, 7010	ICP-AES, GFAA	20 ug/L	Determine the metal concentration in the samples.
Arsenic	6010 D, 7010, 7061A	ICP-AES, GFAA, CVAA	10 ug/L	
Barium	6010 D, 7010	ICP-AES,GFAA	200 ug/L	
Beryllium	6010 D, 7010	ICP-AES, GFAA	0.2 ug/L	
Cadmium	6010 D, 7010	ICP-AES, GFAA	2 ug/L	
Chromium	6010 D, 7010	ICP-AES, GFAA	10 ug/L	
Cobalt	6010 D, 7010	ICP-AES, GFAA	5 ug/L	
Copper	6010 D, 7010	ICP-AES, GFAA	5 ug/L	
Lead	6010 D, 7010	ICP-AES, GFAA	5 ug/L	
Mercury	6010 D, 7470A, 7471B	ICP-AES, CVAA	0.2 ug/L	
Selenium	6010 D, 7010, 7741B	ICP-AES, GFAA, CVAA	5 ug/L	
Silver	6010 D, 7010	ICP-AES, GFAA	10 ug/L	
Thallium	6010 D, 7010	ICP-AES, GFAA	30 ug/L	
Vanadium	6010 D, 7010	ICP-AES, GFAA	5 ug/L	
Zinc	6010 D, 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, 8275A	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.
<i>Other Parameters</i>				
Cyanide	9010C, 9012B	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*. The most recent test methods for SW-846 Test Methods as updated by the EPA, will be used at closure

^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.25-5
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.

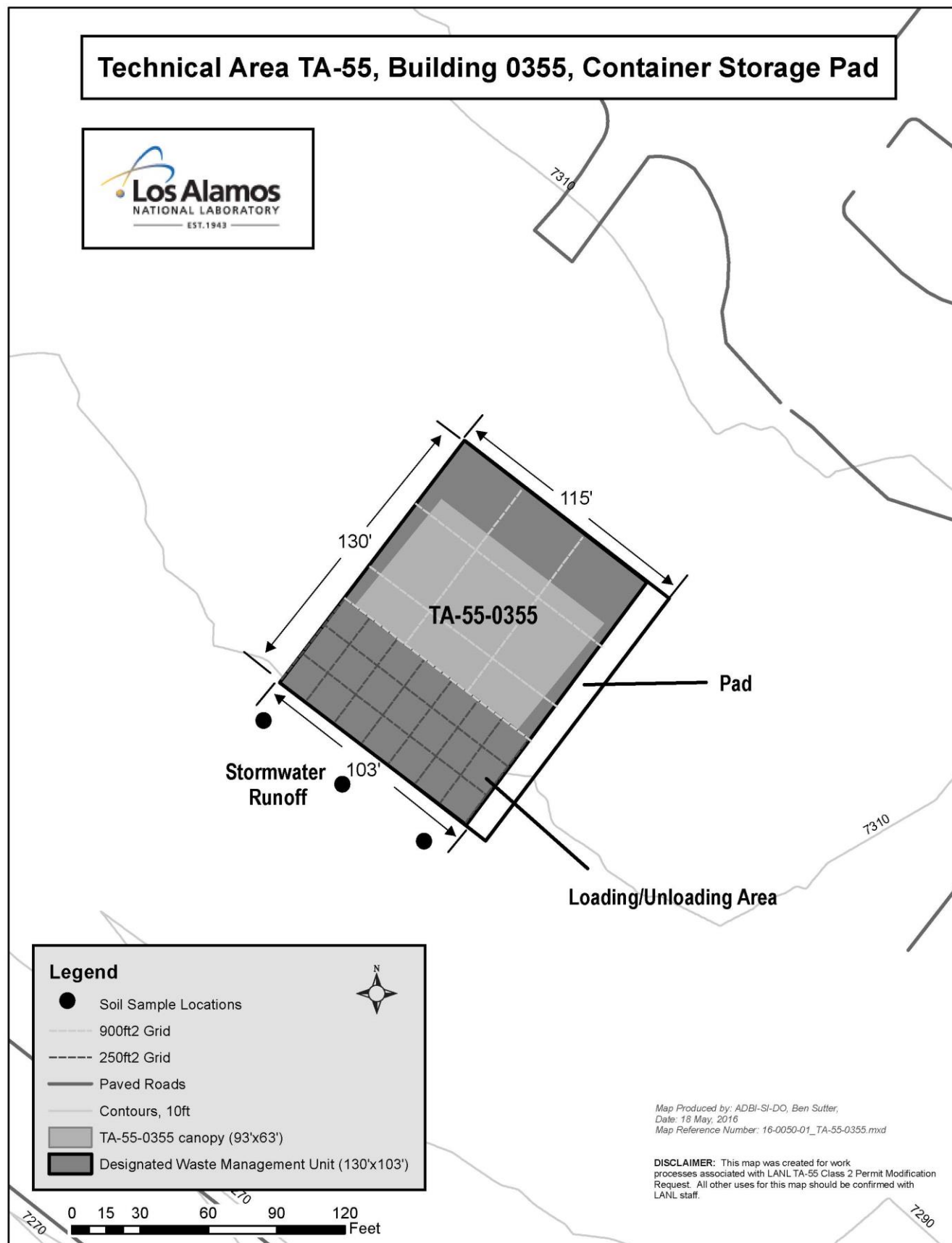


Figure G.25-1: Technical Area TA-55-0355 Pad, Unit Grid Sampling and Additional Sampling Locations

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ATTACHMENT G.26
TECHNICAL AREA 55
OUTDOOR STORAGE PAD
CLOSURE PLAN

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G.26-1	Technical Area 55 Outdoor Container Storage Unit Grid Sampling and Additional Sampling Locations

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the outdoor hazardous waste container storage unit at the Technical Area 55 Outdoor Storage Pad 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 container storage 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, 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 is located southwest of TA-55-4 and is constructed of asphalt with a variable thickness of four to six inches (in.). The permitted unit is trapezoid-shaped pad with dimensions of 102 feet (ft.), 86 ft., 156 ft., and 105 ft., respectively, on its four sides. The permitted unit is sloped, elevated approximately two to four in. above ground level, and has a culvert beneath the pad running from the northwest side to the southeast side to minimize run-on of precipitation.

Waste containment storage building TA-55-PF-190 was formerly located on the south-eastern portion of the permitted unit was used for storage of hazardous waste. The structure measured approximately 22 feet long and 8 feet 4 inches wide. The building was a manufactured steel building that was designed for hazardous waste storage.

A thorough records review of the structure's operating record was performed as required. The results of the records review did not identify any spills or releases. The records search did not identify any issues which could affect the structure or its waste containment capability. The structure was used for product storage, a less than 90-Day Accumulation Area and a Universal Waste Area. The structure was removed from the permitted area in 2016 and relocated for reuse as a less than 90-Day Accumulation Area, Universal Waste Area and product storage area. An affidavit will be kept on file regarding the past and proposed use for the structure. Given that the structure was relocated and was not closed or discarded, and was to be re-used for the same purposes the closure activities were not applicable to the structure. As a best management practice building TA-55-PF-190 was decontaminated twice prior to being removed from the TA-55-4 Outdoor Storage Pad. The TA-55-4 Outdoor Storage Pad continues to actively store waste in accordance with the Permit.

The waste typically stored at the permitted unit consists generally of hazardous and mixed waste in both solid and liquid form. The unit was constructed and placed into use in 1979 and has been subject to waste

management regulations under RCRA since July 25, 1990. Due to the scope of process operations at TA-55-4, the stored wastes include characteristic and listed waste, corrosive liquids, sludge, debris, and chemical wastes with metals and volatile and semi-volatile organic constituents. Specific Environmental Protection Agency (EPA) Hazardous Waste Numbers managed at the unit are included in Table G.26-1.

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 further information about waste management procedures and hazardous waste constituents stored at the permitted unit.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

Approximately 930 cubic meters of waste has been stored in the permitted unit. Throughout the life of this Permit it is estimated that an additional 700 cubic meters of waste will be stored in the permitted unit.

4.0 GENERAL CLOSURE INFORMATION

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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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 for container storage units.

Closure of the unit will be deemed complete when: 1) all structures and related 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 the 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.26-1 of 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 structures and related equipment.

After decontamination, soil sampling and decontamination verification sampling will be conducted to demonstrate that media and related equipment at the permitted unit meet the 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 Section 9.4.1.1.

5.0 CLOSURE PROCEDURES

Closure activities at the permitted unit will involve removal of hazardous wastes; proper management and disposal of hazardous waste residues and contaminated equipment associated with the permitted unit; and verification that the closure performance standards have been achieved. 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 waste 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. 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 previous finding(s) or action(s) that may influence closure activities or potential 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 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 ceiling of the steel building (TA_55-PF-190), as well as inspecting the asphalt pad for any existing cracks or conditions that indicate a potential for, or an actual, release of constituents. Prior to removal of TA-55-PF-190 an assessment of the structure's physical condition will be performed and documented. 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 Structures Equipment

In accordance with Permit Section 9.4.3, all remaining hazardous waste and hazardous waste residues will be removed from the permitted unit. The permitted unit's structures and 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*) and Facility waste management procedures.

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 entire asphalt pad (including all materials associated with it such as any underlying base course or fill) will be removed after the structural assessment.

5.3.2 Decontamination of Structures and Related Equipment

All structures and equipment that will be reused by the Facility will be decontaminated in accordance with Permit Section 9.4.3.1. At this time there is no equipment that is expected to be reused; however, if equipment or structures are identified during the assessment they will be decontaminated in accordance with this section. Decontamination of structures and equipment will be performed using water or a solution consisting of a surfactant detergent (*e.g.*, Alconox[®]) and water. Pressure washing or steam cleaning may be used, as appropriate. Portable berms, other devices (*e.g.*, absorbent socks, plastic sheeting, wading pools, existing secondary containment) will collect excess water and provide containment during the decontamination process.

5.3.3 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during decontamination activities will be cleaned with a wash water solution. Residue, disposable equipment, and small reusable equipment that cannot be decontaminated will be containerized and managed as waste as summarized in Table G.26-3 and in accordance with Facility waste management procedures, depending on the regulated constituents present.

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/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.ii, this closure plan will ensure the collection of 17 soil samples from the following locations:

- a. one sample at the known loading area (*see* Permit Section 9.4.7.1.ii(1));
- b. one soil sample every 900 square feet of the permitted unit for a total of 13 samples (*see* Permit Section 9.4.7.1.ii(2)); and
- c. three samples to address stormwater runoff (*see* Permit Section 9.4.7.1.ii(3)).

Figure G.26-1 illustrates these sampling locations.

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.26-1). 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 collection 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 incorporating 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 Soil and Sediment Sampling

Soil samples will be collected and analyzed to determine if hazardous constituents are present in the soil beneath the permitted unit. Soil samples will be collected using a spade, scoop, auger, or trowel or other equipment as specified in approved methods for the type of analytes and from appropriate depths as directed

in Permit Section 9.4.7.ii (*i.e.*, EPA 1996 or 2002). Samples will be kept at their at-depth temperature or lower, protected from ultraviolet light, sealed tightly in the recommended container, and analyzed within the specific holding times listed in Table G.26-5.

6.2.2 Wipe Sampling

Surface wipe samples will be collected and analyzed to determine if residual hazardous constituents remain on the structures, surfaces, or related 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 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 sections provide a description of sample documentation, handling, preservation, storage, and sample 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 chain-of-custody form to the Facility and it will become part of the permanent sampling record documenting the sampling efforts.

6.3.1.2 Sample Labels and Custody Seals

A sample label will be affixed to each sample container. The sample label will include the following information:

- a. 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.26-5 presents the requirements in *SW-846* (EPA, 1986) for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius will be placed in a cooler with ice or ice gel or in a refrigerator immediately upon collection.

6.3.3 Packaging and Transportation of Samples

All packaging and transportation activities will meet safety expectations, QA requirements, DOE Orders, and relevant local, state, and federal laws (including 10 CFR and 49 CFR). Appropriate Facility documents establish the requirements for packaging design, testing, acquisition, acceptance, use, maintenance, and decommissioning and for on-site, intra-site, and off-site shipment preparation and transportation of general commodities, hazardous materials, substances, waste, and defense program materials.

Off-site transportation of samples will occur via private, contract, or common motor carrier, air carrier, or freight. All off-site transportation will be processed through 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 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.26-4 which lists the analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses. Table G.26-5 references current US EPA SW-846 Methods for sampling containers, preservation and holding time requirements. 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 of this closure plan. The analytical laboratory will have:

- a. a documented comprehensive QA/QC program;
- b. technical analytical expertise;
- c. a document control/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.26-4 is 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 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.26-6 presents a summary of QC sample types, applicable analyses, frequency, and acceptance criteria. QC samples will be given a unique sample identification number and submitted to the analytical laboratory as blind samples. QC samples will be identified on the applicable forms so that the results can be applied to the associated sample.

6.4.2.2 Analytical Laboratory 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 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.26-3 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.26-3, 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, DC.
- 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.26-1

Hazardous Waste Constituents of Concern at the Technical Area 55 Outdoor Container Storage Unit^a

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Inorganics	D004, D005, D006, D007, D008, D009, D010, D011	Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver
	F006	Wastewater treatment sludge
	P015, P056, P073 P113, P120	Beryllium powder, Fluorine , Nickel carbonyl, Thallic oxide, Vanadium oxide
	U151	Mercury
Organic Compounds	D018, D019, D021, D022, D027, D028, D029, D030, D032, D033, D034, D035, D036, , D037, D038, D039, D040, D041, D042, D043	Benzene; Carbon tetrachloride; Chlorobenzene; Chloroform; 1,4-Dichlorobenzene; 1,2-Dichloroethane; 1,1-Dichloroethylene; 2,4-Dinitrotoluene; Hexachlorobenzene; Hexachlorobutadiene; Hexachloroethane; Methyl ethyl ketone; Nitrobenzene; Pentachlorophenol; Pyridine; Tetrachloroethylene; Trichloroethylene; 2,4,5-Trichlorophenol; 2,4,6-Trichlorophenol; Vinyl chloride
	F001, F002, F003, F004, F005	1,1,1-Trichloroethane; Carbon tetrachloride; Chlorinated fluorocarbons; Methylene Chloride; Tetrachloroethylene; Trichloroethylene; Trichlorofluoroethane; 1,1,1-Trichloroethane; 1,1,2-Trichloro-1,2,2-trifluoroethane; 1,1,2-Trichloroethane; Chlorobenzene; Freon tf; Methyl chloride; Methylene chloride; Ortho-dichlorobenzene; Tetrachloroethylene; Trichloroethylene; Trichloroflouromethane; Acetone; Ethyl ether; Methanol; Methyl isobutyl ketone; n-Butyl alcohol; Xylene; Cresols; Cresylic acid; Nitrobenzene; 2-Ethoxyethanol; 2-Nitropropane; Benzene; Carbon disulfide; Isobutanol; Methyl ethyl ketone; Pyridine; Toluene
	U002, U003, U019, U044, U056, U075,	Acetone; Acetonitrile; Benzene; Chloroform; Cyclohexane; Dichlorodifluoromethane; Methane,dichloro-; Dimethyl sulfate; 1,4-Dioxane; Ethane, 1,1'-oxybis-; Methane, trichlorofluoro-; Formic acid; Hydrofluoric acid; Methhanol; Methyl ethyl ketone; Naphthalene; Pyridine; Tetrachloroethylene; Methane, tetrachloro-; Furan, tetrahydro-; Thallium chloride;

	U080, U103, U108, U117, U121, U123, U134, U154, U159, U165, U196, U210, U211, U213, U216, U220, U225, U226, U227, U228, U239	Toluene; Bromoform; Ethane, 1,1,1-trichloro-; 1,1,2-Trichloroethane; Trichloroethylene; Xylene
Cyanides	F007, F009 P030, P098, P099, P106	Cyanide plating bath solutions, Cyanide stripping cleaning solutions Soluble cyanide salts (unspecified), Potassium cyanide, Potassium silver cyanide, Sodium cyanide

^a Based on the permitted unit Operating Record

Table G.26-2
Closure Schedule for the Technical Area 55, 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.	10 days after completed waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.26-3
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an

Table G.26-3
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
		authorized 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.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.26-3
Potential Waste Materials, Waste Types, and Disposal Options

Potential Waste Materials	Waste Types	Disposal Options
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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.26-4
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method ^a	Test Methods/ Instrumentation	Target Detection Limit ^b	Rationale
Metal Analysis				
Arsenic	6010, 7010, 7061A	ICP-AES, GFAA, CVAA	10 ug/L	Determine the metals concentration in the samples.
Barium	6010, 7010	ICP-AES,GFAA	200 ug/L	
Cadmium	6010, 7010	ICP-AES, GFAA	2 ug/L	
Chromium	6010, 7010	ICP-AES, GFAA	10 ug/L	
Lead	6010, 7010	ICP-AES, GFAA	5 ug/L	
Mercury	6010, 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	
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.

^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.26-5
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP/Total Metals: 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	
TCLP/Total Mercury	Aqueous Media: 500-mL Wide Mouth-Polyethylene or Glass with Teflon Liner	Aqueous Media: HNO ₃ to pH <2 Cool to 4 °C	28 Days
	Solid Media: 125-mL Glass	Solid Media: Cool to 4 °C	
Volatile Organic Compounds			
Target Compound Volatile Organic Compounds	Aqueous Media: Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Aqueous Media: HCl to pH<2 Cool to 4 °C	14 days
	Solid Media: 125-mL Glass or Two 40-mL Amber Glass Vials with Teflon-Lined Septa	Solid Media Cool to 4 °C Add 5 mL Methanol or Other Water Miscible Organic Solvent to 40-mL Glass Vials	
Semi-Volatile Organic Compounds			

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

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

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

°C = degrees Celsius

HCl = hydrochloric acid

mL = milliliter

HNO₃ = nitric acid

L = Liter

TCLP = Toxicity Characteristic Leaching Procedure

Table G.26-6

Recommended Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

QC Sample Type	Applicable Analysis ^a	Frequency	Acceptance Criteria
Trip Blank	VOC	One set per shipping cooler containing samples to be analyzed for VOCs	Not Applicable
Field Blank	VOC/SVOC, metals	One sample daily per analysis	Not Applicable
Field Duplicate	Chemical	One for each sampling sequence	Relative percent difference less than or equal to 20 percent
Equipment Rinsate Blank ^b	VOC/SVOC, metals	One sample daily	Not Applicable

^a For VOC and SVOC analysis, if blank shows detectable levels of any common laboratory contaminant (*e.g.*, methylene chloride, acetone, 2-butanone, toluene, and/or any phthalate ester), sample must exhibit that contaminant at a level 10 times the quantitation limit to be considered detectable. For all other contaminants, sample must exhibit the contaminant at a level 5 times the quantitation level to be considered detectable.

^b Collected only if reusable sampling equipment used.

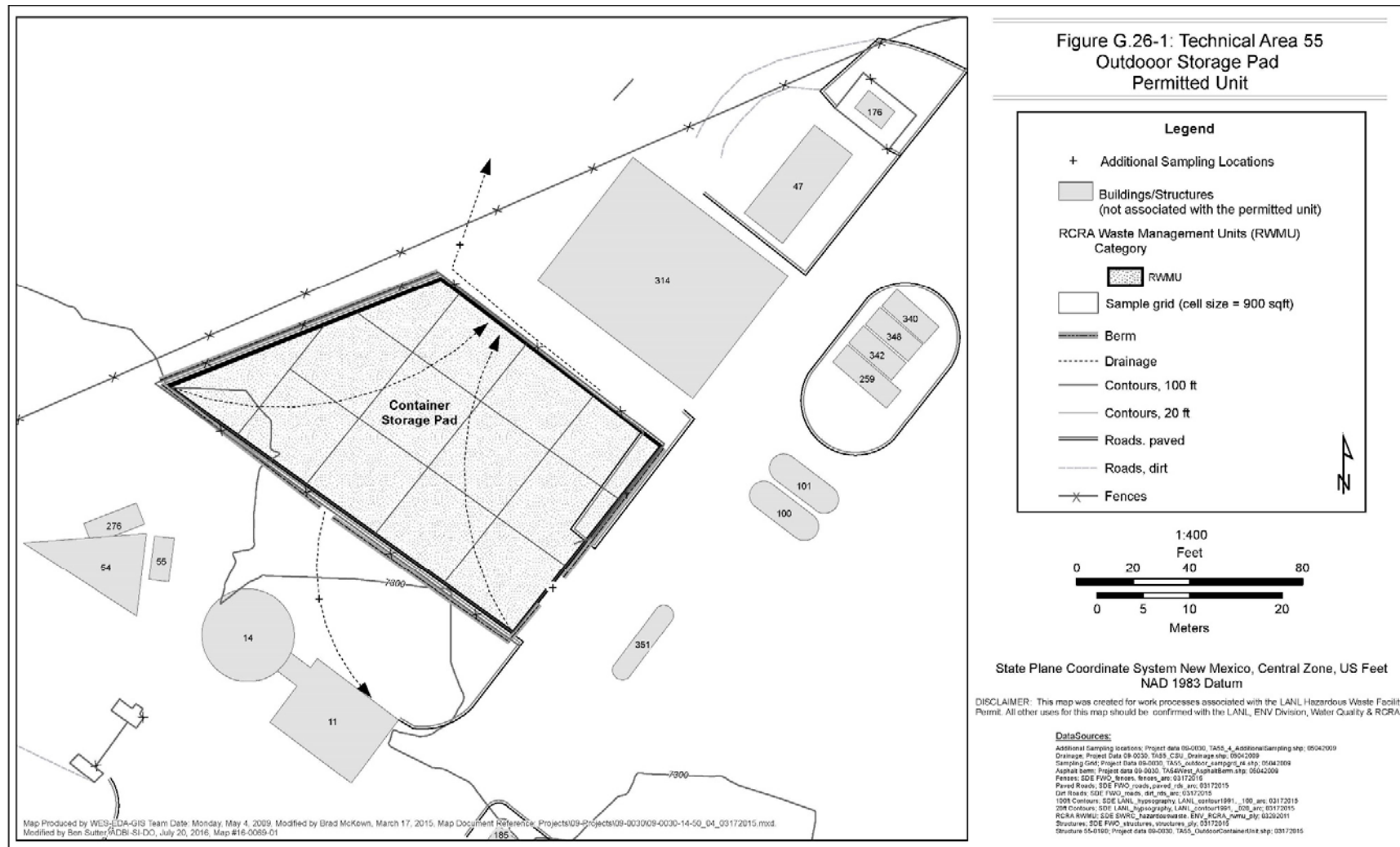


Figure G.26-1: Technical Area 55 Outdoor Container Storage Unit Grid Sampling and Additional Sampling Locations

ATTACHMENT G.27
TECHNICAL AREA 63
TRANSURANIC WASTE FACILITY
CLOSURE PLAN

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1.0 INTRODUCTION

This closure plan describes the activities necessary to close the permitted mixed waste Transuranic Waste Facility (TWF) at Technical Area (TA)-63 at the Los Alamos National Laboratory (Facility) hereinafter referred to as the “Unit To Be Closed,” or 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 waste management units operated at the Facility under the Resource Conservation and Recovery Act (RCRA) and the New Mexico Hazardous Waste Act.

The TWF unit will be closed by removal of all structures and equipment. Until closure is complete and has been certified in accordance with Permit Part 9.5 and 40 CFR §264.115, 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 unit, this closure plan may be amended in accordance with Permit Section 9.4.8 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 (the Department) for approval prior to implementing closure activities.

2.0 DESCRIPTION OF UNIT TO BE CLOSED

The TWF is located at TA-63 at the junction of Pajarito Road and Puye Road, within the triangle formed by Building 63-111 to the east, Puye Road to the north, and Pajarito Road to the southwest. It was designed, constructed, and commissioned as a Hazard Category (HC)-2 nuclear facility and permitted as Resource Conservation and Recovery Act (RCRA) Storage Facility for TRU, mixed TRU and hazardous wastes. This site is shown on Permit Figure 55. Permit Attachment A.6, Technical Area (TA), Unit Descriptions contains additional site information and building numbers.

STRUCTURES THAT HAVE MANAGED HAZARDOUS WASTE TO BE REMOVED AT CLOSURE:

- Storage Buildings: 63-0149, 63-0150, 63-0151, 63-0152, and 63-0153
- Storage and Characterization Building: 63-0154
- Characterization Trailers: 63-0155, 63-0156, and 63-0156
- Concrete Storage Pad

Six buildings are designated for storage of TRU and Mixed TRU wastes in support of LANL programs and missions. One of the storage structures is used for both storage of larger-sized waste containers and for head space gas sampling and analysis. Certification of containers in accordance with Waste Isolation Pilot Plant (WIPP) Waste Acceptance Criteria (WAC) occurs at three characterization and testing trailers. A concrete pad underlies the storage and characterization buildings and trailers. The boundaries of the pad will be used to designate the RCRA-permitted portion of the TWF.

OTHER TWF STRUCTURES TO BE REMOVED AT CLOSURE:

- Retention Basin
- Calibration Source and Matrix Module (CSMM) Building: 63-0158

The CSMM Building and the Retention Basin are the only structures that will be closed within the boundary of the TWF permitted hazardous waste management unit that are not used to manage hazardous waste.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

The TWF shall not store a volume greater than 105,875 gallons of waste at any time for the lifetime of the permitted facility.

4.0 GENERAL CLOSURE REQUIREMENTS

4.1 Closure Performance Standards

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; and
- 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. The cleanup levels for soil shall be established based on residential land use. The Permittees must also demonstrate that there is no potential for contaminants to affect surface water or groundwater.

Closure of the permitted unit will be deemed complete when: 1) All 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 is intended to address closure requirements for the permitted unit within the authorized timeframe of this Permit (see Permit Section 9.4.1). 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. Subject to the provisions of 40 CFR §264.113(a), such removal may only occur before the end of the allowed 90 day period to remove, treat or dispose of all hazardous waste after receipt of the final volume of waste. For the purposes of this closure plan, portable and temporary structures in this permitted unit such as characterization trailers are considered to be equipment by their design rather than structures.

Closure activities will proceed according to the schedule discussed below and Table 1 of this closure plan. Notification of closure will occur at least 45 days prior to the start of closure activities (see 40 CFR § 264.112(d)(1)). Closure activities will begin according to the requirements of 40 CFR § 264.112(d)(2) no later than 30 days after the date on which the unit receives the known final volume of waste. All hazardous wastes will be removed from the TWF within 90 days of the receipt of the known final volume of waste pursuant to Permit Section 9.4.1, Closure Schedule, Permit Section 9.4.2, Removal of Hazardous Waste, and 40 CFR §264.113(a). A records review of the operating history of the unit shall be completed within ten days of the removal or treatment of all waste from the permitted unit as required by Permit Section 9.4.6.1, Records Review. A structural assessment of the unit will occur within ten days of the completed removal or treatment of all waste from the permitted unit as required by Permit Section 9.4.6.2,

Structural Assessment. Notification of the structural assessment (assessment), as described in Section 5.2 of this closure plan, will occur in accordance with Permit Section 9.4.6.2.

After completion of the records review and structural assessment, the Permittees shall submit an amended closure plan, if necessary, to the NMED for review and approval as a permit modification request to incorporate changes to the sampling and analysis plan. Decontamination verification sampling activities, and soil sampling, shall be conducted in accordance with this closure plan to demonstrate the closure performance standards included in Permit Section 9.2.1 have been met.

All closure activities shall be completed within 150 days of the beginning of closure activities or 180 days after the receipt of the known final volume of waste in compliance with Permit Section 9.4.1.1. The final closure report and certification will be submitted to NMED for review and approval within 60 days of completion of closure in accordance with Permit Section 9.5. In the event that the activities required under the closure plan cannot be completed within the allotted timeframe, the Permittees may request a permit modification to modify the schedule pursuant to the requirements of Permit Section 9.4.8, Amendment of the Closure Plan. In the event that closure of the TWF cannot proceed according to schedule, the Permittees shall request a time extension to complete the closure in accordance with Permit Section 9.4.1.1.

5.0 CLOSURE PROCEDURES

The following sections describe the procedures to be used for closure of the permitted unit. The procedures shall occur in the sequence described in this section (5), although the operating record review described in Section 5.2.1 may be started earlier.

5.1 Removal of Waste

In accordance with Permit Part 9.4.2, all stored hazardous waste shall be removed from the TWF for transport to WIPP in accordance with all DOE, US DOT, and WIPP shipping and transporting requirements. All hazardous-only or MLLW waste containers 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

Before starting decontamination and sampling activities, the operating and inspection records for the TWF shall be reviewed and a structural assessment of the entire TWF shall be conducted to identify 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 this review will be to:

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

5.2.2 Structural Assessment

A structural assessment (assessment) of the unit's physical condition shall be conducted in accordance with Permit Section 9.4.6.2 and all observations shall be documented including any necessary

photographs and drawings. The TWF structural assessment shall include the concrete pad (as an outdoor pad defined in Section 9.1.3(1) of the Permit) and the retention basin. If the assessment reveals any evidence of a release (e.g., stains) or damage (e.g., cracks, gaps, chips) to the flooring or building materials, the Permittees must incorporate these locations as additional sampling points in the updated sampling and analysis plan (see Section 7.0) and describe the applicable sampling methods and procedures in the plan. If evidence of a release or damage is present, a wipe sample or a representative sample of the media (e.g., concrete chip) will be collected according to the procedures in Section 7.2. If additional sampling locations are necessary, the Permittees shall request a permit modification to modify the sampling and analysis plan in accordance with Permit Section 9.4.6. The locations of any additional sampling locations shall be determined in accordance with Permit Section 11.10.2.5.

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 shall be removed from the TWF. The unit's structures and related equipment shall be decontaminated and removed. All waste shall be managed and characterized as necessary for disposal as required by Permit Attachment C, Waste Analysis Plan, Permit Section 9.4.5, and the LANL waste management procedures.

5.3.1 Removal of Structures and Related Equipment

All structures and related equipment that are removed from the unit will require no further decontamination but shall be considered solid waste and potentially, hazardous waste, as defined by this Permit, at removal. The materials shall be disposed in accordance with Permit Section 9.4.5 and Section 5.3 of this closure plan. The concrete pad, the materials associated with the pad (curbing and ramps), and a minimum of six inches of the base course and soil underlying the concrete pad shall be removed. If the remaining soil surface shows evidence that the removal to this point has not included all contaminated soils and construction materials associated with the pad, additional soil shall be removed until the conditions of Permit Section 9.2 are met. The option of removing small areas of concrete 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 may be evaluated at the time of the structural assessment. If this option is used, the concrete removed at the sampling location and any concrete subsequently removed from the location during the general removal of the concrete pad to a radius to be determined during the structural assessment shall be segregated to prevent potential cross contamination during the closure process.

5.3.2 Decontamination of Structures and Related Equipment

All structures and related equipment that will be re-used by the Facility will be decontaminated in accordance with Permit Section 9.4.3.1. This may include the characterization trailers and any associated equipment removed at closure. The lists of equipment needing decontamination shall be reviewed during the pre-closure and structural assessment described in Part 9 of the Permit.

Water resistant equipment at the permitted unit will be decontaminated by steam cleaning using water or pressure washing with a solution consisting of a surfactant detergent (e.g., Alconox®) and water. Wipe-down washing with a solution consisting of a surfactant detergent (e.g., Alconox®) and water may be conducted on equipment within the unit if containment cannot be established for collection of the steam cleaning water or pressure wash solution or these methods will damage the equipment preventing further use or recycling. The quantity of the wash solution shall be minimized by dispensing from buckets, spray bottles, or other types of containers. Cheesecloth, rags, or other absorbent materials shall be used to wipe

down the equipment after being wetted in the wash solution or after spraying solution onto the equipment. If necessary, portable berms or other devices (e.g., absorbent socks, plastic sheeting, wading pools, or existing secondary containment) designed to collect and provide containment shall collect excess wash water and provide containment during the decontamination process. Wash solutions shall not be allowed to enter the fire suppression water drains.

5.4 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during closure activities shall be cleaned with an Alconox® or other NMED approved wash water solution. The solution shall be characterized and managed as a hazardous waste unless characterization demonstrates that the solution is nonhazardous. Residue, disposable equipment, and equipment that cannot be decontaminated shall be containerized and managed as waste.

6.0 SAMPLING AND ANALYSIS PLAN

This sampling and analysis plan (SAP) describes the sampling and analytical methods as well as the quality assurance and quality control (QA/QC) procedures that shall be used to demonstrate that the permitted unit is closed in accordance with Permit Part 9 and all applicable closure requirements.

6.1 Soil Sampling Locations

Soils sampling shall be conducted at the permitted unit in order to verify that the removal of structures and soils, with other closure related activities meet the closure performance standards in Permit Section 9.2, Closure Performance Standards. All samples shall be collected and analyzed in accordance with the procedures in Sections 6.2, 6.3, and 6.4 of this closure plan. Soil samples shall be collected from beneath the concrete pad of the unit and in additional sampling locations specified to meet the conditions of Permit Section 9.4.7.1.ii.

In compliance with Permit Section 9.4.7.ii, this closure plan will ensure the collection of surface soil samples in the following locations:

- a. a minimum of one sample at each loading/unloading point for a total of six samples (see Permit Section 9.4.7.1.ii(1));
- b. a minimum of one sample every 900 square feet of the permitted unit for a total of 88 samples (see Permit Section 9.4.7.1.ii(2));
- c. a minimum of one sample at the stormwater discharge drainage location (see Permit Section 9.4.7.1.ii(3));
- d. a minimum of one sample, at 30 foot intervals, along the valley gutter for a total of 4 samples (see Permit Section 9.4.7.1.ii(8)); and
- e. a minimum of three additional samples along the long axis of the retention basin (see Permit Section 9.4.7.ii(5)).

The above referenced soil sample locations are illustrated in Figure F-1 of this closure plan.

6.2 Sample Collection Procedures

Samples shall be collected in accordance with Permit Sections 9.4.7.1 and 11.10 and the procedures described in this SAP. Additional surface and subsurface samples shall be collected if contamination is

detected or if the records review or structural assessment identify the need for additional sample collection.

6.2.1 Liquid Sampling

Grab samples of any liquids present in the retention basin shall be collected to demonstrate that the drain system has not been contaminated. Liquid sampling shall be conducted using glass or plastic tubes, a composite liquid waste sampler, a bacon bomb sampler, or bailer. The samples shall be transferred directly from the sampler to the pre-cleaned laboratory prepared sample containers appropriate for each analytical method.

6.2.2 Wipe Sampling

If surface wipe samples are collected from structures or surfaces, the samples shall be collected in accordance with the National Institute of Occupational Safety and Health (NIOSH) Manual of Analytical Methods, Method 9100 (NIOSH, 1994), or other approved methodology. Wipe sample methods shall be appropriate for the type of surface being sampled, the type of contaminant, and the desired method detection limits, wiping a 100 square centimeter area at each discrete location in accordance with guidance and the requirements of the analytical laboratory.

6.2.3 Soil Sampling

Soil shall be sampled using a spade, trowel, or other equipment as specified in approved methods for the type of analyte (i.e., EPA 1996 or 2002). At minimum soil samples shall be collected at the frequency specified in the Permit, Section 9.4.7.1.ii. The soil samples shall be collected in accordance with Permit section 11.10.2.9.

6.2.4 Cleaning of Sampling Equipment

Reusable sampling equipment shall be decontaminated and rinsed prior to use. Sampling equipment rinsate blanks shall be collected and analyzed if reusable sampling equipment is used. Reusable equipment, tools and, sampling equipment shall be cleaned prior to each use in accordance with Permit Section 11.10.2.11. A disposable sampler is considered clean if still in a factory-sealed wrapper. Residue and decontamination equipment that cannot be decontaminated will be containerized as solid or hazardous waste as appropriate.

6.3 Sample Management Procedures

Samples shall be collected and transported using documented chain-of-custody and sample management procedures to ensure the integrity of the sample and provide an accurate and defensible written record of the possession and handling of a sample from the time of collection through laboratory analysis in accordance with Permit Section 11.10.2.9.

6.3.1 Sample Documentation

Sampling personnel shall document all sampling, logging and field screening activities. Sample documentation will include sample identification numbers, chain-of-custody forms, analysis requested, sample descriptions (e.g., soil classification) sample logbooks detailing sample collection activities, and shipping forms (if necessary).

6.3.1.1 Chain-of-Custody

Chain-of-custody procedures shall be followed until the samples are relinquished to the analytical laboratory in accordance with Permit Section 11.10.2.14.ii. The sample collector is responsible for the integrity of the samples collected until transferred. 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 shall document all sample collection data. Individuals relinquishing or receiving custody of the samples shall 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. Copies of completed original chain-of-custody form shall be returned to the Permittees by the analytical laboratory and included with the associated laboratory report attached to the Closure Report.

6.3.1.2 Sample Labels and Custody Seals

A sample label shall 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 shall be placed on each sample container or shipping container containing multiple samples 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 and the change initialed and dated by the author. The sample logbook shall include the following information:

- a. the sample location by GPS, or other NMED approved coordinates;
- b. 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. names of personnel responsible for the observations.

6.3.2 Sample Handling, Preservation, and Storage

Samples shall be collected and containerized in appropriate pre-cleaned sample containers in accordance with the requirements specified in SW-846 (EPA, 1986 as updated) and Permit Section 11.10.2.9 for sample containers, preservation techniques, and holding times. Samples that require cooling to 4 degrees Celsius shall 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 shall meet U.S. DOT requirements for transport of solid, hazardous, and radioactive waste, as applicable, DOE Orders, and all other relevant local, state, and federal laws (including 10 CFR and 49 CFR).

Off-site transportation of samples shall occur via private, contract, or common motor carrier; air carrier; or freight.

6.4 Sample Analysis Requirements

Samples shall be analyzed for all hazardous constituents listed in Appendix VIII 40 CFR 261 and in Appendix IX of 40 CFR 264 that have been stored at the permitted unit during its operational history. Samples shall be analyzed by an independent laboratory using the analytical methods appropriate for the constituents identified in the operating record.

6.4.1 Analytical Laboratory Requirements

The analytical laboratory shall perform the detailed qualitative and quantitative chemical analyses in accordance with Section 6.4.2 and Permit Section 11.10.3. The analytical methods and quality control procedures shall be conducted in accordance with Permit Section 11.10.3 and specifically Section 11.10.3.1. This Closure Plan shall be updated to list the specific analytical methods used for sample analysis no less than 10 days prior to closure of the hazardous waste management unit.

6.4.2 Quality Assurance/Quality Control

Field sampling procedures and laboratory analyses shall be evaluated through the use of QA/QC samples to assess the overall quality of the data produced in accordance with Permit Sections 11.10.2.4.vii, 11.10.2.8.iv, and 11.10.3.1. QC samples evaluate precision, accuracy, and potential sample contaminations associated with the sampling/analysis process and are described in the following sections, along with information on calculations necessary to evaluate the QC results. Analysis will be conducted in accordance with the procedures described in SW-846 (EPA, 1986 as updated) and Permit Section 11.10.3.

6.4.2.1 Field Quality Control

The field QC samples that will be collected include trip blanks, field blanks, field duplicates, and equipment rinsate blanks as required by Permit Sections 9.4.7.1(8), 11.10.2.4.vii, and 11.10.2.9(4). QC samples will be labeled with 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 compared 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 shall include the data specified in Permit Section 11.10.3.1.iv. The level II laboratory analytical data package shall be included with the closure report for the HWMU.

The laboratory shall include a case narrative in each laboratory report for the hazardous waste management unit that identifies data quality exception corrective action taken and the effect of the data quality exceptions on the acceptability of the data.

7.0 WASTE MANAGEMENT

All waste generated during closure shall 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, which are listed with potential disposal options in Table G.27-2 of this closure plan. Subsequent disposition options for the decontaminated structures and equipment include reuse, recycling, or disposal.

Portable berms or other devices, if necessary, shall be used to collect excess wash water and provide containment during the decontamination activities to prevent releases. All wash water shall be collected, transferred to containers, sampled, and analyzed for the hazardous constituents as referenced in section 6.4 of this plan. Based on the results of the analysis, the wash water shall be managed as hazardous or non-hazardous wastewater. Reusable protective clothing, tools, and equipment used during decontamination shall be cleaned in accordance with section 6.2.4 of this plan. Disposable equipment and other small equipment that cannot be decontaminated shall be containerized and managed as waste.

8.0 CLOSURE CERTIFICATION REPORT

Upon completion of the closure activities at the TWF, a closure report shall be prepared and submitted to the Department. The report shall document that the unit has been closed in compliance with the specifications in this closure plan and will contain the following information in accordance with Section 9.5 of the Permit:

The closure report shall summarize all activities conducted during closure including, but not limited to, the following:

- 1) a summary of the site history including the waste managed at the unit and any records of spill or other incidents;

- 2) the results of all investigations conducted during closure following the report format set forth in Permit Section 11.12.3;
- 3) remediation waste management;
- 4) decontamination;
- 5) decontamination verification and soil sampling activities; and
- 6) results of all chemical analyses and other characterization activities;
- 7) a summary of all cleanup actions, including volumes of contaminated media removed and confirmation sampling results; and
- 8) a demonstration that the cleanup levels specified in Permit Section 11.4 and 11.5 have been achieved.

The closure report shall be submitted to the Department no later than 60 days after completion of closure of the TWF Permitted Unit. The certification must be signed by the Permittees and by an independent professional engineer registered in the State of New Mexico.

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

- 9) a copy of the certification pursuant to 40 CFR § 264.115;
- 10) any variance, and the reason for the variance, from the activities approved in this closure plan;
- 11) documentation of the structural assessment and records review conducted under this Permit Part 9;
- 12) a summary of all sampling results related to equipment decontamination, demolition and disposal that includes:
 - a. sample identification;
 - b. sampling location;
 - c. data reported;
 - d. detection limit for each analyte;
 - e. a measure of analytical precision (e.g., uncertainty, range, variance);
 - f. identification of analytical procedure; and
 - g. identification of analytical laboratory;
- 13) a QA/QC statement on analytical data validation and decontamination verification;
- 14) storage or disposal locations for hazardous waste resulting from closure activities; and
- 15) a certification statement of the accuracy of the Closure Report.

9.0 DEPARTMENT CLOSURE ASSESSMENT

Upon submittal of the closure certification report described in Section 8.0 of this closure plan, the Facility shall arrange an on-site closure review with representatives of the Department to assess the completion of the closure activities of the permitted unit's closure activities.

10.0 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, DC.

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

Table G.27-1
Closure Schedule for the TA-63 TWF

Closure Activity	Schedule	Basis
Provide closure notification to NMED	-45	40 CFR §264.112(d)(1)
Receive known final volume of waste	-30	Permit Section 9.4.1, 40 CFR §264.112(d)(2)(i)
Begin closure activity – requirement to begin removal of hazardous waste from the permitted unit	0	Permit Section 9.4.1, 40 CFR §264.112(d)(2)(i)
Notification of structural assessment to NMED	40	Permit Section 9.4.6.2: notification to occur at least 30 days prior to the structural assessment.
Hazardous waste removed	60	Permit Section 9.4.1 and 9.4.2, 40 CFR §264.113(a): removal must be completed within 90 days of the receipt of known final volume of hazardous waste.
Completion of record review	70	Permit Section 9.4.6.1: record review will occur within 10 days of completed waste removal or treatment.
Completion of structural assessment	70	Permit Section 9.4.6.2: structural assessment will occur within 10 days of completed waste removal or treatment.
Completion of closure activities	150	Permit Section 9.4.1.1, 40 CFR §264.113(b): closure activities must be completed within 180 days of the receipt of known final volume of hazardous waste.
Submittal of closure report to NMED	210	Permit Section 9.5, 40 CFR §264.115: report submitted within 60 days of closure completion

Note: The schedule shown represents the maximum allowable time to complete the activity.

Table G.27-2

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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA, or an authorized off-site radioactive waste disposal facility. ^a
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D mixed waste landfill or the 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 mixed waste landfill or WIPP, as appropriate.
Verification 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	RLWTF
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D mixed waste landfill or WIPP, as appropriate.
Metal	Non-regulated solid waste	Subtitle D landfill or recycled

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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA, or an authorized off-site radioactive waste disposal facility. ^a
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D mixed waste landfill, or WIPP, as appropriate.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA, or an authorized off-site radioactive waste disposal facility. ^a
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D mixed waste 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA , or an authorized off-site radioactive waste disposal facility. ^a
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D mixed waste landfill or WIPP, as appropriate.
Storage 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.

Potential Waste Materials	Waste Types	Disposal Options
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA, or an authorized off-site radioactive waste disposal facility. ^a
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D mixed waste landfill or WIPP, as appropriate.
Concrete Pad	Non-regulated solid waste	Subtitle D landfill or potentially, re-use/recycle
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA, or an authorized off-site radioactive waste disposal facility. ^a
	Mixed waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D mixed waste landfill or WIPP, as appropriate.

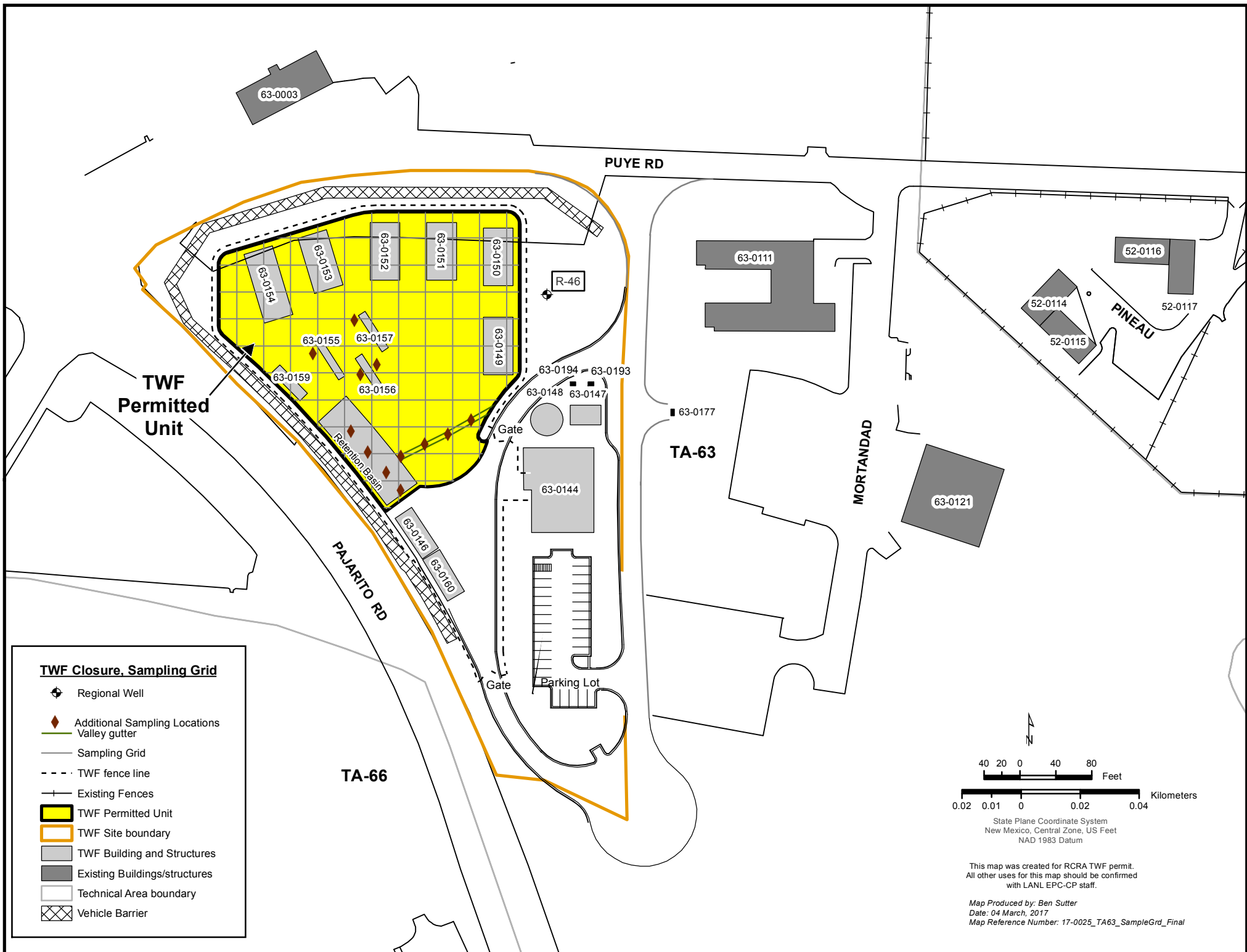
^a This description of the disposal option for low level waste may be subject to revision pending the resolution of the LANL Appeal of the November 2010 LANL Hazardous Waste Facility Permit.

Table G.27-3
Hazardous Waste Constituents of Concern at the TWF^a

Category	EPA Hazardous Waste Numbers	Specific Constituents
Toxic Contaminants	D004	Arsenic
	D005	Barium hydroxide
	D006	Cadmium
	D007	Chromium
	D008	Lead
	D009	Mercury
	D010	Selenium
	D011	Silver
	D018	Benzene
	D019	Carbon tetrachloride
	D021	Chlorobenzene
	D022	Chloroform
	D026	Cresol
	D027	1,4-Dichlorobenzene
	D028	1,2-Dichloroethane
	D029	1,1-Dichloroethylene
	D030	2,4-Dinitrotoluene
	D032	Hexachlorobenzene
	D033	Hexachlorobutadiene
	D034	Hexachloroethane
	D035	Methyl ethyl ketone
	D036	Nitrobenzene
	D037	Pentachlorophenol
	D038	Pyridine
	D039	Tetrachloroethylene
	D040	Trichloroethylene
	D041	2,4,5-Trichlorophenol
	D042	2,4,6-Trichlorophenol
	D043	Vinyl chloride
Volatile Organic Compounds	F001	Spent halogenated solvents, trichloroethylene
	F002	Spent halogenated solvents
	F003	Spent non-halogenated solvents, xylene, acetone
	F004	Spent non-halogenated solvents
	F005	Spent non-halogenated solvents
Toxic listed waste	U080	Methylene chloride

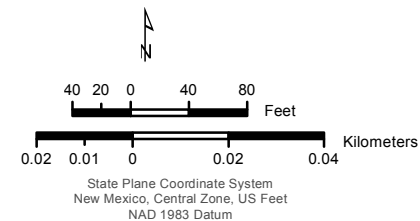
^a This will be modified as needed, based on the unit operating record.

EPA = U.S. Environmental Protection Agency



TWF Closure, Sampling Grid

- Regional Well
- Additional Sampling Locations
- Valley gutter
- Sampling Grid
- TWF fence line
- Existing Fences
- TWF Permitted Unit
- TWF Site boundary
- TWF Building and Structures
- Existing Buildings/structures
- Technical Area boundary
- Vehicle Barrier



This map was created for RCRA TWF permit.
All other uses for this map should be confirmed
with LANL EPC-CP staff.

Map Produced by: Ben Sutter
Date: 04 March, 2017
Map Reference Number: 17-0025_TA63_SampleGrd_Final

ATTACHMENT G.28
RESERVED

ATTACHMENT G.29
TECHNICAL AREA 55, BUILDING 4 ROOM B13
CLOSURE PLAN

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G.29-5	Quality Control Sample Types, Applicable Analyses, Frequency, and Acceptance Criteria

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FIGURE NO.

TITLE

G.29-1

Technical Area 55, Building 4, Room B13, Indoor Container Storage Unit

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the indoor hazardous waste container storage unit which is located in Room B13 in the basement of Technical Area (TA) 55, Building 4 (TA55-4) 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 the permitted unit and not discussed within the Permit are described below.

The entire floor of the permitted unit has been used for storage of hazardous waste. The storage room is approximately 8 ft. high, 17 ft. 6in. wide and 28 ft. 4 in. long. The maximum storage capacity of this unit is 4,950 gal. or the equivalent of 90 55-gal drums. The types of waste containers holding hazardous or mixed waste that are stored in B13 include 30-, 55-, 85-gal drums and solid waste boxes. No containers with free liquids will be stored in the unit, so secondary containment will not be necessary.

The waste stored at the permitted unit consists of hazardous and mixed waste in solid form. The permitted unit was constructed in 1979, where the unit now resides. 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 regarding waste management procedures and hazardous waste constituents stored at the permitted unit.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

To date, no hazardous waste has been stored at the permitted unit. Throughout the life of this Permit, it is estimated that 1,000 cubic meters of waste will be stored in 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; and

- 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 clean-up levels shall be established based on residential use. The Permittees must also demonstrate that there is no potential to contaminate groundwater.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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, 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 the 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.29-1 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.

Decontamination verification, and soil sampling if applicable, will be conducted to demonstrate surfaces, related equipment, and media if applicable, 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 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 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 waste 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 flatbed trucks, trailers, or other appropriate vehicles for transport. 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 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 (including 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 floor and walls of the permitted unit 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 (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 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

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*) 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 disposed of in accordance with Permit Section 9.4.5 and Section 7.0 of this closure plan. Table G.29-2 outlines the potential waste materials, waste types, and disposal options.

5.3.2 Decontamination of Structures and Related Equipment

All structures and equipment that will be reused by the Facility will be decontaminated in accordance with Permit Section 9.4.3.1. There is currently no equipment located at the permitted unit that expected to be left in place; however, if equipment identified during the assessment is expected to be left in place, it will be decontaminated in accordance with this section.

Decontamination of the permitted unit will be conducted by first removing loose material (*e.g.*, dust dirt) through sweeping followed by washing using a manual wipe down method with a solution consisting of a surfactant detergent (*e.g.*, Alconox[®]) and water mixed in accordance with the manufacture's recommendations.

Wipe-down washing will be utilized because of the need to minimize the potential for exposure to workers and the mitigation of cleaning solution to other areas of the basement outside the Permitted unit's boundary. Migration of the wash solution (in the form of splashing, condensation, or drainage) from steam cleaning or pressure washing may potentially contaminate or otherwise negatively affect ongoing operations within the basement. Migration can potentially be mitigated using plastic barriers taped to surfaces to enclose the area. However, areas enclosed in this manner will require workers to use additional personal protective equipment (PPE). This PPE will include fully enclosed protective wear and supplied air because of the increased risk of exposure to personnel due to a potential release of radiological materials and organic compounds and concentrations within the enclosure. Enclosure of the area increases the risk of personnel exhaustion, because of the additional PPE, and the potential for worker to reach radiological work exposure limits. Therefore, wipe-down washing, rather than steam cleaning for pressure washing will be utilized because of the need to minimize the potential for exposure to workers and the migration of cleaning solution to other areas of the basement outside of the permitted unit's boundary.

The entirety of the unit's floor will be decontaminated. To ensure that decontamination of the wall is conducted to a sufficient height, all walls in the permitted unit will be decontaminated to a height of 8 ft.

The ceilings of this permitted unit is 8 ft. tall and will be decontaminated. The areas outside of the permitted unit will be presumed to be free of contamination unless there is some physical indication of contamination (*e.g.*, staining), the records review reveals that large amounts of liquid volatile or semi-volatile organic waste was stored in the permitted unit, or a spill or release occurred within the permitted unit that could have affected the surrounding areas.

Cloths, or other absorbent cleaning devices, will not be reused to wipe-down the surfaces after being wetted in the wash solution or after spraying solution onto surfaces. Only one cloth or absorbent cleaning device will be used at a time in a single area to prevent cross-contamination. To minimize the amount of liquid waste generated as a result of decontamination activities, the wash solution will be dispersed from buckets, spray bottles, or other types of small containers.

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.

5.3.3 Equipment Used During Decontamination Activities

Reusable protective clothing, tools, and equipment used during closure 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.29-2 and in accordance 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 Decontamination Verification Sampling Activities

Decontamination verification sampling activities will be conducted at the Permitted unit in order to verify that surfaces 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 Section 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 the floor and from each wall (up to 8 ft.) of the permitted unit. A total of 5 wipe samples will be collected: one from the floor, one from each of the four walls.

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit.

6.2 Sample Collection Procedures

Samples will be collected in accordance with the Permit Section 9.4.7.1 and procedures identified in this SAP which incorporates guidance from the United States Environmental Protection Agency (US 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 used to determine if residual hazardous constituents remain on surfaces, 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.

6.2.2 Solid Chip Sampling

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit. Any non-porous inclusions from the sampling location will be removed by brushing or wiping. Using a chisel, drill, hole saw, or similar tool, a minimum of 100 grams of the sample will be collected to a depth of 2 cm, or to an alternate depth specified in the assessment and transferred to an appropriate sampling container. The holding time and preservation techniques to be used for each analysis will be determined from Table G.29-3.

6.2.3 Cleaning of Sampling Equipment

Reusable sampling equipment will be cleaned and rinsed prior to use. Sampling equipment rinse 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 sections provide a description of sample documentation, handling, preservation, storage, packaging, and transportation requirements that will be followed during the sampling activities associated with the closure.

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

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

- 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 chain-of-custody form to the Facility and it 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;
- k. name(s) of personnel responsible for the observations; and
- l. any deviations and supporting information.

6.3.2 Sample Handling, Preservation, and Storage

Samples will be collected and containerized in appropriate pre-cleaned sample containers. Table G.29-3 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 hazardous constituents listed in 40 CFR Part 261 Appendix VIII 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.29-4. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.29-4. 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.29-4 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 constituents 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.29-5 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.29-2 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.29-3, 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.29-1

Closure Schedule for the Technical Area 55, Building 4, Room B13, Indoor 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.	10 days after completed waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.29-2
Potential Waste Materials, Waste Types, and Disposal Options

Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
Decontamination wash water	Non-regulated solid 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 Water 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	The waste will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
Discarded Concrete	Non-regulated solid waste	Subtitle D landfill, recycled or reused.
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.29-3
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP/ Total Metals: 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 HNO₃ = nitric acid L = Liter mL = milliliter HCl = hydrochloric acid
TCLP = Toxicity Characteristic Leaching Procedure

Table G.29-4
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method ^a	Test Methods/ Instrumentation	Target Detection Limit ^b	Rationale
Metal Analysis				
Arsenic	7060A ^c , 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A ^d , 7081 ^c	FLAA, GFAA	200 ug/L	
Cadmium	7130 ^d , 7131A ^c	FLAA, GFAA	2 ug/L	
Chromium	7190 ^d , 7191 ^c	FLAA, GFAA	10 ug/L	
Lead	7420 ^d , 7421 ^c	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A ^e	CVAA	0.2 ug/L	
Selenium	7740 ^c , 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A ^d , 7761 ^c	FLAA, GFAA	10 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 ^c	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.

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

^b Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.

^c Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.

^d Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.

^e Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy; GFAA= Graphite furnace atomic absorption spectroscopy;

FLAA = Flame atomic absorption spectroscopy; mg/L = milligrams per liter;

GC/MS = Gas chromatography/mass spectrometry; ug/L = micrograms per liter.

Table G.29-5

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.

Figure G.29-1

**THIS FIGURE CONTAINS UNCLASSIFIED CONTROLLED NUCLEAR
INFORMATION (UCNI) AS DEFINED BY SECTION 148 OF THE ATOMIC ENERGY
ACT**

ATTACHMENT G.30
TECHNICAL AREA 55, BUILDING 4 ROOM G12
CLOSURE PLAN

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<u>FIGURE NO.</u>	<u>TITLE</u>
G.30-1	Technical Area 55, Building 4, Room G12, Indoor Container Storage Unit

1.0 INTRODUCTION

This closure plan describes the activities necessary to close the indoor hazardous waste container storage unit which is located in Room G12 in the basement of Technical Area (TA) 55, Building 4 (TA55-4) 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 the permitted unit and not discussed within the Permit are described below.

The entire floor of the permitted unit has been used for storage of hazardous waste. The permitted is located in the TA-55-4 basement. This storage area is irregularly shaped (512.98 ft.²) and the walls consist of chain link fencing, shown in Figure 29-1. The maximum storage capacity of this unit is 5,225 gal. or the equivalent of 95 55-gal drums. The types of waste containers holding hazardous or mixed waste that are stored in B13 include 30-, 55-, 85-gal drums and solid waste boxes. No containers with free liquids will be stored in the unit, so secondary containment will not be necessary.

The permitted unit was constructed in 1979, where the unit now resides. The unit is used to store hazardous and mixed waste in solid form. 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 regarding waste management procedures and hazardous waste constituents stored at the permitted unit.

3.0 ESTIMATE OF MAXIMUM WASTE STORED

To date, no hazardous waste has been stored at the permitted unit. Throughout the life of this Permit, it is estimated that 1,000 cubic meters of waste will be stored in 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; and
- 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.

If the Permittees are unable to achieve either of the clean closure standards above, they must:

- 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, 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 the 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.30-1 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.

Decontamination verification, and soil sampling if applicable, will be conducted to demonstrate surfaces, related equipment, and media if applicable, 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 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 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 waste 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 flatbed trucks, trailers, or other appropriate vehicles for transport. 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 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 (including 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 floor and walls of the permitted unit 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 (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 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 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*) 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 disposed of in accordance with Permit Section 9.4.5 and Section 7.0 of this closure plan. Table G.30-2 outlines the potential waste materials, waste types, and disposal options.

5.3.2 Decontamination of Structures and Related Equipment

All structures and equipment that will be reused by the Facility will be decontaminated in accordance with Permit Section 9.4.3.1. There is currently no equipment located at the permitted unit that expected to be left in place; however, if equipment identified during the assessment is expected to be left in place, it will be decontaminated in accordance with this section.

Decontamination of the permitted unit will be conducted by first removing loose material (*e.g.*, dust dirt) through sweeping followed by washing using a manual wipe down method with a solution consisting of a surfactant detergent (*e.g.*, Alconox®) and water mixed in accordance with the manufacture's recommendations.

Wipe-down washing will be utilized because of the need to minimize the potential for exposure to workers and the mitigation of cleaning solution to other areas of the basement outside the Permitted unit's boundary. Migration of the wash solution (in the form of splashing, condensation, or drainage) from steam cleaning or pressure washing may potentially contaminate or otherwise negatively affect ongoing operations within the basement. Migration can potentially be mitigated using plastic barriers taped to surfaces to enclose the area. However, areas enclosed in this manner will require workers to use additional personal protective equipment (PPE). This PPE will include fully enclosed protective wear and supplied air because of the increased risk of exposure to personnel due to a potential release of radiological materials and organic compounds and concentrations within the enclosure. Enclosure of the

area increases the risk of personnel exhaustion, because of the additional PPE, and the potential for worker to reach radiological work exposure limits. Therefore, wipe-down washing, rather than steam cleaning for pressure washing will be utilized because of the need to minimize the potential for exposure to workers and the migration of cleaning solution to other areas of the basement outside of the permitted unit's boundary.

The entirety of the unit's floor will be decontaminated. To ensure that decontamination of the wall is conducted to a sufficient height, all walls in the permitted unit will be decontaminated to a height of 8 ft.

The ceilings of this permitted unit is 8 ft. tall and will be decontaminated. The areas outside of the permitted unit will be presumed to be free of contamination unless there is some physical indication of contamination (*e.g.*, staining), the records review reveals that large amounts of liquid volatile or semi-volatile organic waste was stored in the permitted unit, or a spill or release occurred within the permitted unit that could have affected the surrounding areas.

Cloths, or other absorbent cleaning devices, will not be reused to wipe-down the surfaces after being wetted in the wash solution or after spraying solution onto surfaces. Only one cloth or absorbent cleaning device will be used at a time in a single area to prevent cross-contamination. To minimize the amount of liquid waste generated as a result of decontamination activities, the wash solution will be dispersed from buckets, spray bottles, or other types of small containers.

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 closure 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.30-2 and in accordance 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 Decontamination Verification Sampling Activities

Decontamination verification sampling activities will be conducted at the Permitted unit in order to verify that surfaces 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 Section 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 the floor and from each wall (up to 11 ft.) of the permitted unit. Verification wipe samples

will be collected from random locations within each of the sample areas indicated on Figure G.30-1 (provided under a separate cover) of this closure plan. A total of one wipe sample, from the floor. Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit.

6.2 Sample Collection Procedures

Samples will be collected in accordance with the Permit Section 9.4.7.1 and procedures identified in this SAP which incorporates guidance from the United States Environmental Protection Agency (US 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 used to determine if residual hazardous constituents remain on surfaces, 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.

6.2.2 Solid Chip Sampling

Solid chip samples may be collected and analyzed to determine if residual hazardous constituents remain in the concrete floor at the permitted unit. Any non-porous inclusions from the sampling location will be removed by brushing or wiping. Using a chisel, drill, hole saw, or similar tool, a minimum of 100 grams of the sample will be collected to a depth of 2 cm, or to an alternate depth specified in the assessment and transferred to an appropriate sampling container. The holding time and preservation techniques to be used for each analysis will be determined from Table G.30-3.

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

6.3.1 Sample Documentation

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

6.3.1.1 Chain-of-Custody

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

- 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 chain-of-custody form to the Facility and it 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;
- k. name(s) of personnel responsible for the observations; and
- l. any deviations and supporting information.

6.3.2 Sample Handling, Preservation, and Storage

Samples will be collected and containerized in appropriate pre-cleaned sample containers. Table G.30-3 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 hazardous constituents listed in 40 CFR Part 261 Appendix VIII 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.30-4. Analytes, test methods and instrumentation, target detection limits, and rationale for metals and organic analyses are presented in Table G.30-4. 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.30-4 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 constituents 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.30-5 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.30-2 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.30-3, 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.

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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.30-1

Closure Schedule for the Technical Area 55, Building 4, Room G12, Indoor 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.	10 days after completed waste removal or 100 days after final receipt of waste
Complete all closure activities and submit final closure certification report to the Department.	Day 180

Table G.30-2
Potential Waste Materials, Waste Types, and Disposal Options

Personal protective equipment (PPE)	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	The PPE will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
Decontamination wash water	Non-regulated solid 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 Water 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	The waste will be treated to meet Land Disposal Restriction (LDR) treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
Discarded Concrete	Non-regulated solid waste	Subtitle D landfill, recycled or reused.
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.
Discarded waste management equipment	Non-regulated solid waste	Subtitle D landfill
	Hazardous waste	Waste will be treated to meet LDR treatment standards, if necessary, and disposed in a Subtitle C or D landfill, as appropriate.
	Low-level radioactive solid waste	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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	Either an authorized on-site radioactive waste disposal area that is not undergoing closure under RCRA or its state analog, or an authorized 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.30-3
Sample Containers^a, Preservation Techniques, and Holding Times^b

Analyte Class and Sample Type	Container Type and Materials	Preservation	Holding Time
Metals			
TCLP/ Total Metals: 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 L = Liter mL = milliliter HCl = hydrochloric acid
TCLP = Toxicity Characteristic Leaching Procedure

Table G.30-4
Summary of Analytical Methods

Analyte	EPA SW-846 Analytical Method ^a	Test Methods/ Instrumentation	Target Detection Limit ^b	Rationale
Metal Analysis				
Arsenic	7060A ^c , 7061A	FLAA, GFAA	10 ug/L	Determine the metal concentration in the samples.
Barium	7080A ^d , 7081 ^c	FLAA, GFAA	200 ug/L	
Cadmium	7130 ^d , 7131A ^c	FLAA, GFAA	2 ug/L	
Chromium	7190 ^d , 7191 ^c	FLAA, GFAA	10 ug/L	
Lead	7420 ^d , 7421 ^c	FLAA, GFAA	5 ug/L	
Mercury	7470A, 7471A ^e	CVAA	0.2 ug/L	
Selenium	7740 ^c , 7741A	FLAA, GFAA	5 ug/L	
Silver	7760A ^d , 7761 ^c	FLAA, GFAA	10 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 ^c	GC/MS	10 mg/L	Determine the SVOCs concentration in the samples.

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

^b Detection limits listed for metals are for clean water. Detection limits for organics are expressed as practical quantitation limits. Actual detection limits may be higher depending on sample composition and matrix type.

^c Method being integrated into Method 7010, per the May 1998 SW-846 Draft Update IVA.

^d Method being integrated into Method 7000B, per the May 1998 SW-846 Draft Update IVA.

^e Method being revised to 7471B per the May 1998 SW-846 Draft Update IVA.

CVAA = Cold-vapor atomic absorption spectroscopy; GFAA= Graphite furnace atomic absorption spectroscopy;
FLAA = Flame atomic absorption spectroscopy; mg/L = milligrams per liter;
GC/MS = Gas chromatography/mass spectrometry; ug/L = micrograms per liter.

Table G.30-5
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.

Figure G.30-1

**THIS FIGURE CONTAINS UNCLASSIFIED CONTROLLED NUCLEAR
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ACT**

ATTACHMENT N

FIGURES

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- Figure 5: Reserved
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Figure 47: TA-55, Building 4, Room 401, Storage Tank System Process Flow Diagram
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Figure 57: TA-44, Building 4, Room B13
Figure 58: TA-55, Building 4, Room G12
Figure 59: TA-55, Pad 55-0355

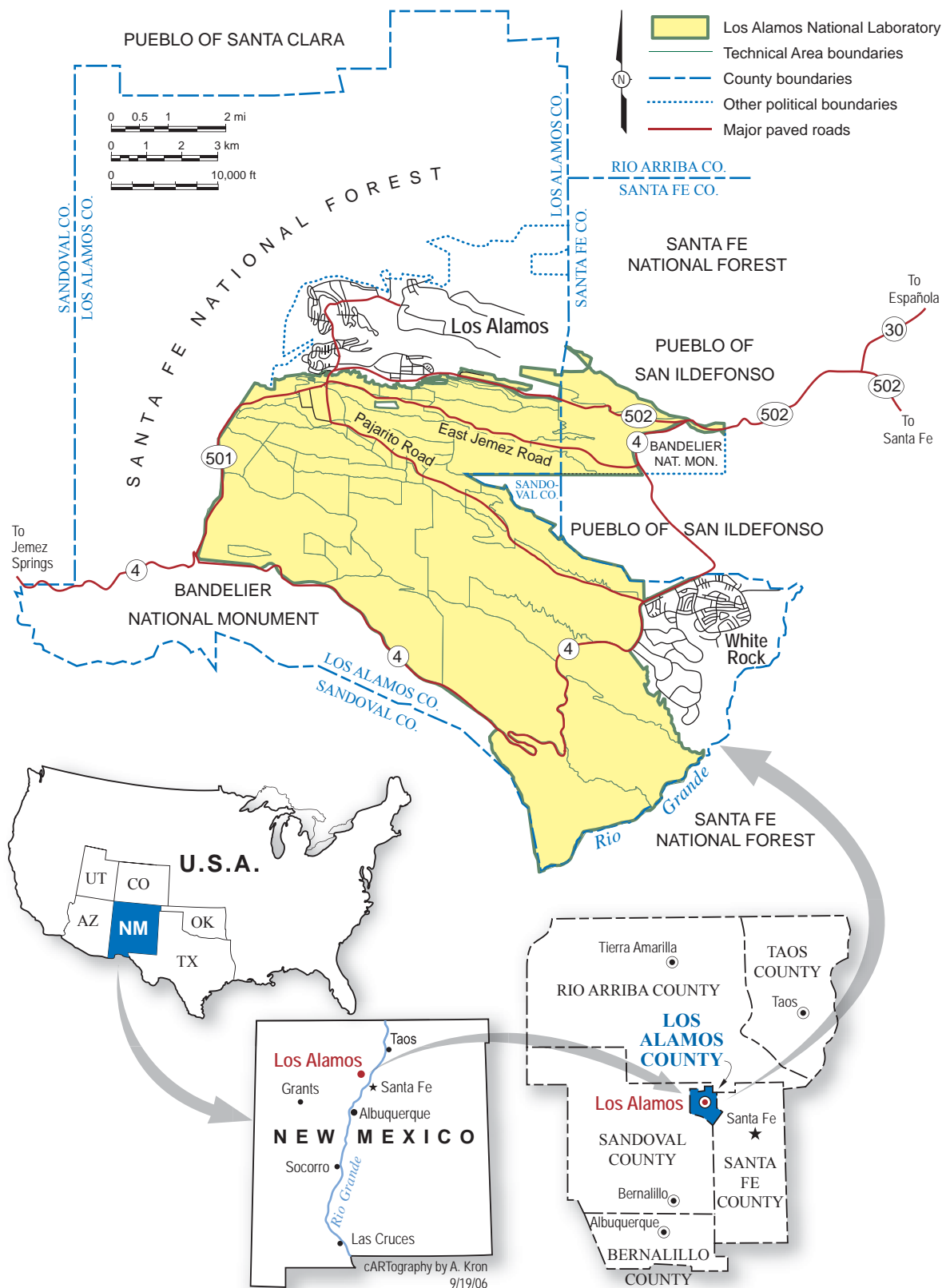
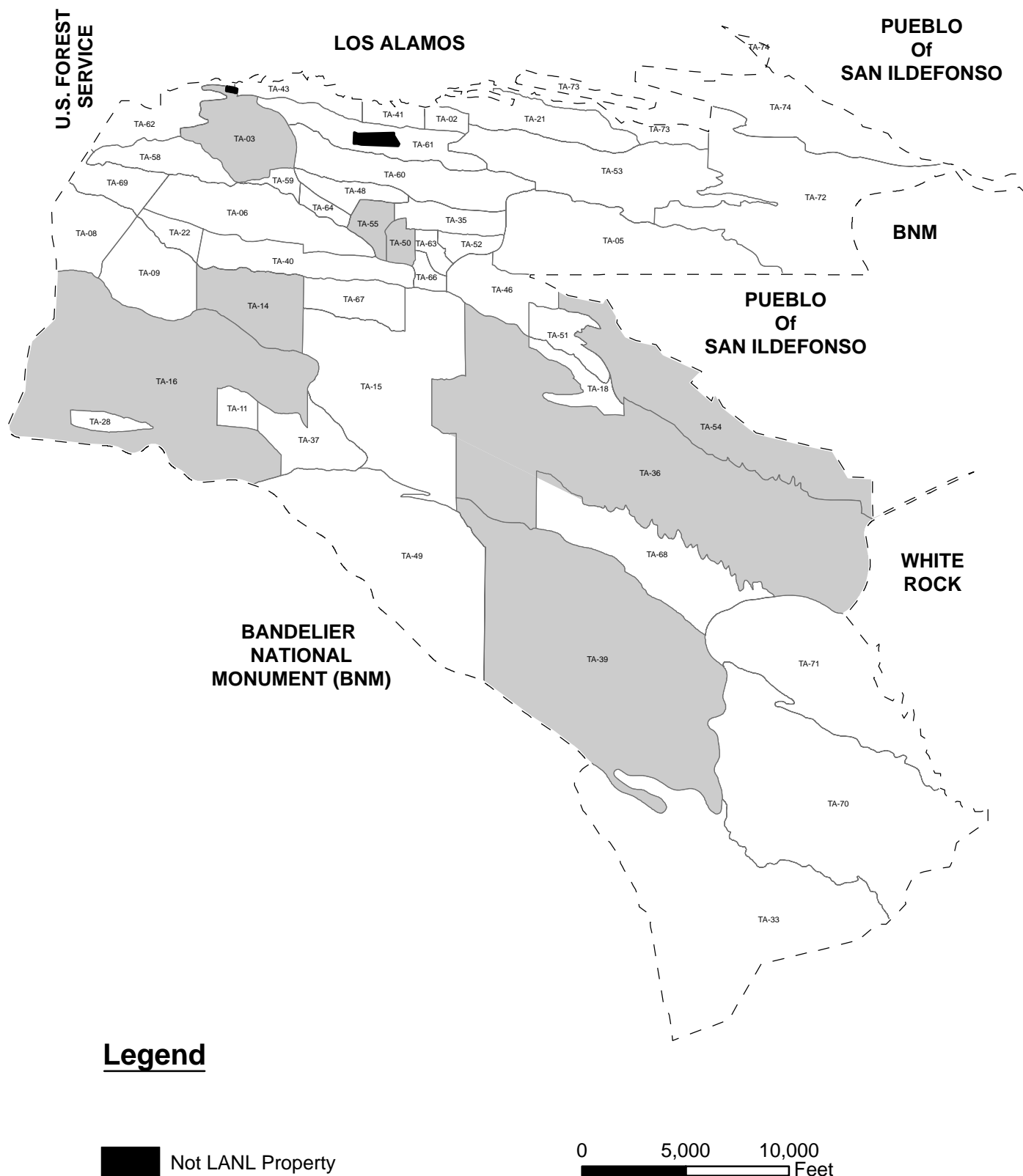


Figure 1
Regional Location Map of Los Alamos National Laboratory



Legend

Not LANL Property

0 5,000 10,000
Feet

Figure 2
Facility Boundary and Location Map of Los Alamos National Laboratory (LANL)
Technical Areas (TAs)

Created by ERSS GIS TEAM. Map Number 06-0108 September 12, 2005
State Plane Coordinate System New Mexico Central Zone North American Datum 1983 (ft)
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Boundary of Department of Energy Property I Around the Los Alamos National Laboratory; Los Alamos National Laboratory, SSMO Site Planning & Project Initiation; Infrastructure Planning Office. 10 February 2006
Boundary of Department of Energy Property In and Around the Los Alamos National Laboratory; Los Alamos National Laboratory, SSMO Site Planning & Project Initiation; 01 February 2003 as captured 07 September 2004.

Two areas outlined in red and shown in overviews are not under LANL control

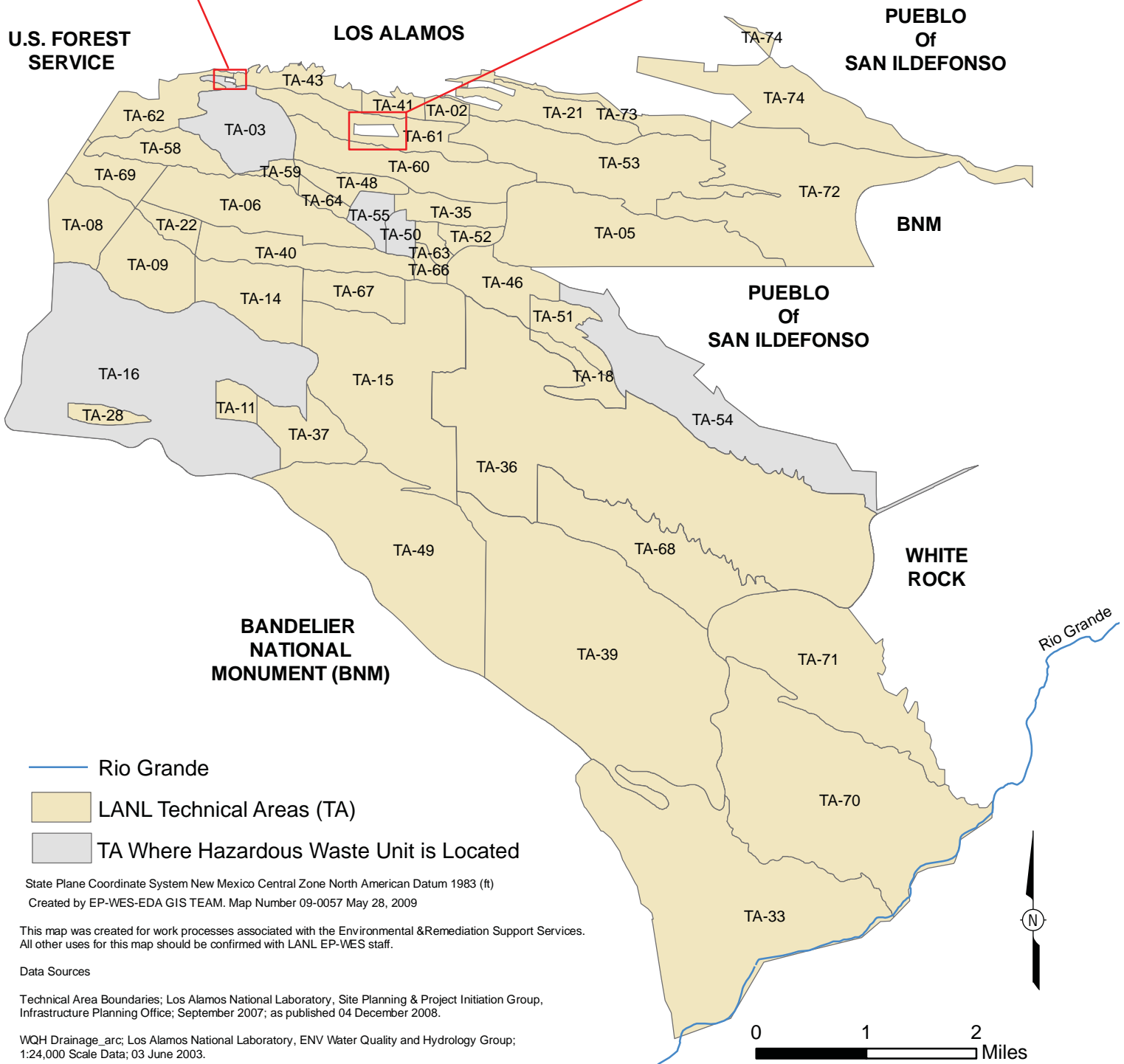


Figure 3: Los Alamos National Laboratory Facility Boundary with Detail of Non-LANL Areas

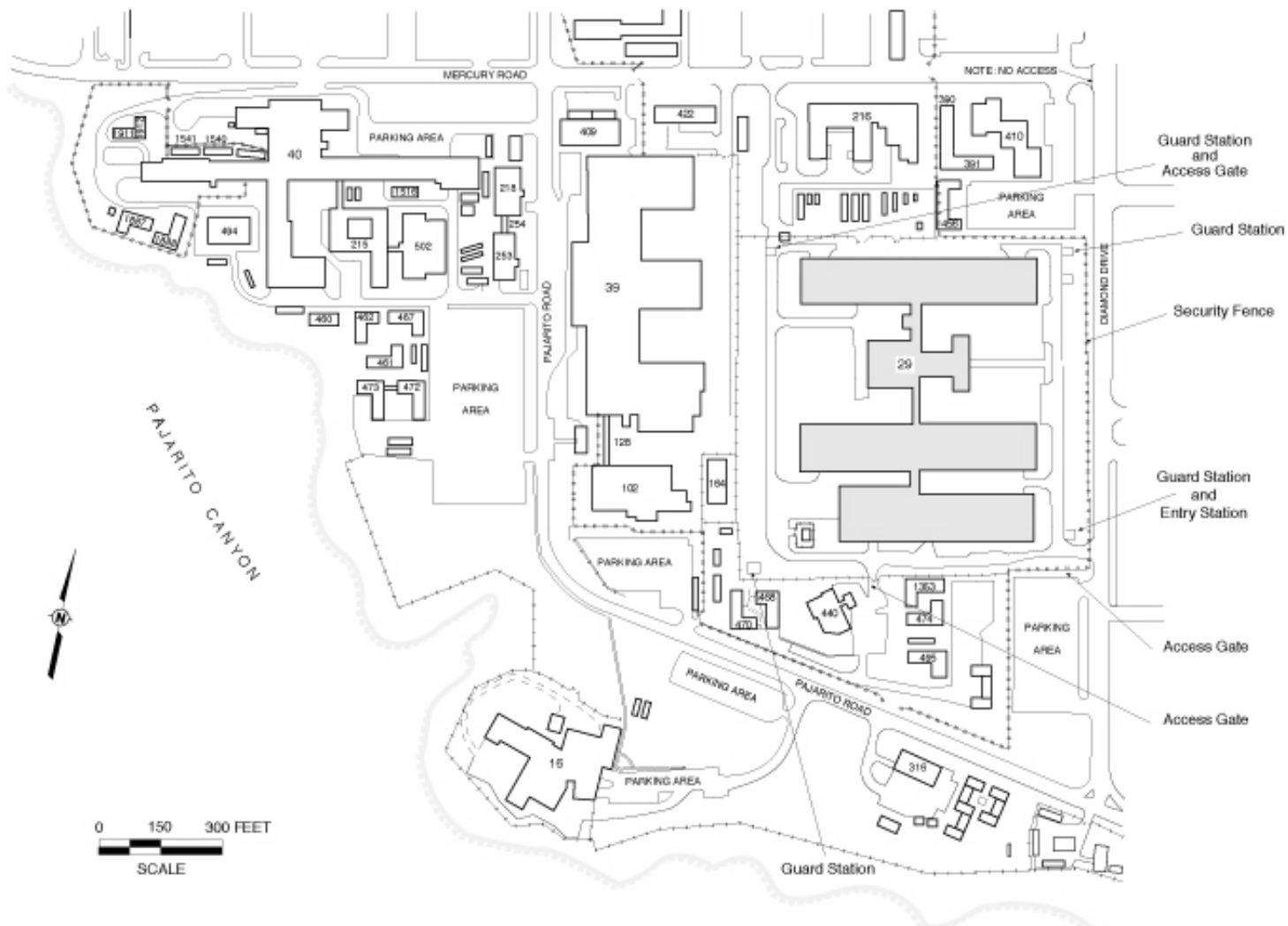


Figure 4
Technical Area (TA) 3 Location Map Showing Security Fences, Entry Gates, and Entry Stations

FIGURE 5 – RESERVED

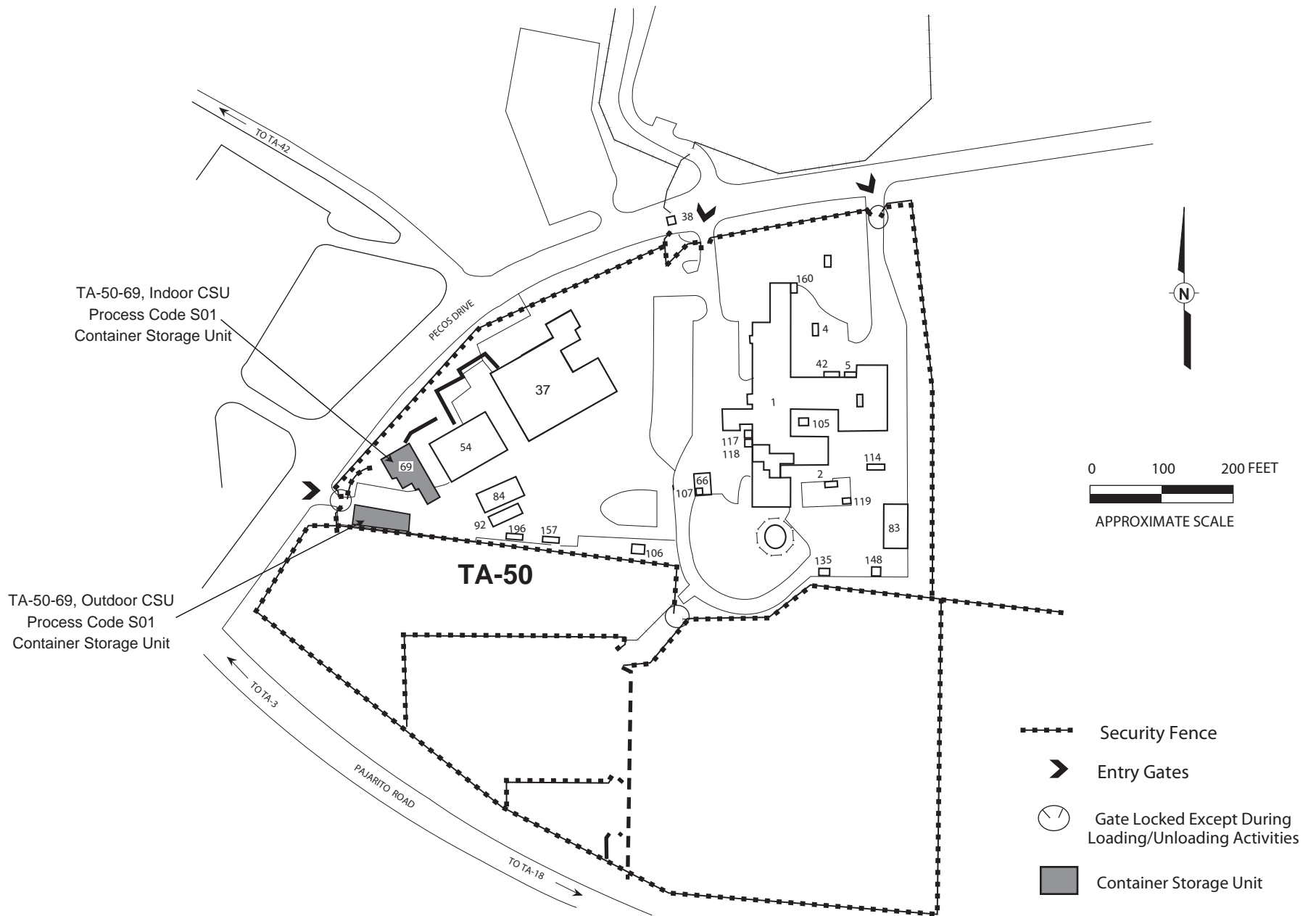


Figure 6:
Technical Area (TA) 50 Location Map Showing Security Fences, Entry Gates, and Entry Stations

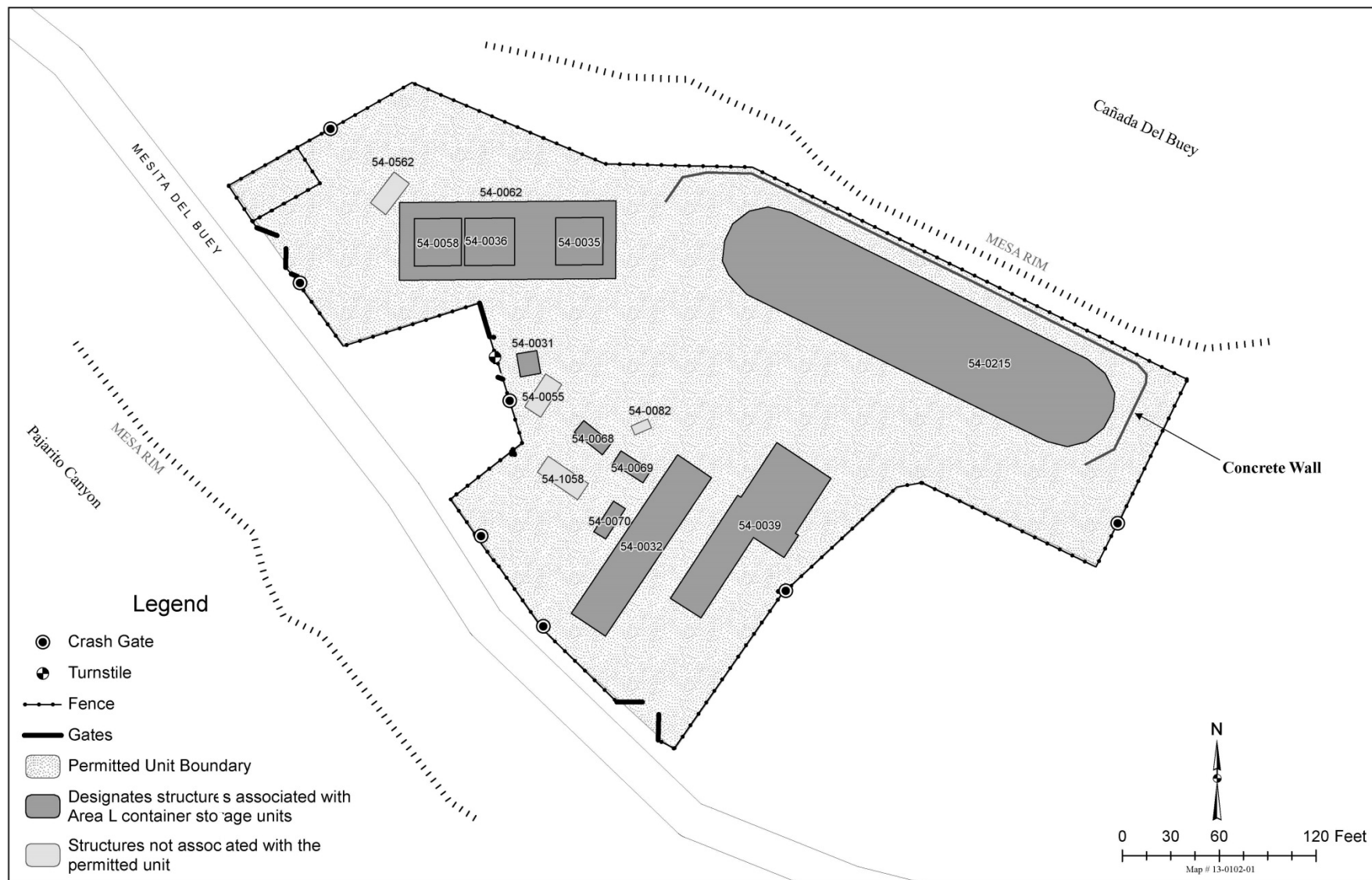
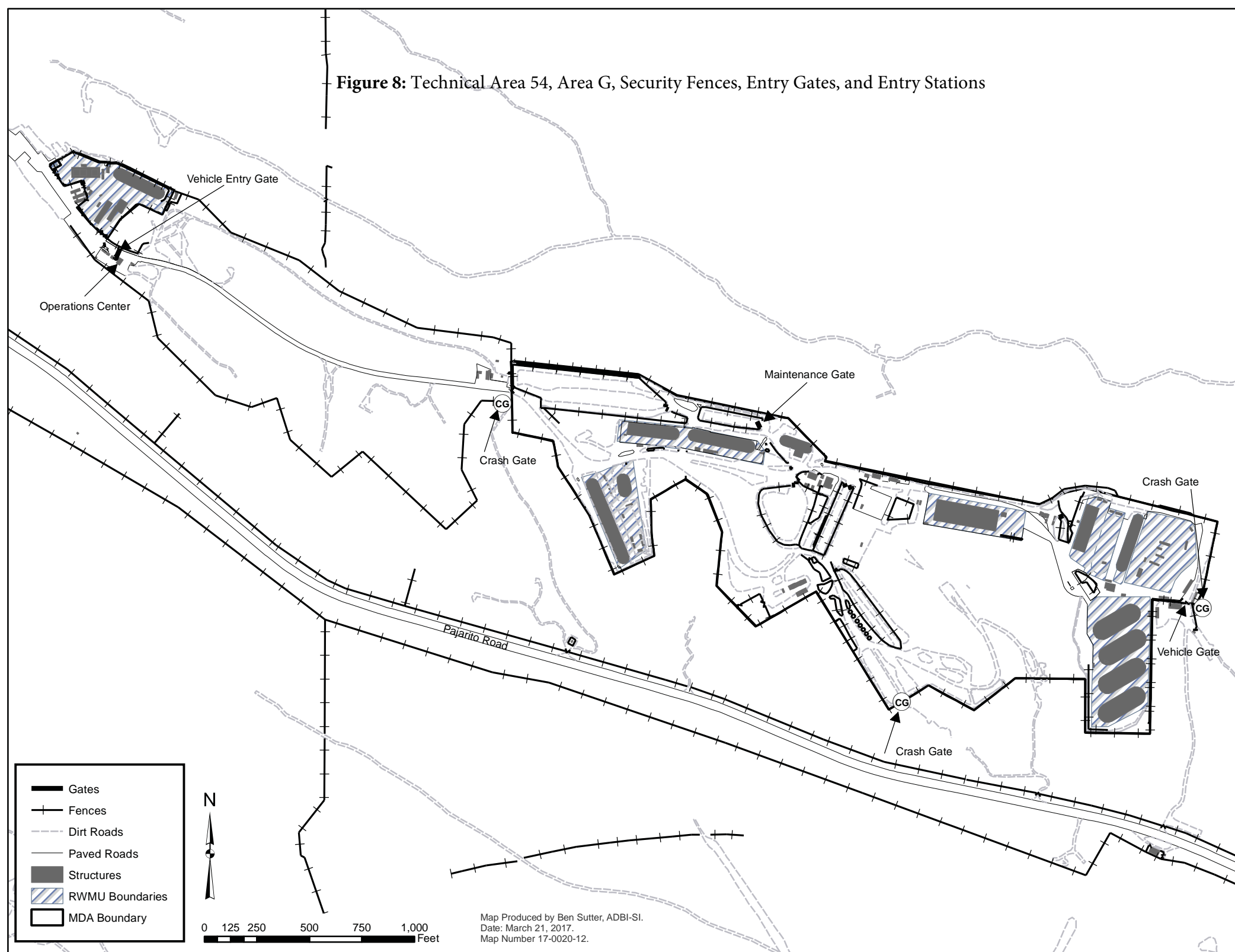


Figure 7: Technical Area 54, Area L, Security Fences, Entry Gates, and Entry Stations

Figure 8: Technical Area 54, Area G, Security Fences, Entry Gates, and Entry Stations



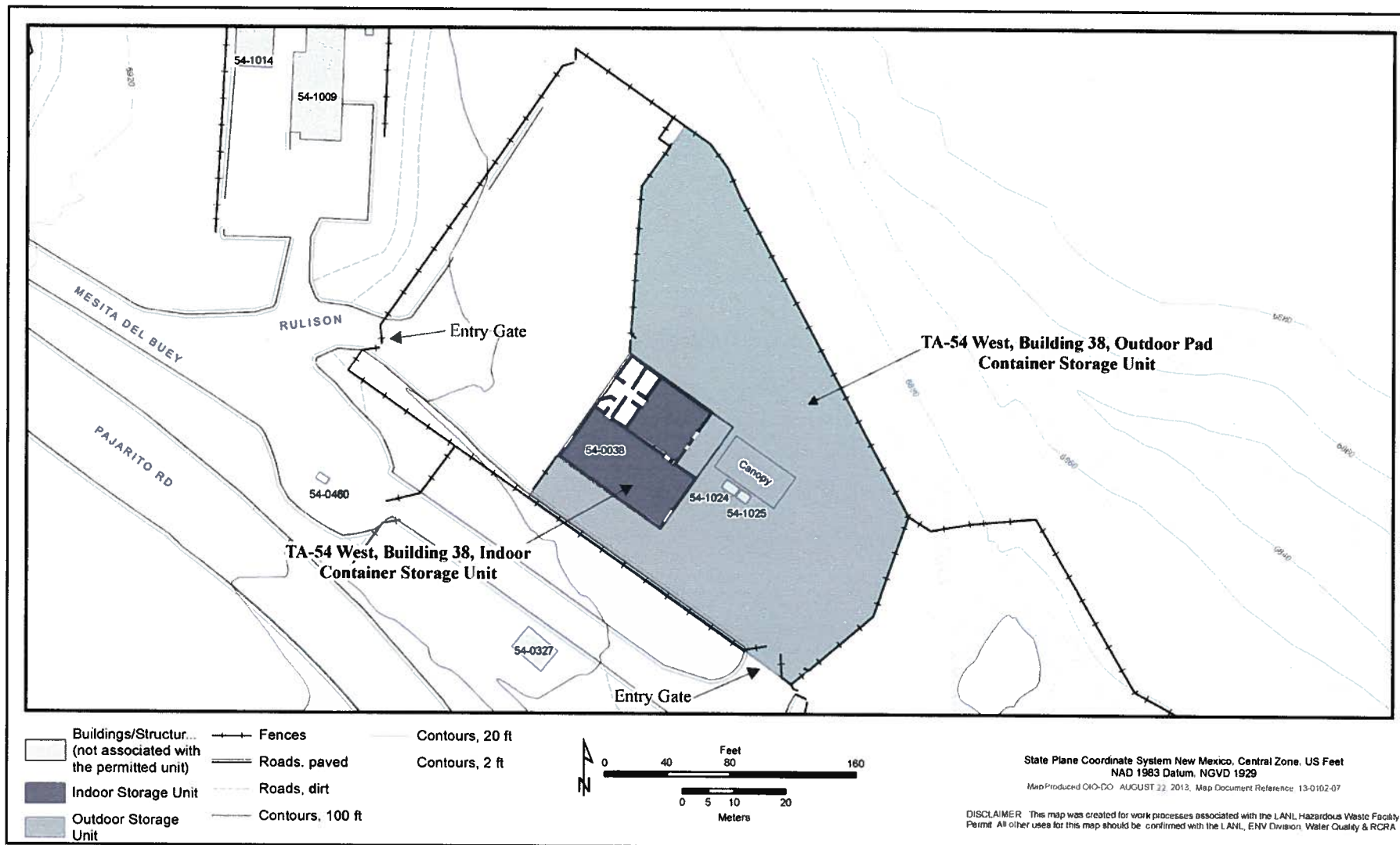


Figure 9: Technical Area (TA) 54 West Location Map Showing Security Fences, Entry Gates, and Entry Stations

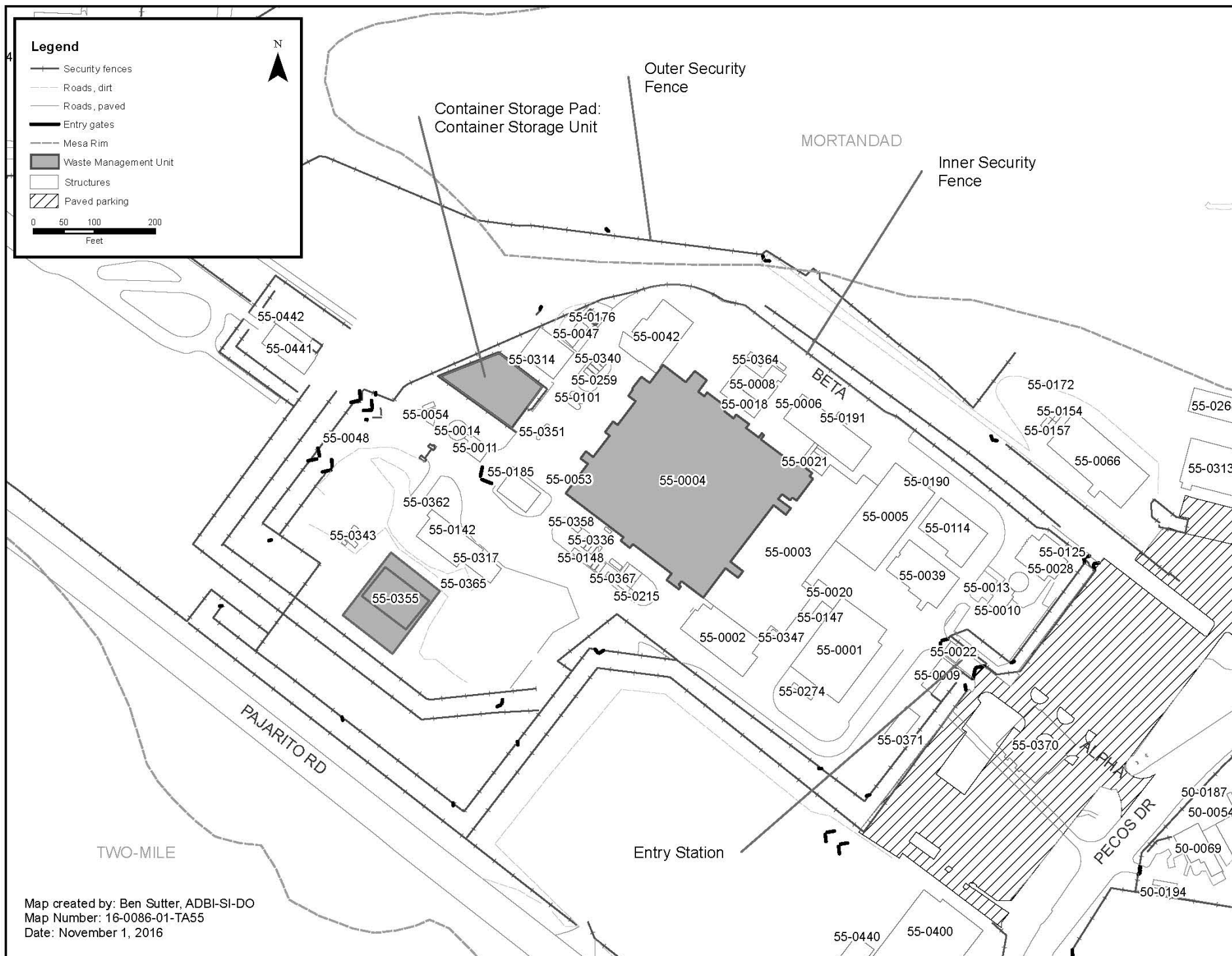


Figure 10
Technical Area (TA) 55 Location Map Showing Security Fences, Entry Gates, and Entry Station

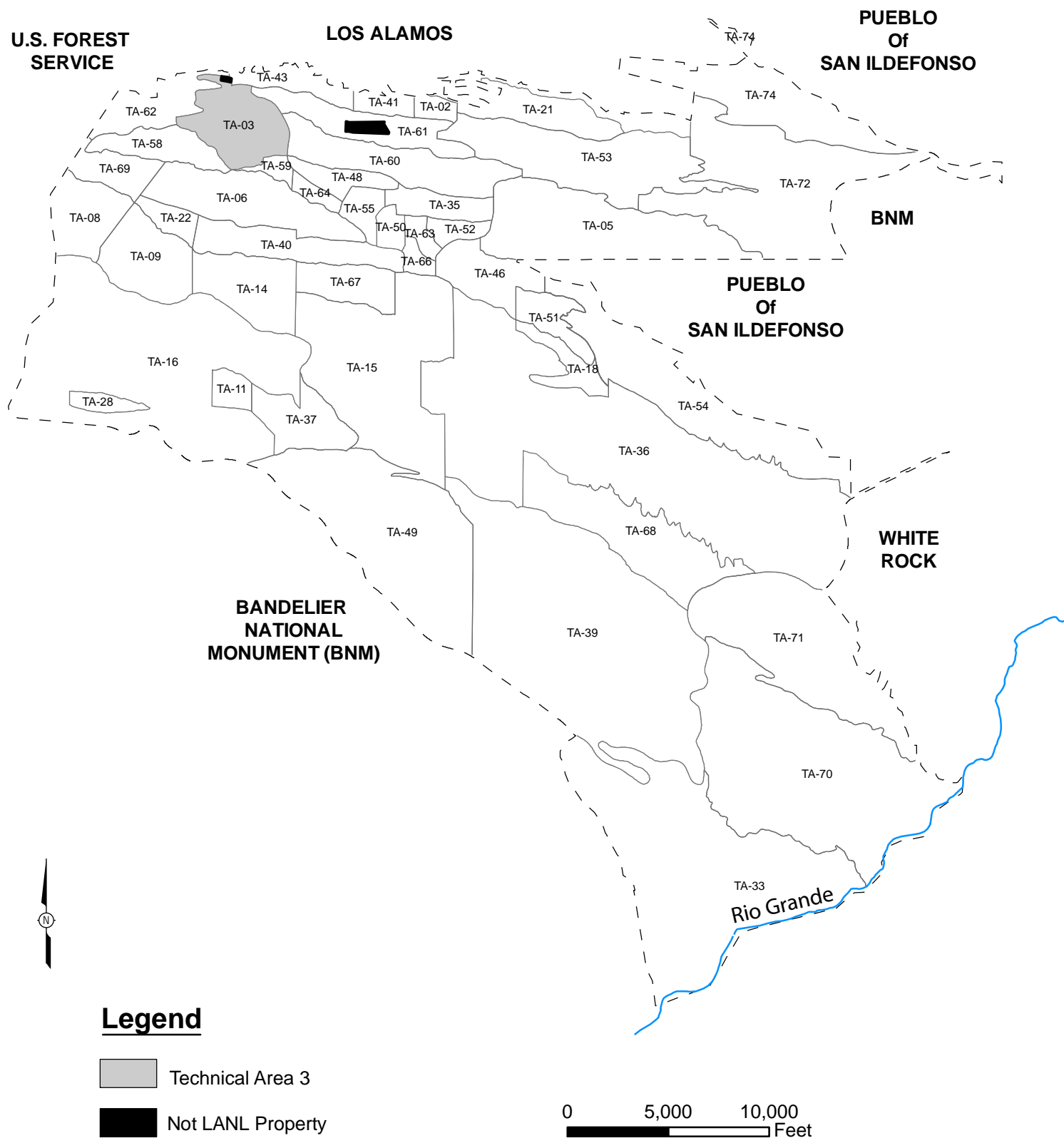


Figure 11:

Technical Area (TA) 3 Location Map

Created by EP-WES-EDA GIS TEAM. Map Number 06-0108 November 13, 2008, modified by ENV-RCRA August 2009

State Plane Coordinate System New Mexico Central Zone North American Datum 1983 (ft)

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 Boundary of Department of Energy Property In and Around the Los Alamos National Laboratory; Los Alamos National Laboratory, SSMO Site Planning & Project Initiation; 04 June 2008

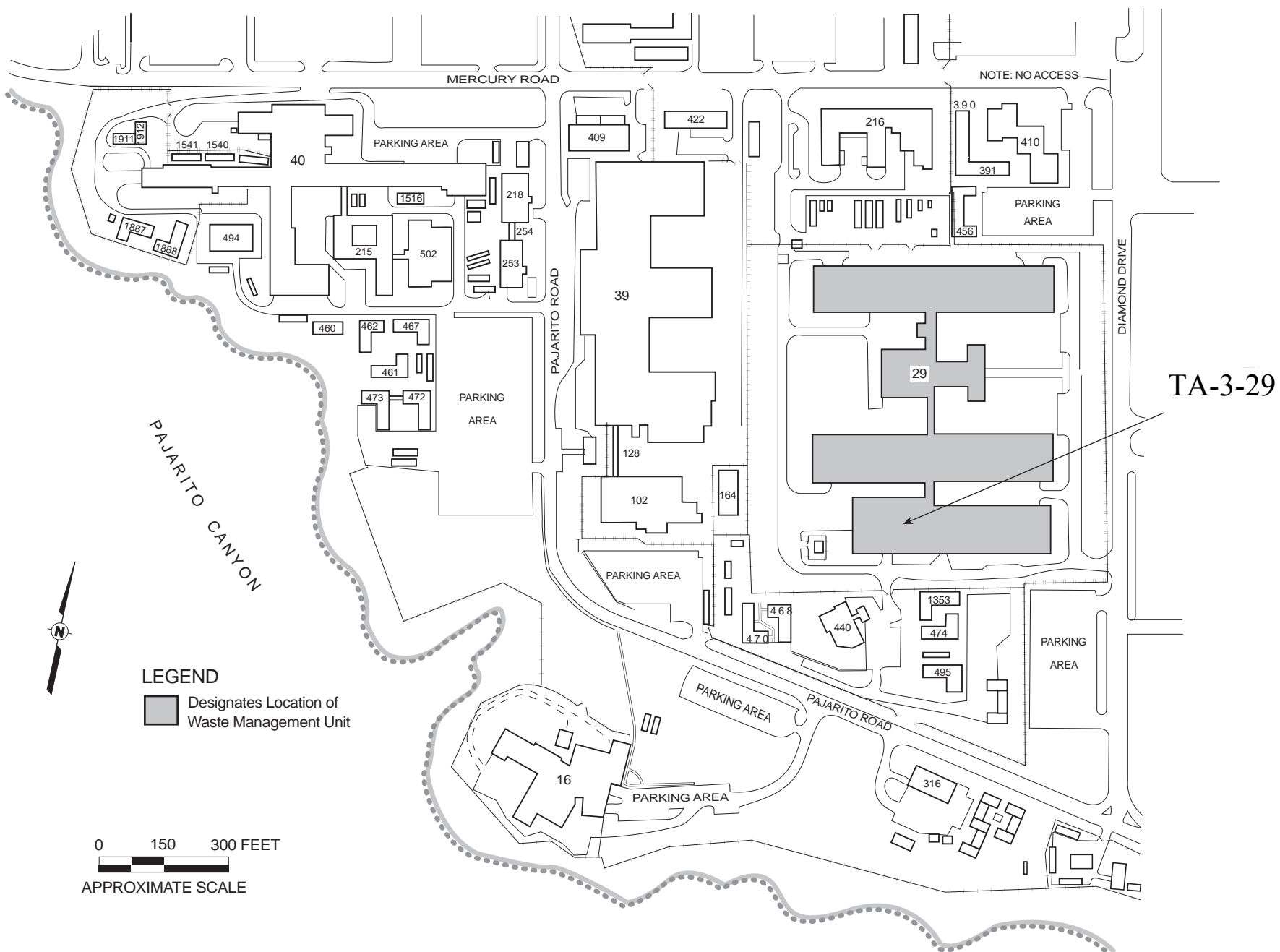


Figure 12:
Technical Area (TA) 3, Building 29, Location Map

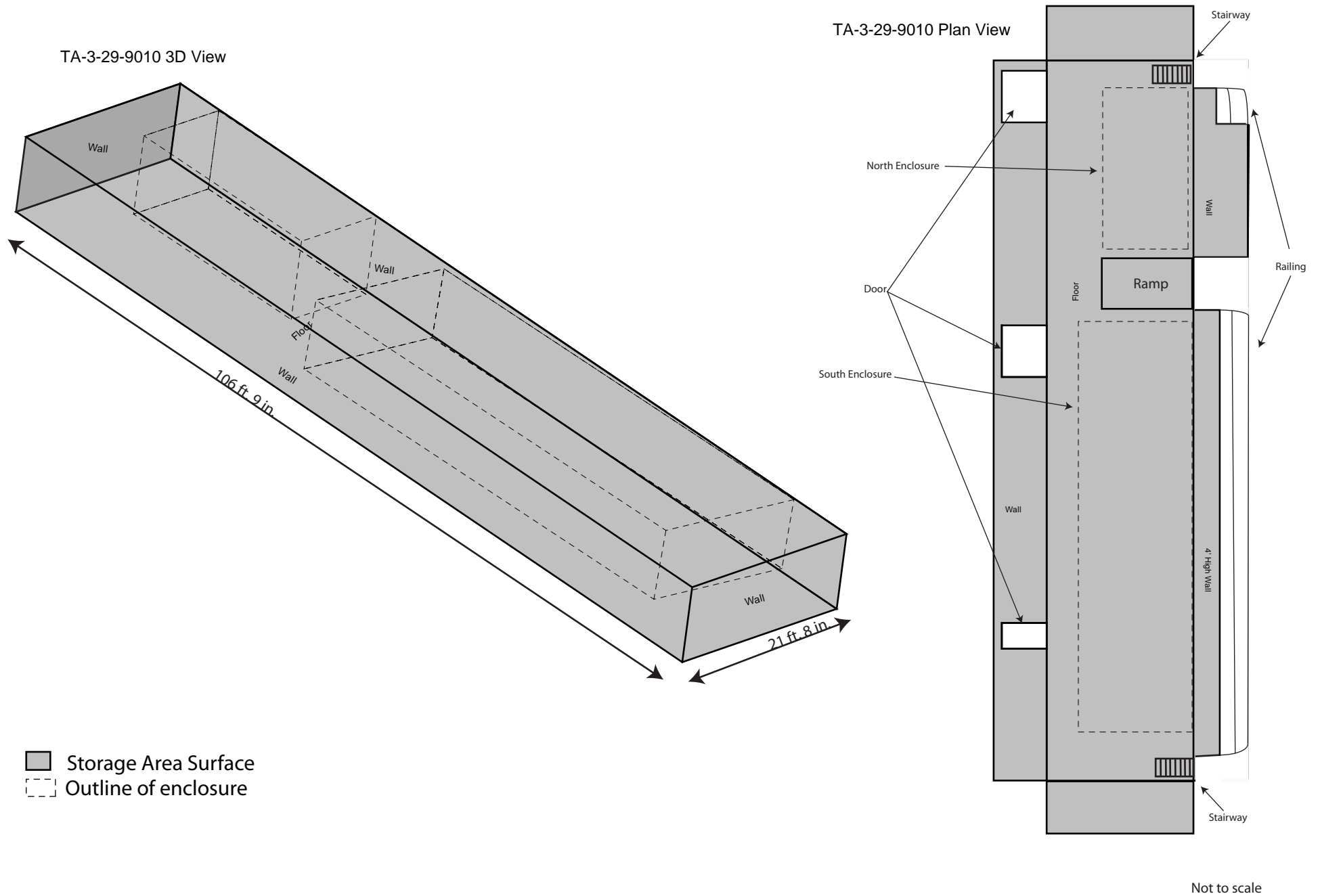
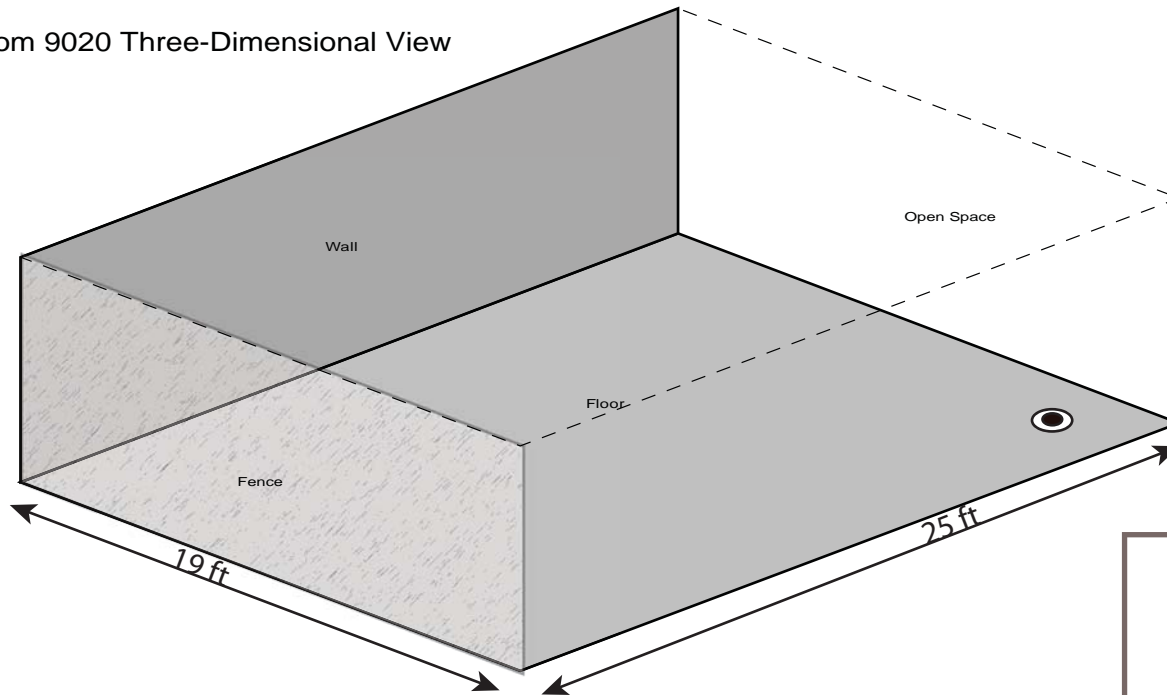
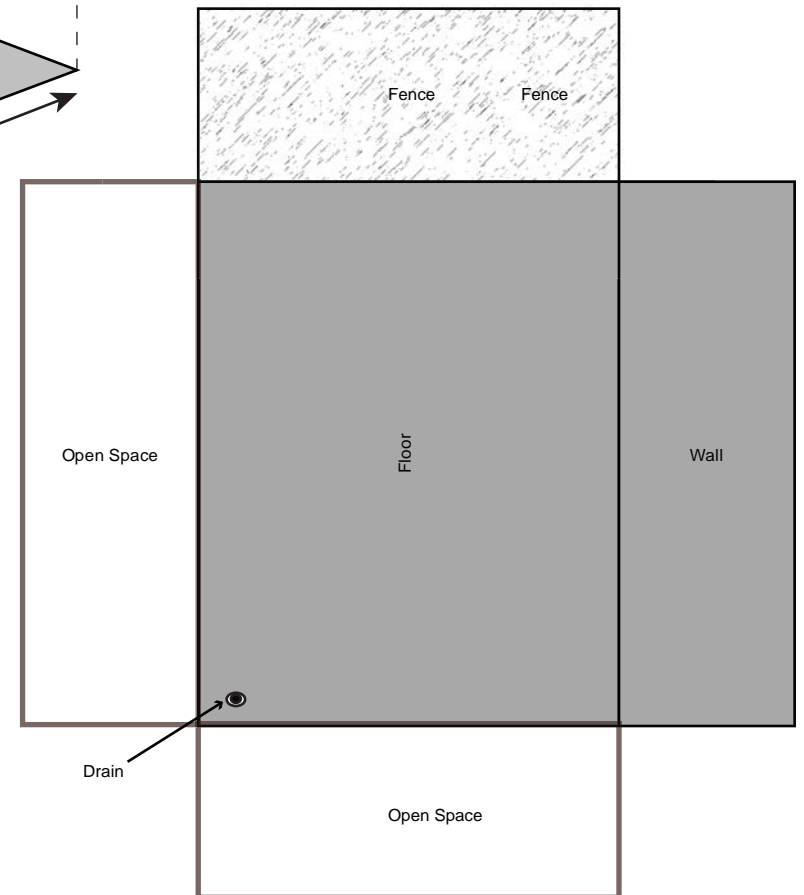


Figure 13:
Technical Area (TA) 3, Building 29, Room 9010

Room 9020 Three-Dimensional View



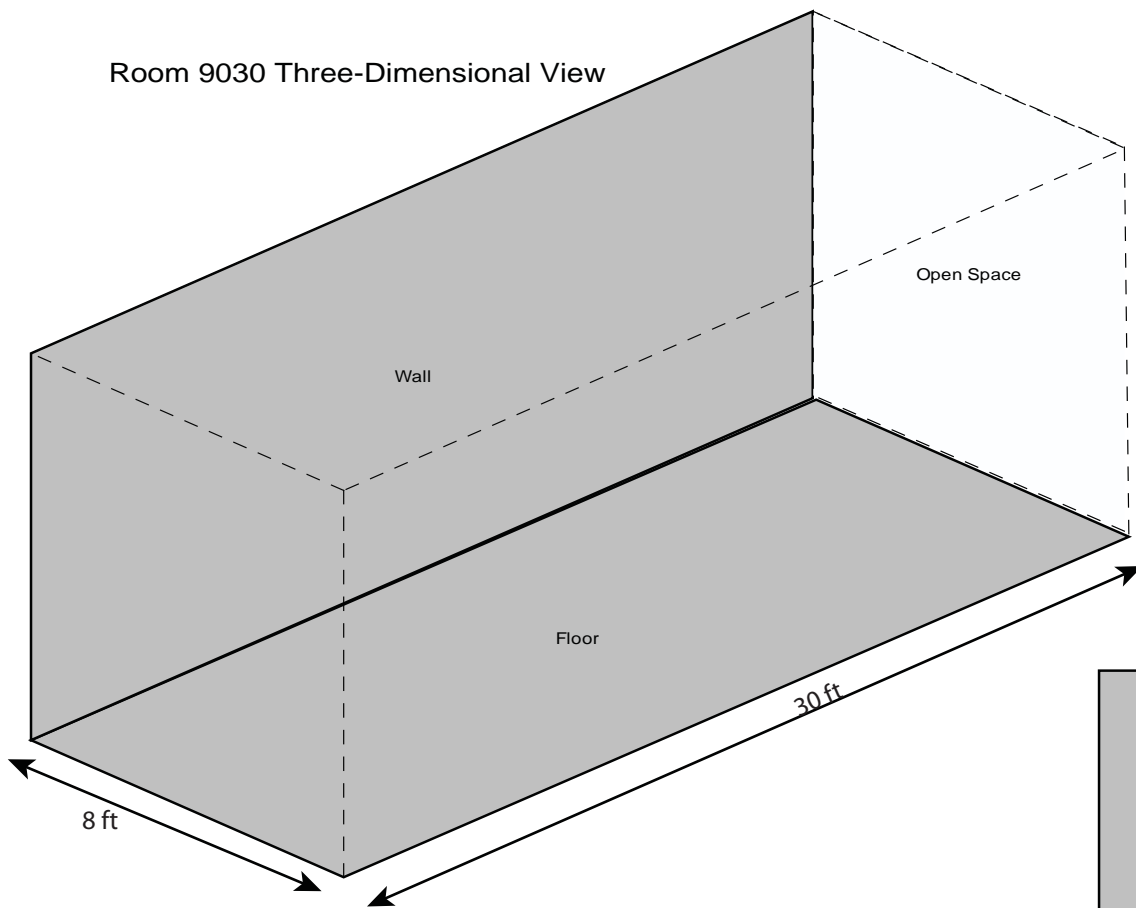
Room 9020 Plan View



- Storage Area Surface
- Chainlink fence
- Drain

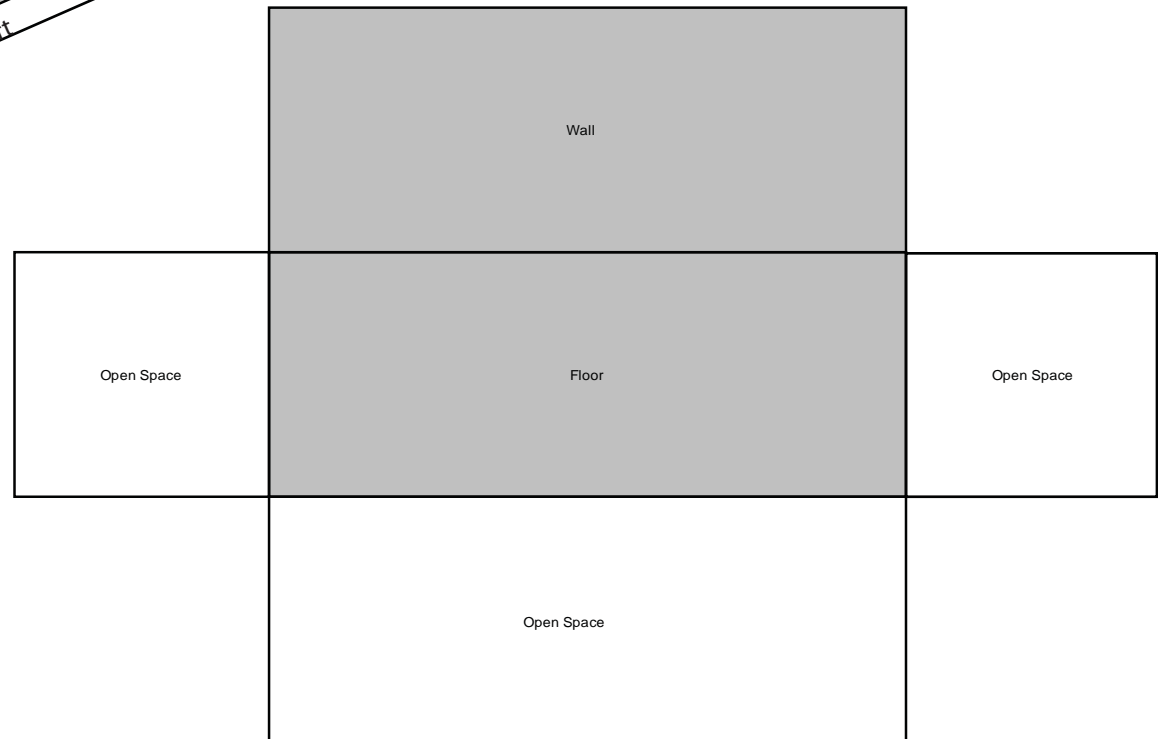
Not to scale

Figure 14:
Technical Area (TA) 3, Building 29, Portion of Room 9020



Not to scale

Room 9030 Plan View



Storage Area Surface

Figure 15:
Technical Area 3, Building 29, Portion of Room 9030

FIGURE 16 – RESERVED

FIGURE 17 – RESERVED

FIGURE 18 – RESERVED

FIGURE 19 – RESERVED

FIGURE 20 – RESERVED

FIGURE 21 – RESERVED

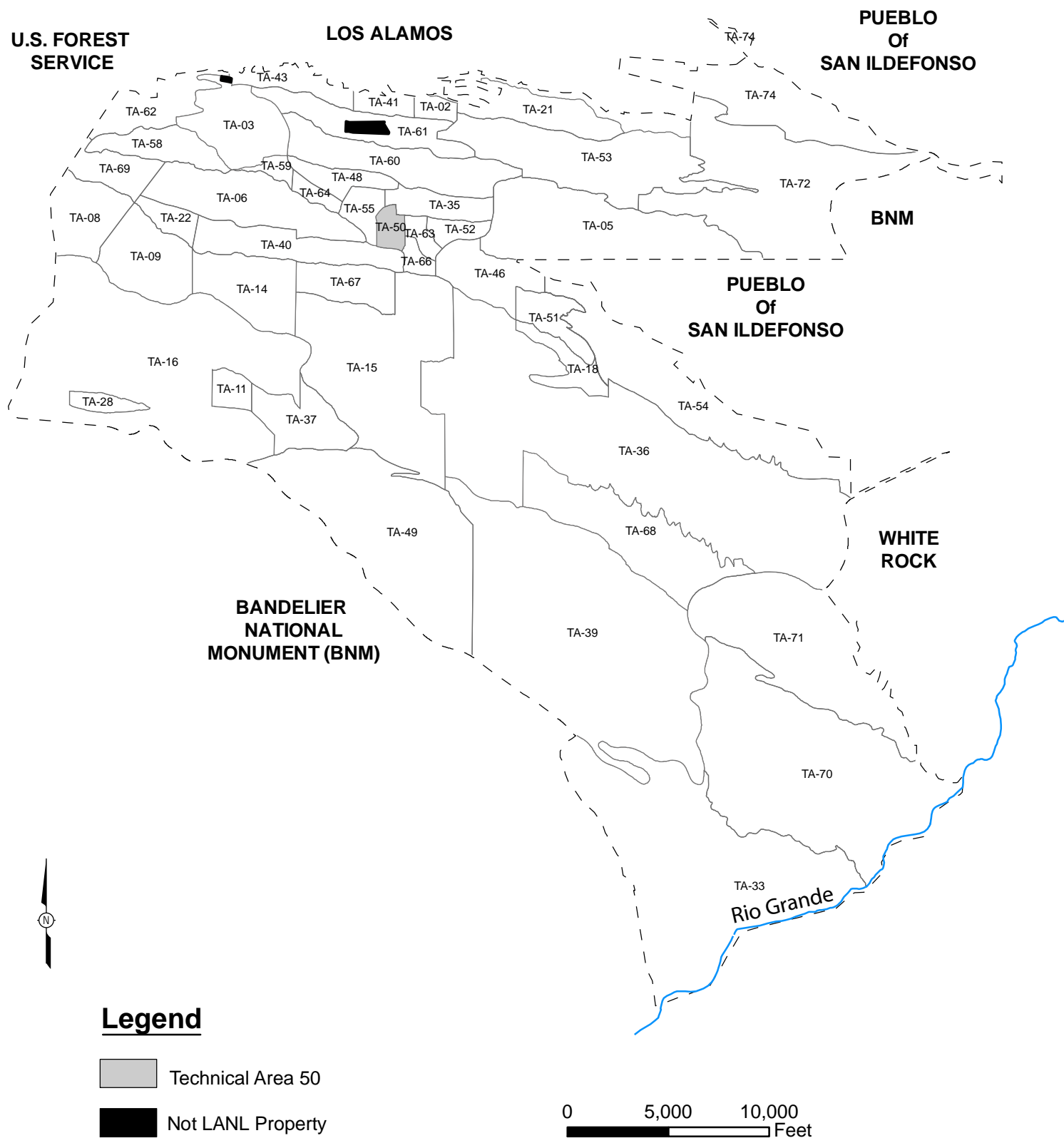


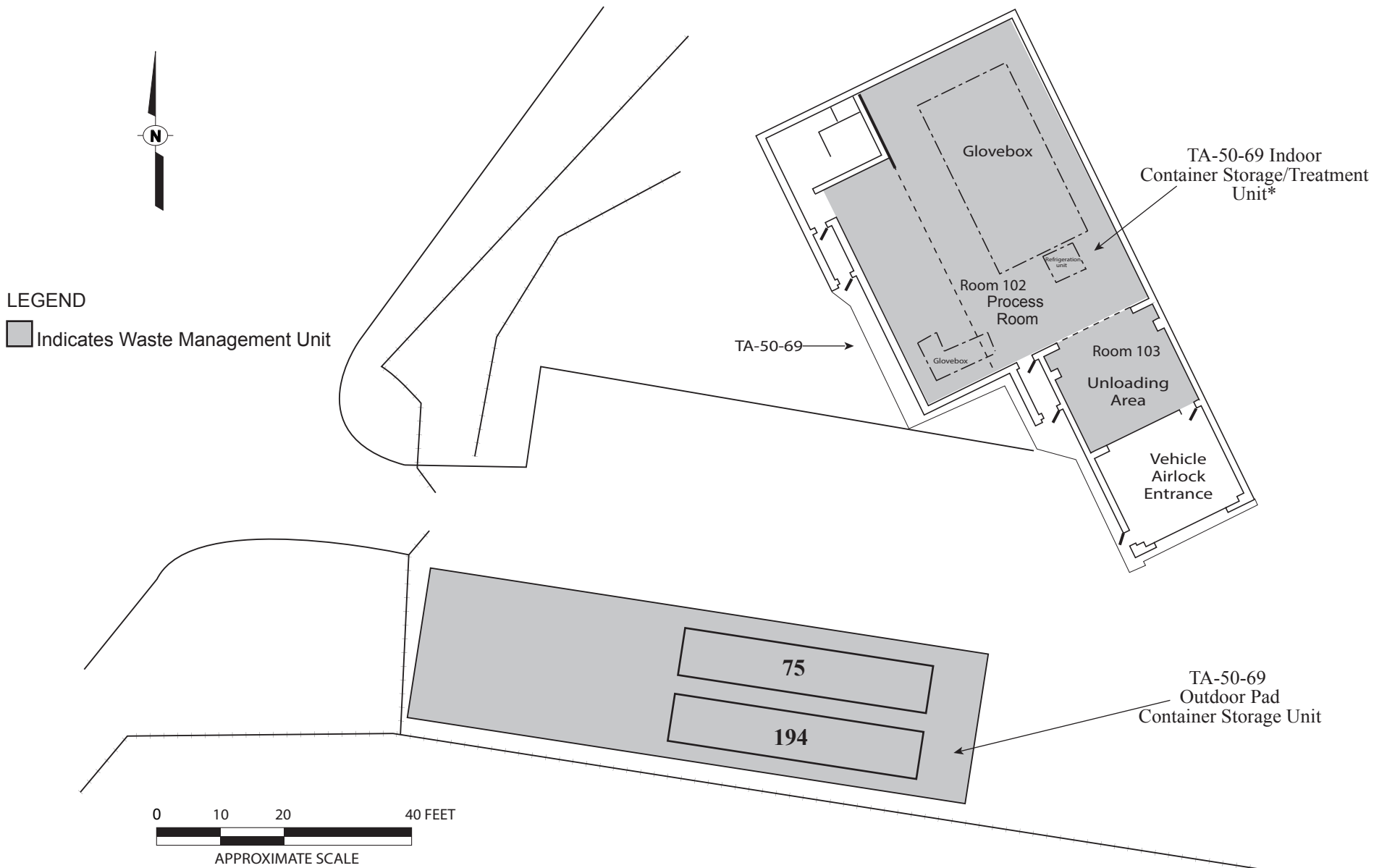
Figure 22:

Technical Area (TA) 50 Location Map

Created by EP-WES-EDA GIS TEAM. Map Number 06-0108 November 13, 2008, modified by ENV-RCRA August 2009

State Plane Coordinate System New Mexico Central Zone North American Datum 1983 (ft)

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Boundary of Department of Energy Property In and Around the Los Alamos National Laboratory; Los Alamos National Laboratory, SSMO Site Planning & Project Initiation; 04 June 2008



*Note: Container Storage Area in Building 69 does not include mezzanine.

Figure 23
Technical Area (TA) 50, Building 69, Indoor Storage/Treatment Unit and Outdoor Container Storage Unit

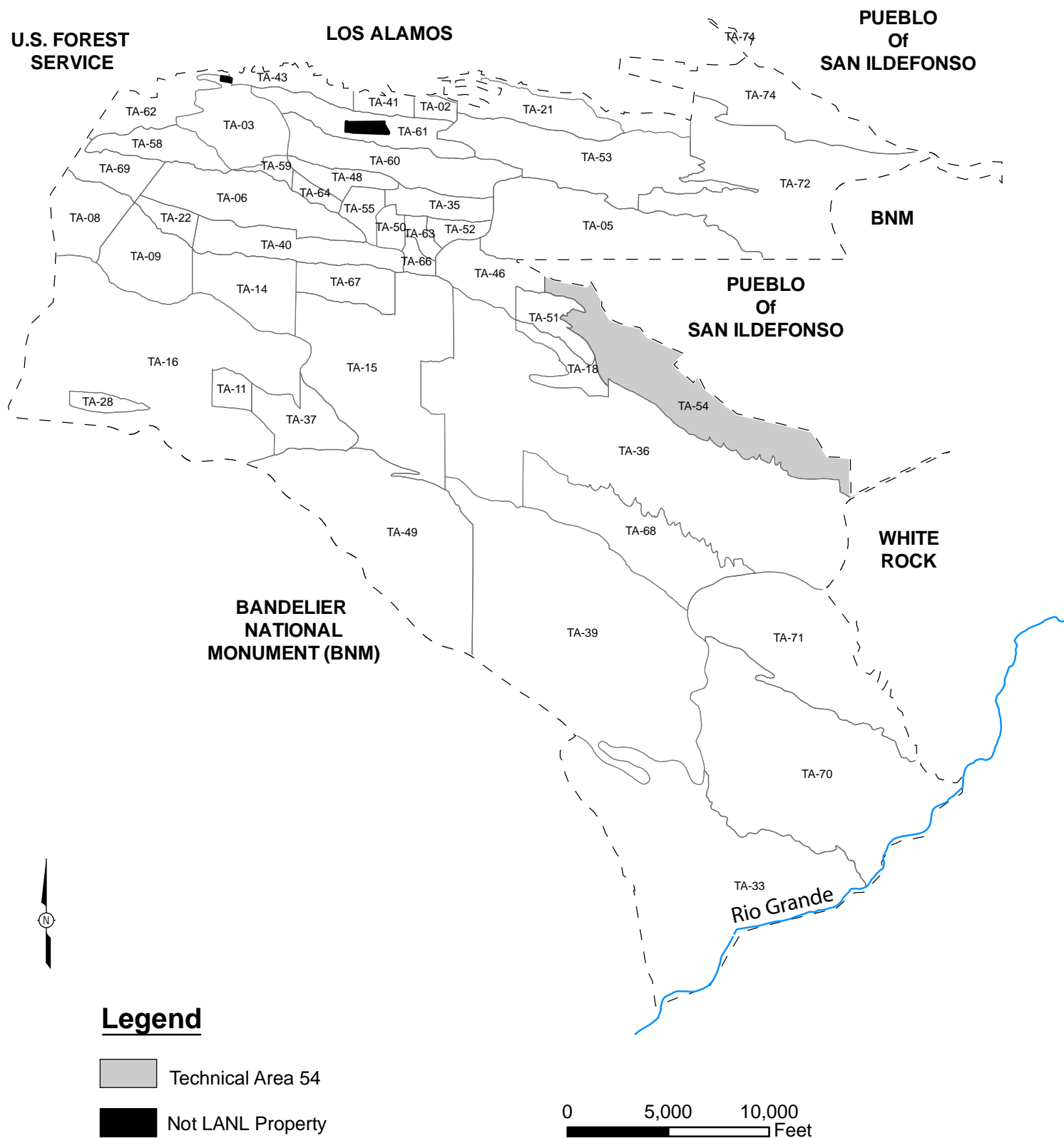


Figure 24:

Technical Area (TA) 54 Location Map

Created by EP-WES-EDA GIS TEAM. Map Number 06-0108 November 13, 2008, modified by ENV-RCRA August 2009

State Plane Coordinate System New Mexico Central Zone North American Datum 1983 (ft)

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 Boundary of Department of Energy Property In and Around the Los Alamos National Laboratory; Los Alamos National Laboratory, SSMO Site Planning & Project Initiation; 04 June 2008

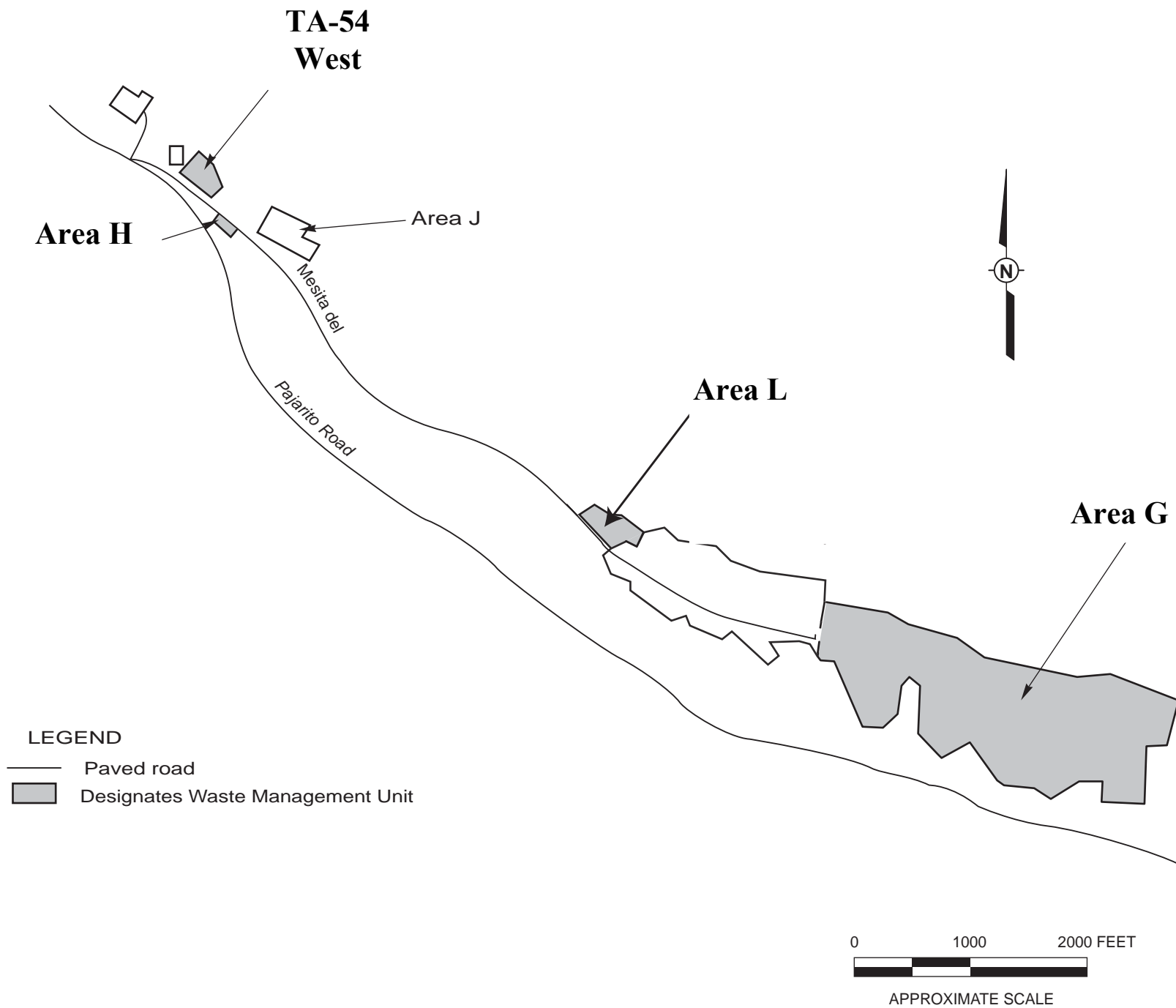


Figure 25
Technical Area (TA)-54, Areas G, H, L, and TA-54 West Location Map

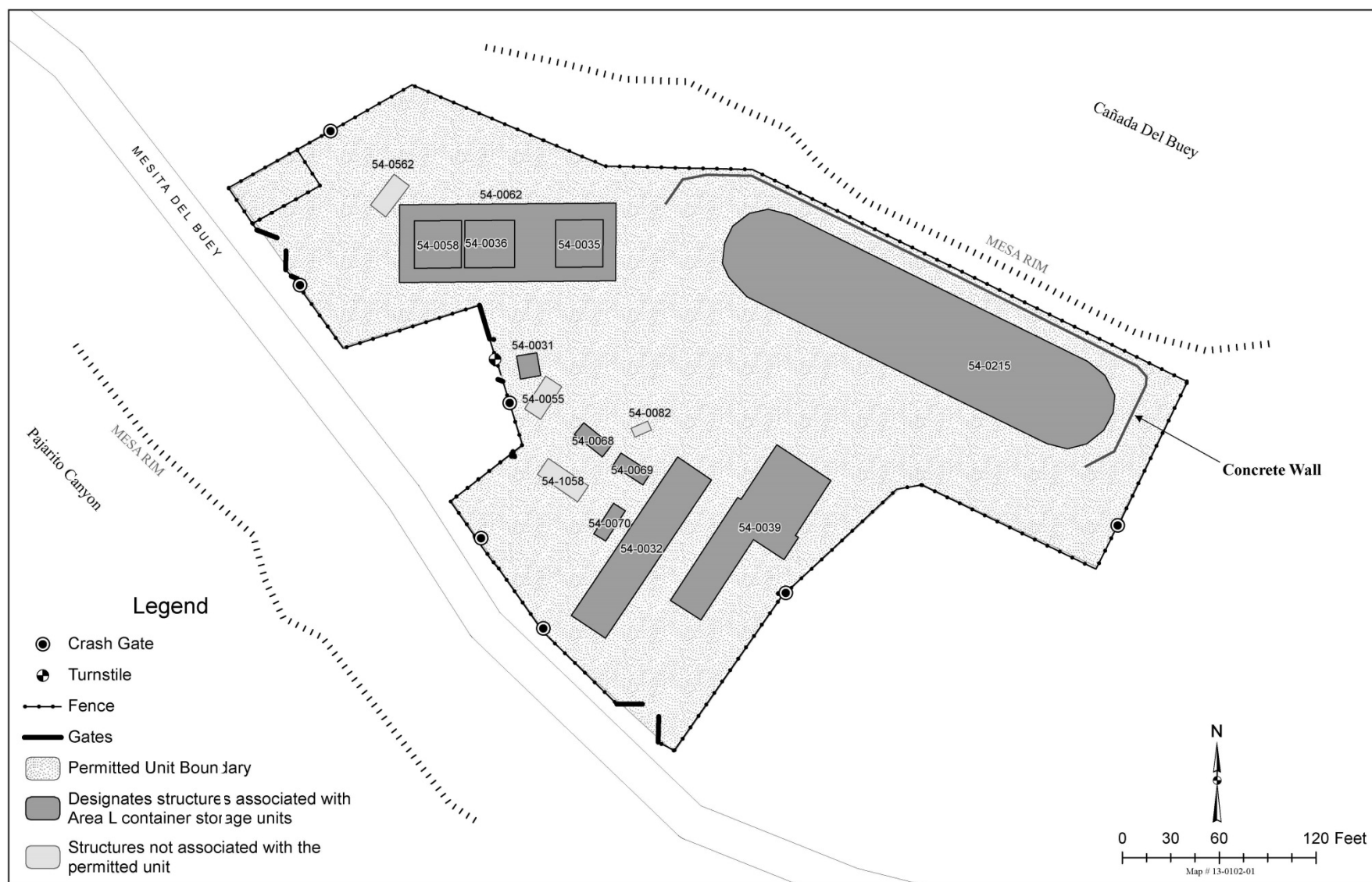


Figure 26: Technical Area 54, Area L, Container Storage Unit



Figure 27 TA-54, Area G, Container Storage and Treatment Units

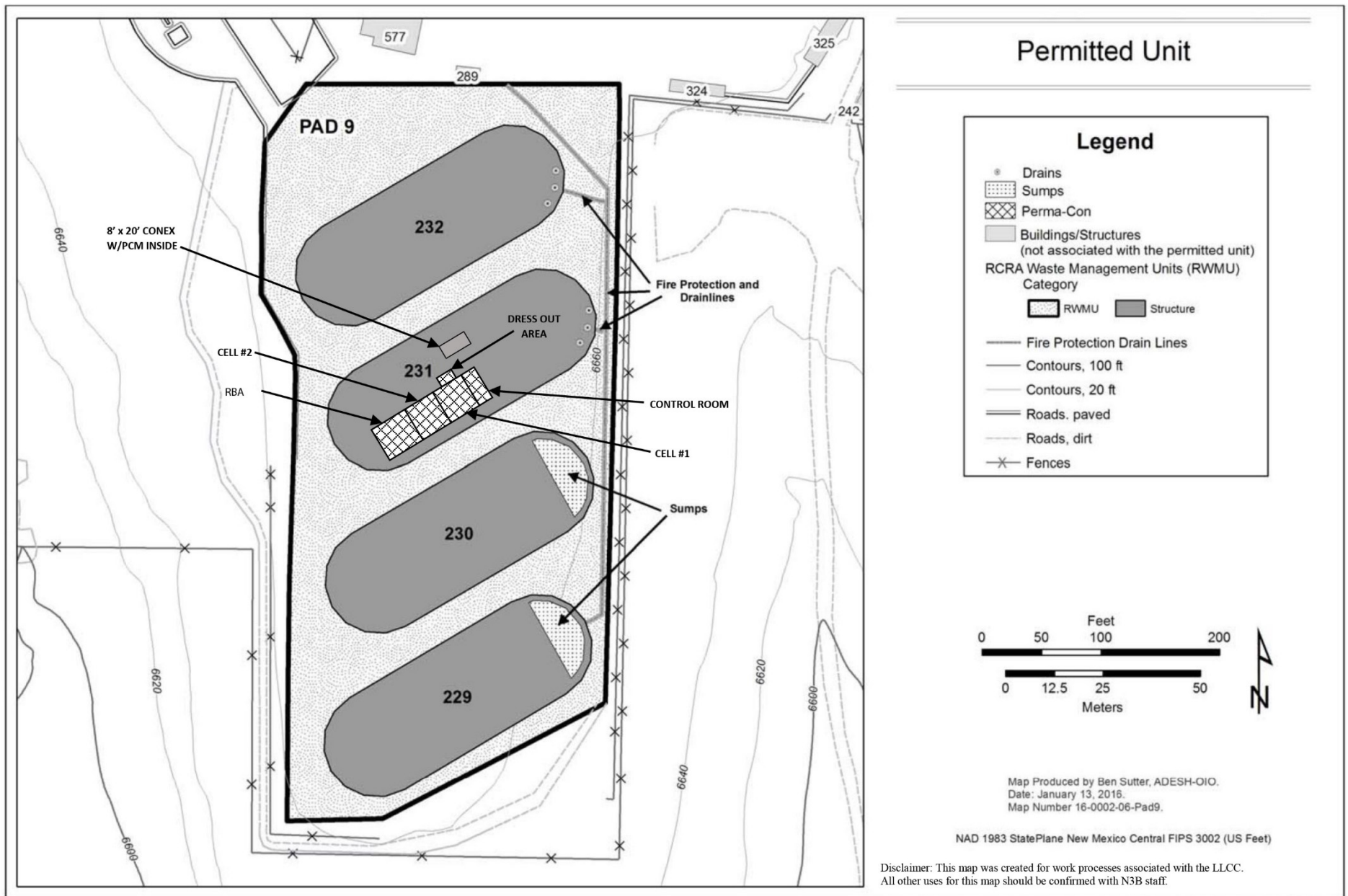


Figure 28: TA-54, Area G, Pad 9 Outdoor Container Storage/Treatment Unit (TWSP Domes 229, 230, 231, and 232)

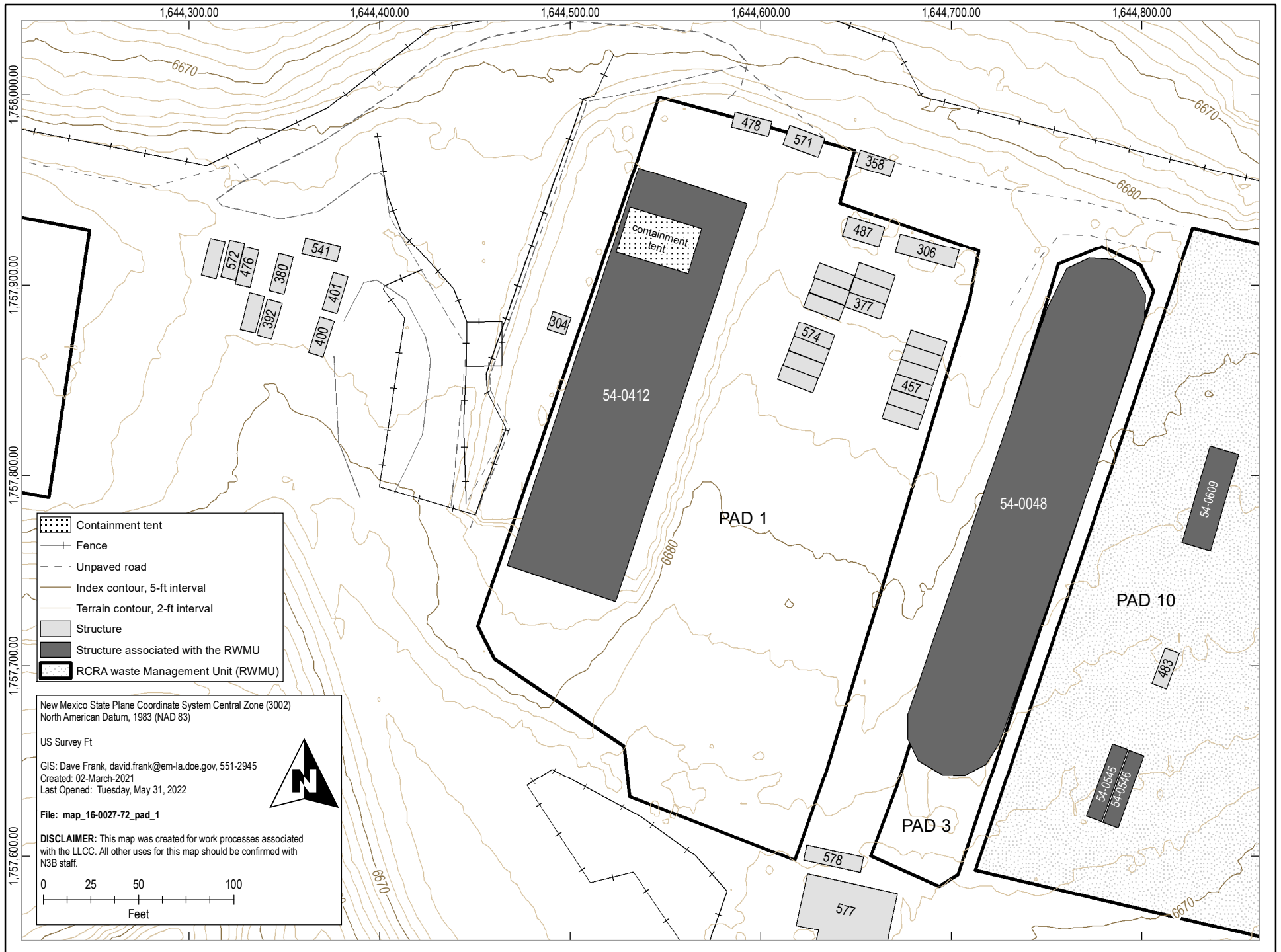
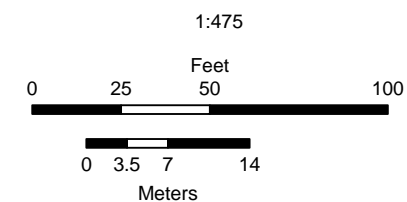
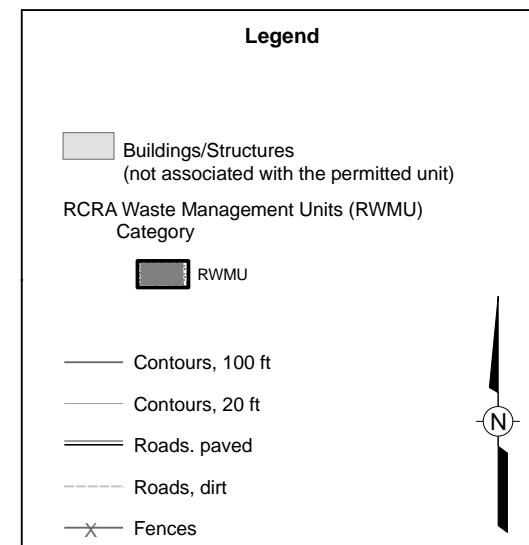
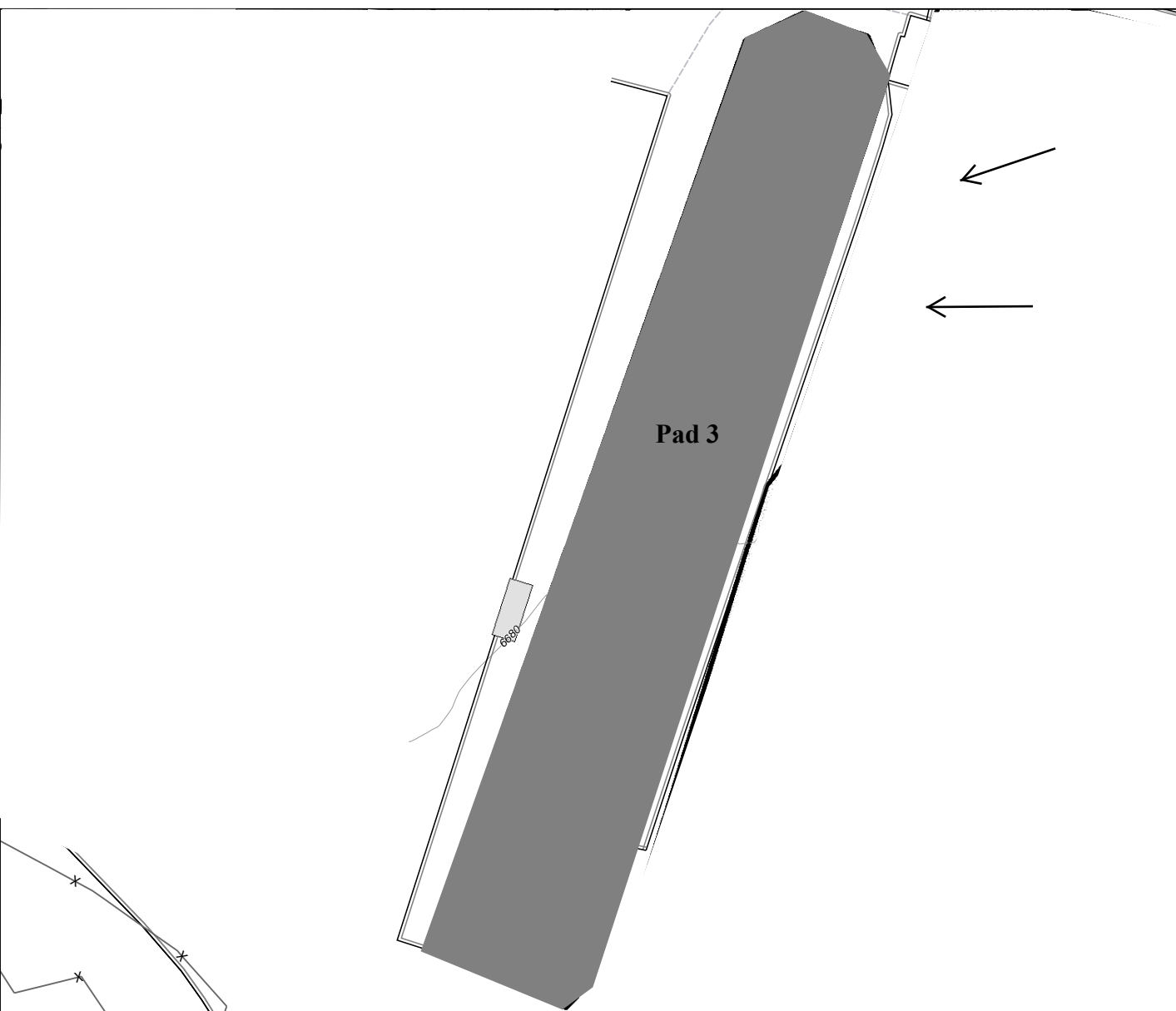


Figure 29: TA-54, Area G, Pad 1



State Plane Coordinate System New Mexico, Central Zone, US Feet
NAD 1983 Datum

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Figure 30:
Technical Area (TA)-54, Area G, Pad 3

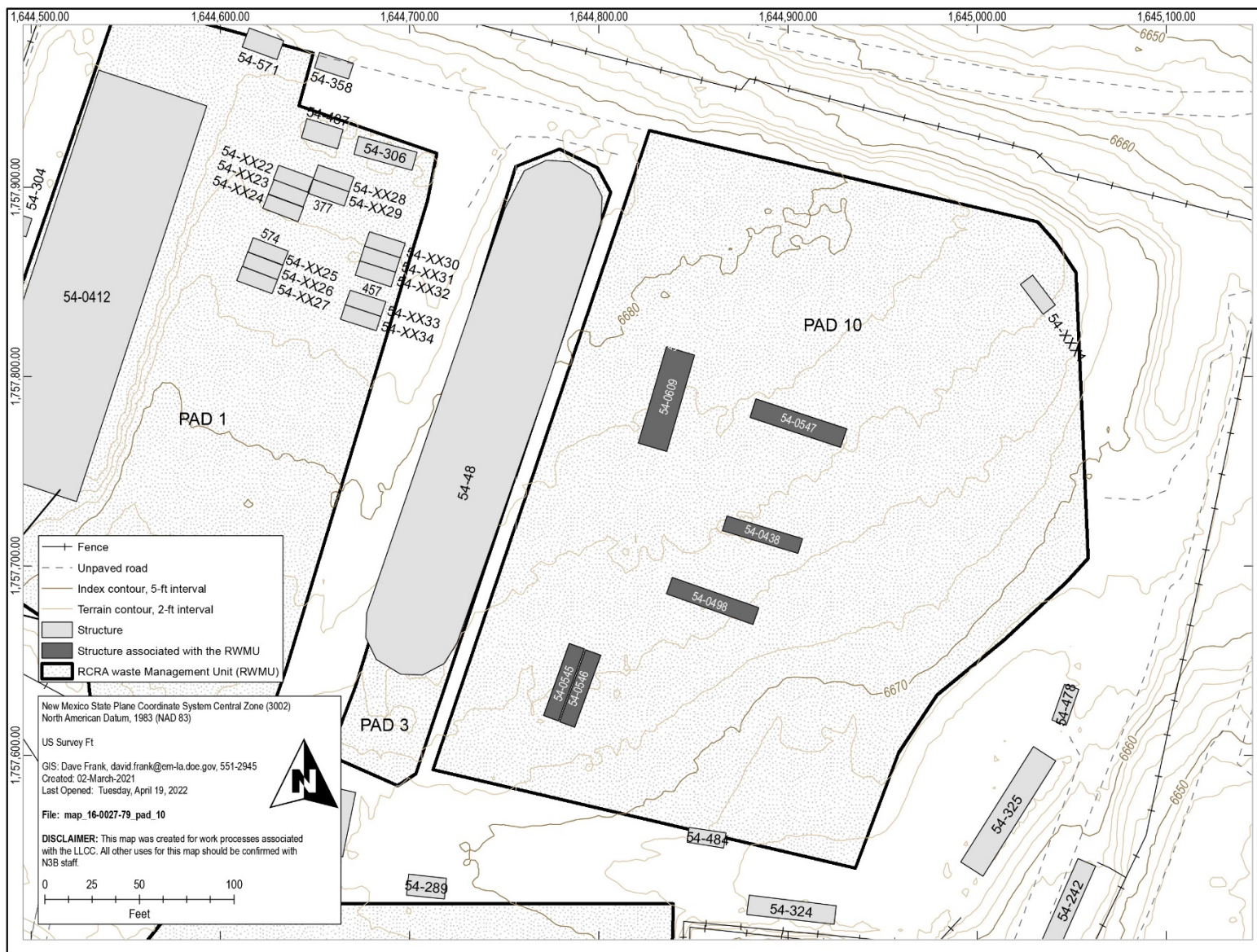


Figure 31 TA-54, Area G, Pad 10

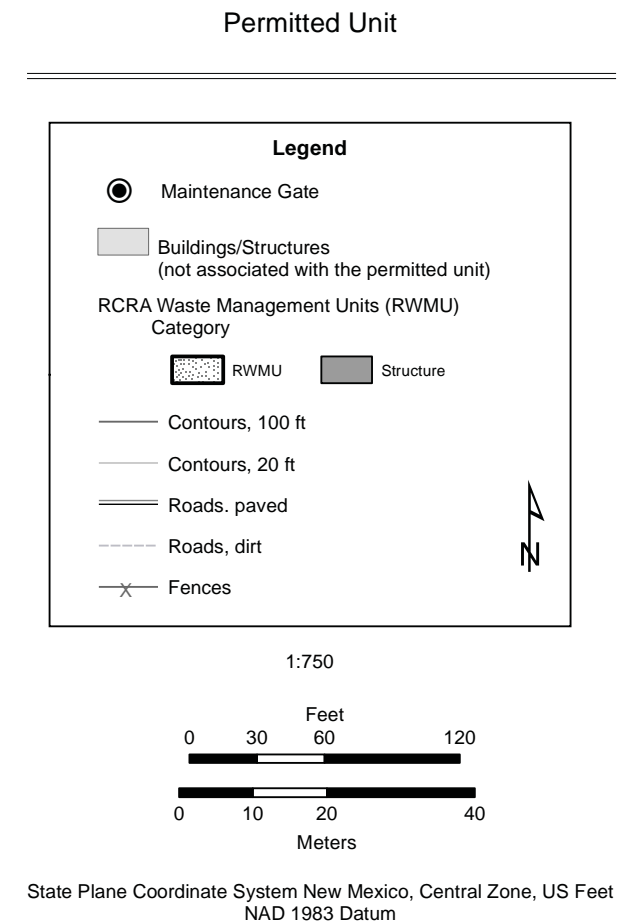
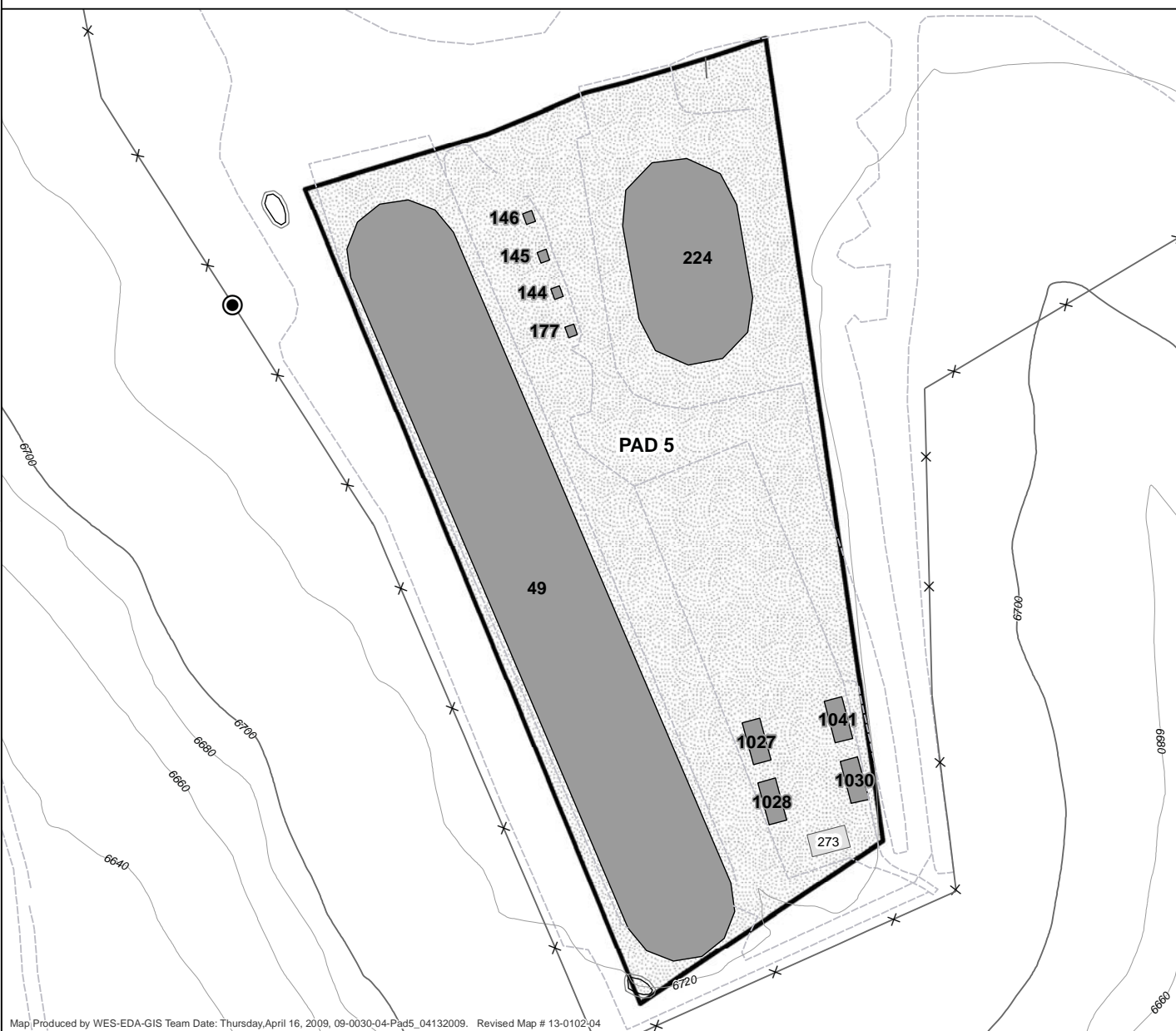
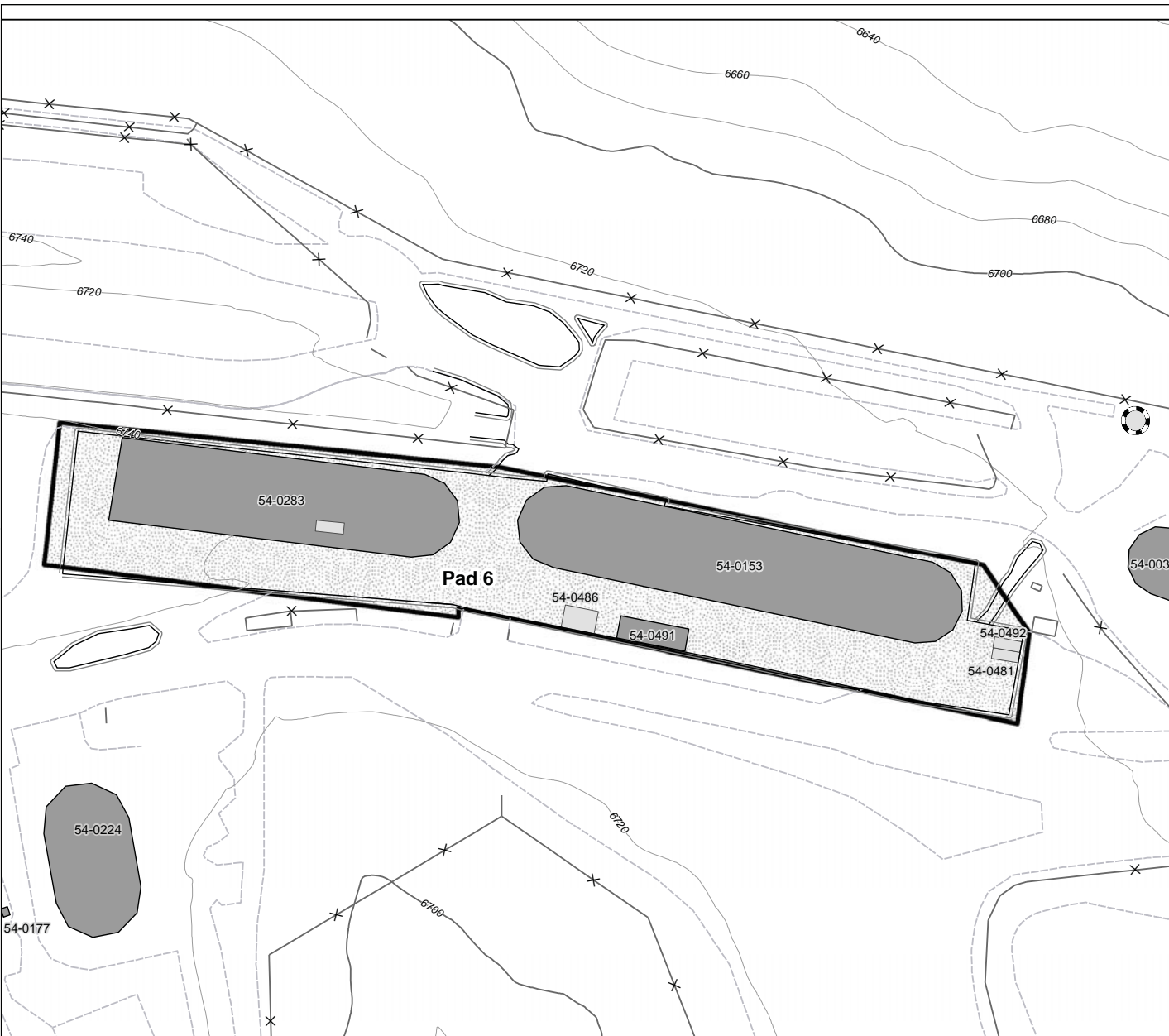



Figure 32: Technical Area (TA)-54, Area G, Pad 5 (Domes 49 and 224; and Storage Sheds 114, 145, 146, 177, 1027, 1028, 1030, and 1041)



Permitted Unit

Legend

 Buildings/Structures
(not associated with the permitted unit)

RCRA Waste Management Units (RWMU)
Category

 RWMU  Structure


 Sediment Trap

 Contours, 100 ft

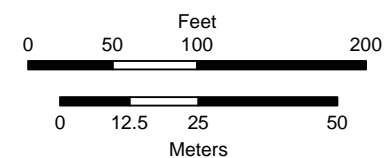
 Contours, 20 ft

 Roads, paved

 Roads, dirt

 Fences

1:1,000



State Plane Coordinate System New Mexico, Central Zone, US Feet
NAD 1983 Datum

Map Produced by Ben Sutter, ADBI-SI.
Date: March 20, 2017.
Map Number 17-0020-08.

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Figure 33: Technical Area (TA)-54, Area G, Pad 6, (Domes 153 & 283)

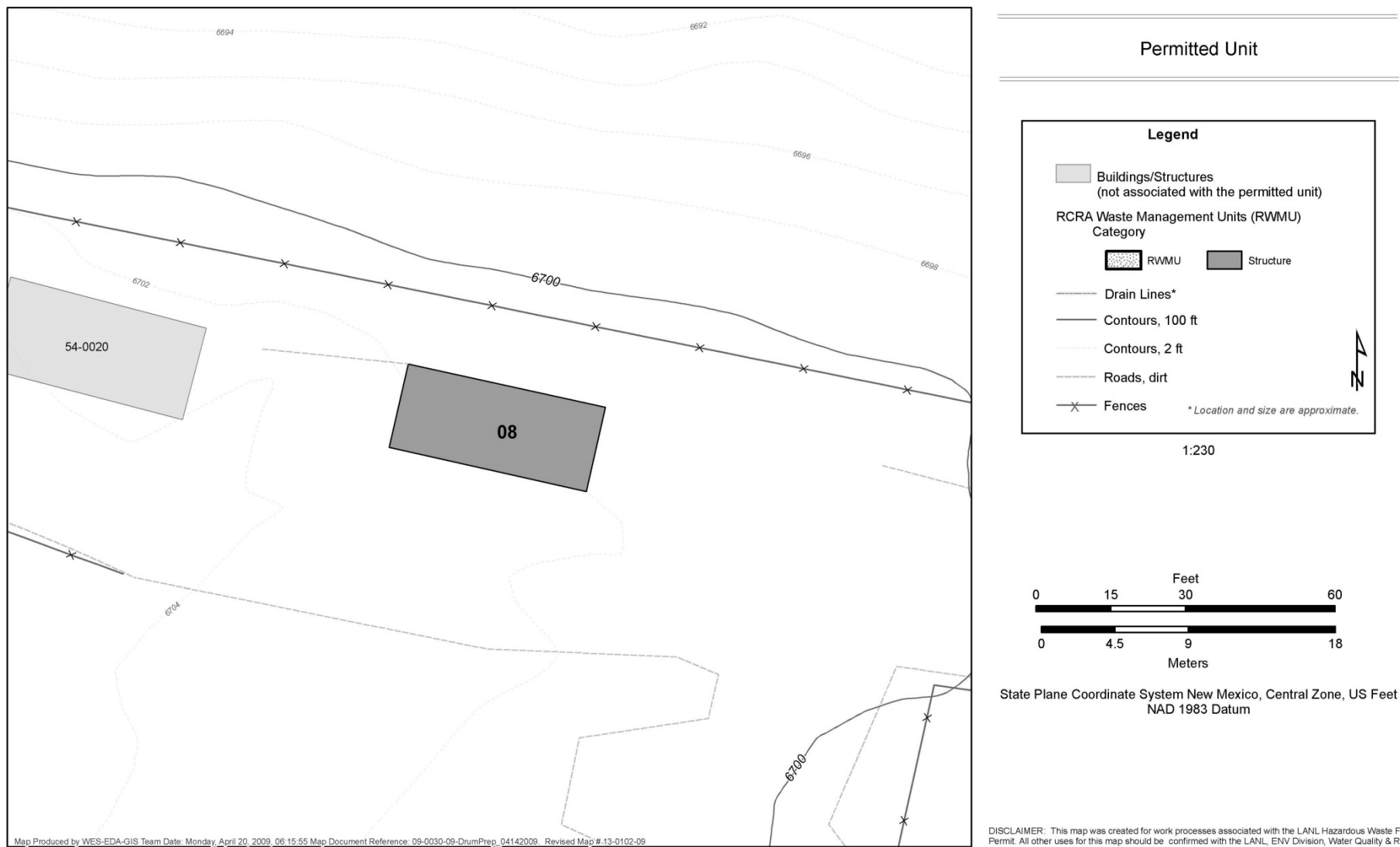
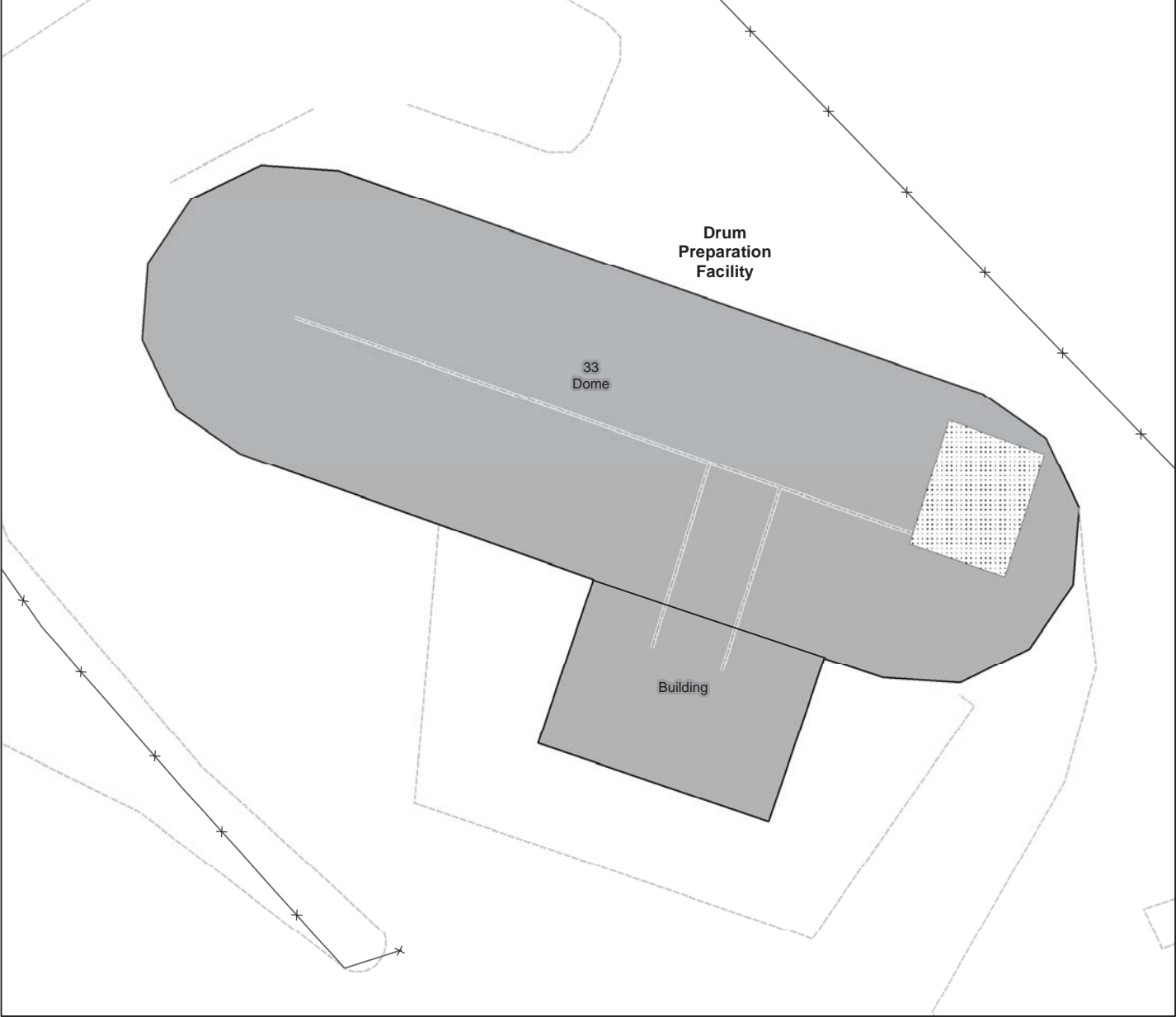


Figure 34: Technical Area (TA)-54, Area G, Storage Shed 8



Legend

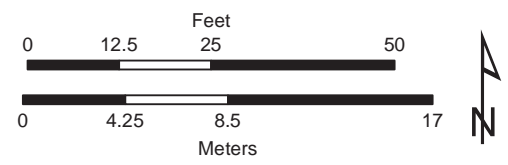
- Sumps*
- Buildings/Structures (not associated with the permitted unit)

RCRA Waste Management Units (RWMU) Category

- RWMU
- Structure

- Drain Lines*
- Contours, 100 ft
- Contours, 20 ft
- Roads, paved
- Roads, dirt
- Fences

** Location and size are approximate.*

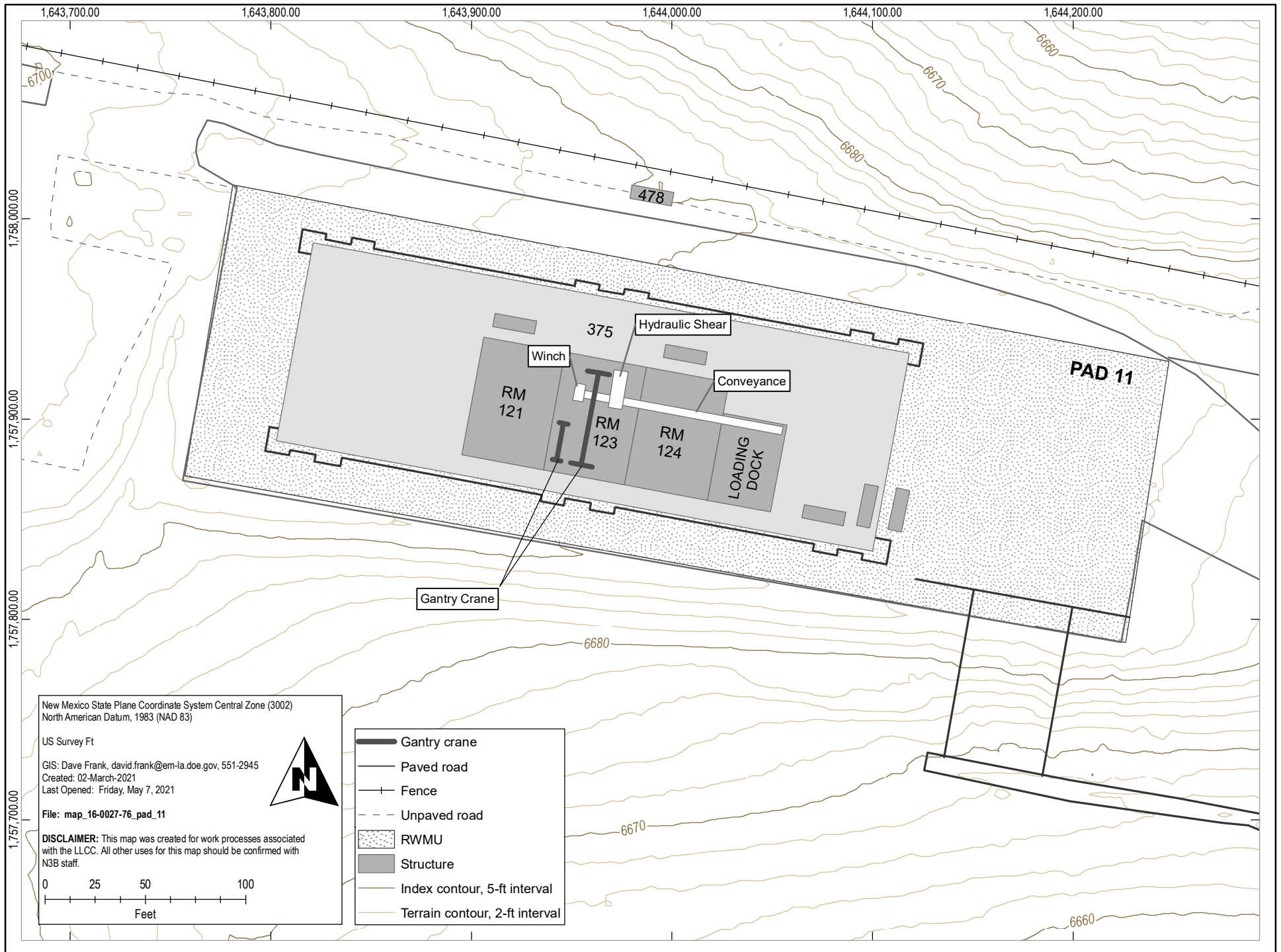


Map Produced by Ben Sutter, ADESH-OIO.
 Date: March 20, 2017.
 Map Number 17-0020-07-Building33_2.

NAD 1983 StatePlane New Mexico Central FIPS 3002 (US Feet)

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Figure 35
 Technical Area (TA)-54, Area G, Building 33



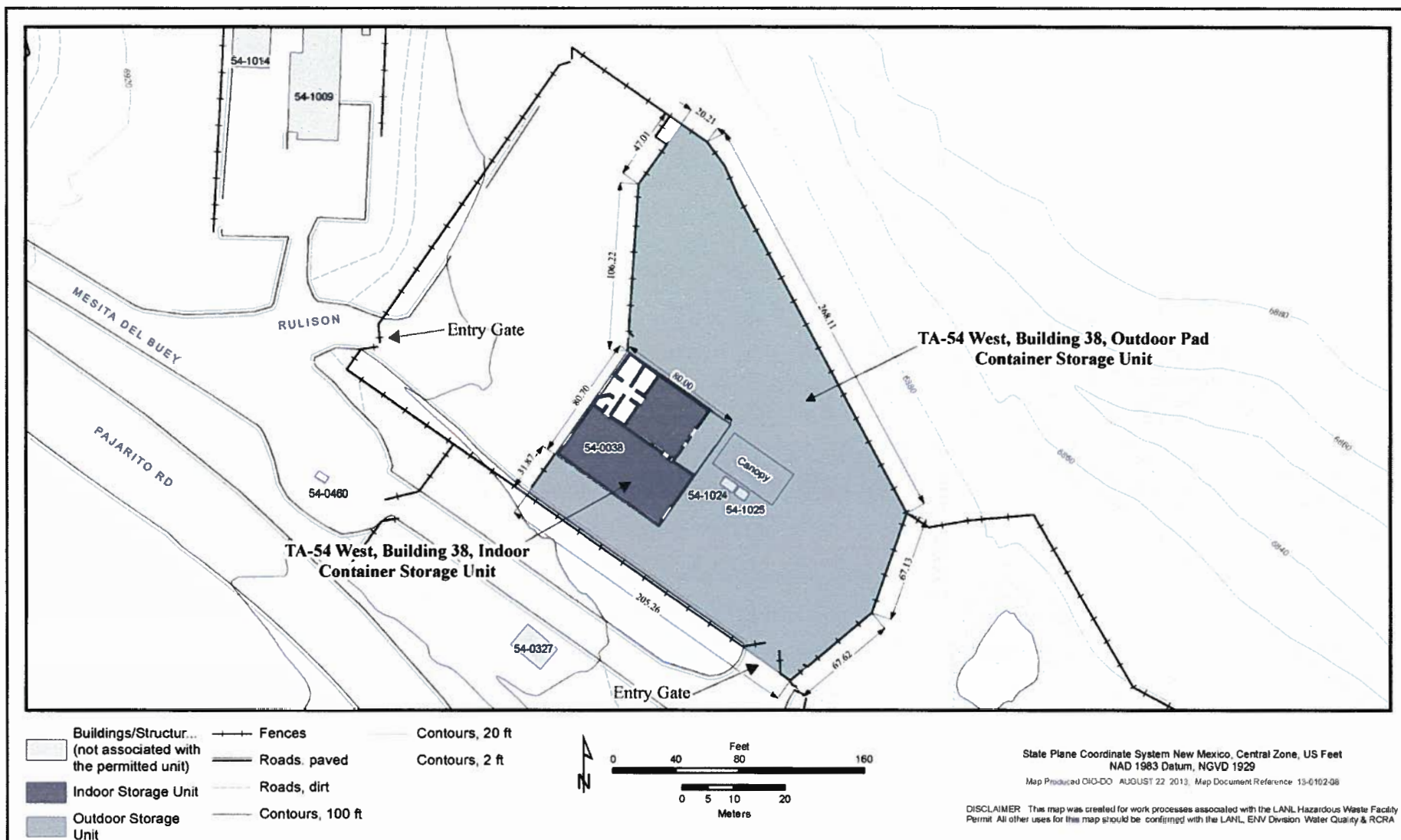


Figure 37: Technical Area (TA) 54 West, Building 38 Indoor (High Bay and Low Bay) and Outdoor Pad

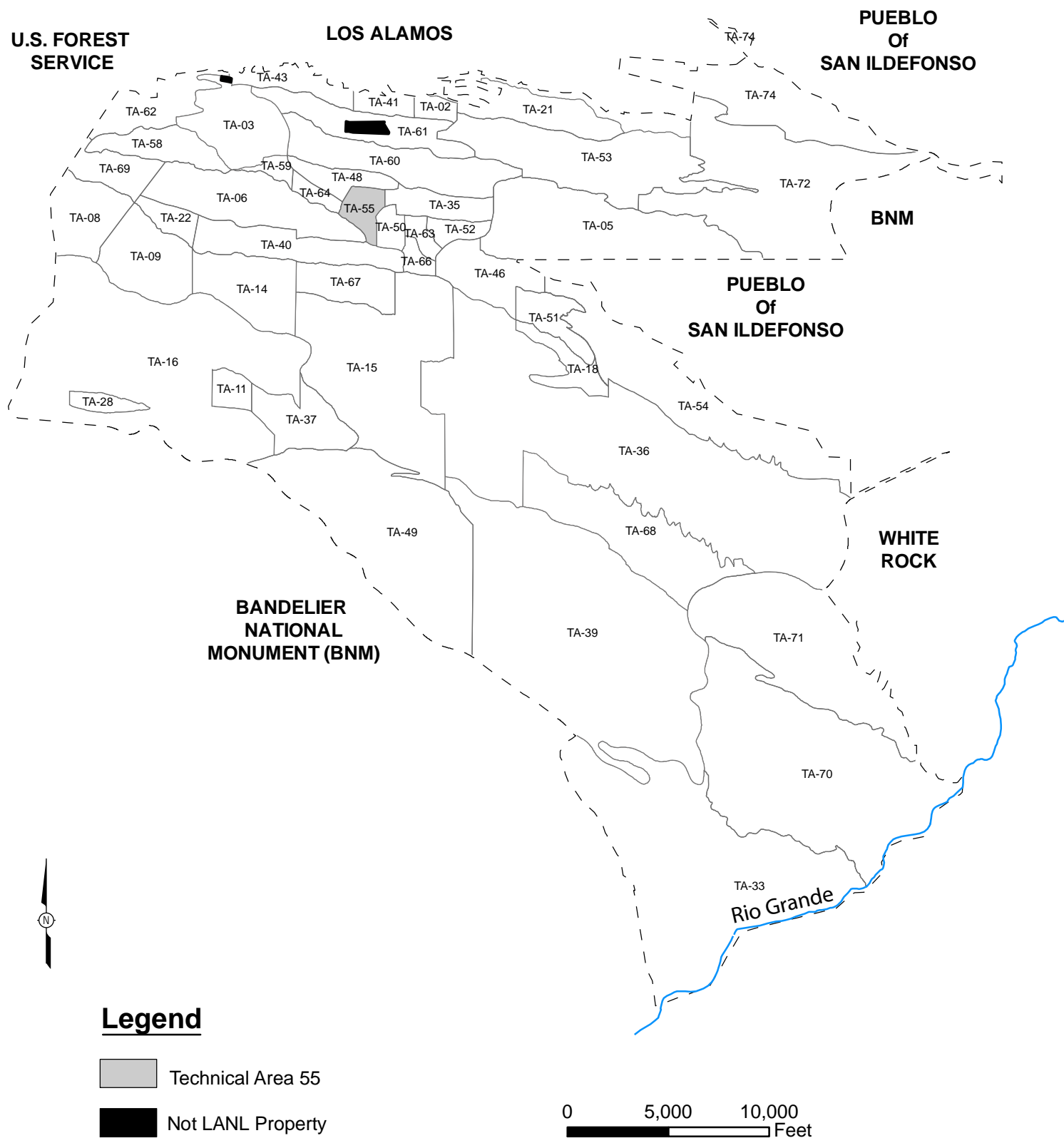


Figure 38:

Technical Area (TA) 55 Location Map

Created by EP-WES-EDA GIS TEAM. Map Number 06-0108 November 13, 2008, modified by ENV-RCRA August 2009

State Plane Coordinate System New Mexico Central Zone North American Datum 1983 (ft)

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 Boundary of Department of Energy Property In and Around the Los Alamos National Laboratory; Los Alamos National Laboratory, SSMO Site Planning & Project Initiation; 04 June 2008

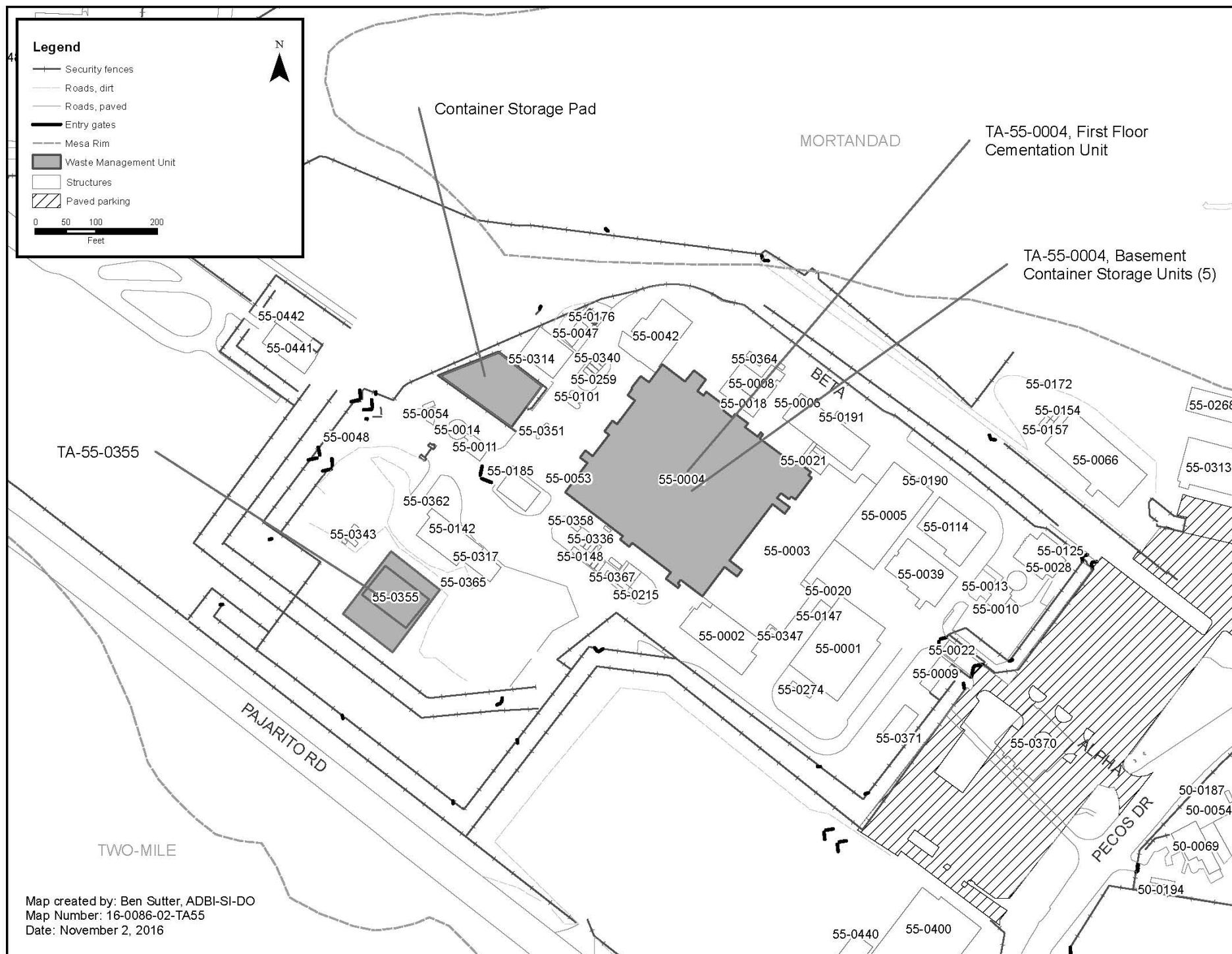


Figure 39
Technical Area (TA) 55, Building 4 Location Map

(FIGURE 40 - TA-55, BUILDING 4, ROOM B40)

UCNI

LOS ALAMOS NATIONAL LABORATORY

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(FIGURE 41 - TA-55, BUILDING 4, ROOM K13)

UCNI

LOS ALAMOS NATIONAL LABORATORY

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ACT**

(FIGURE 42 - TA-55, BUILDING 4, ROOM B05)

UCNI

LOS ALAMOS NATIONAL LABORATORY

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INFORMATION (UCNI) AS DEFINED BY SECTION 148 OF THE ATOMIC ENERGY
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(FIGURE 43 - TA-55, BUILDING 4, ROOM B45)

UCNI

LOS ALAMOS NATIONAL LABORATORY

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(FIGURE 44 - TA-55, BUILDING 4, VAULT)

UCNI

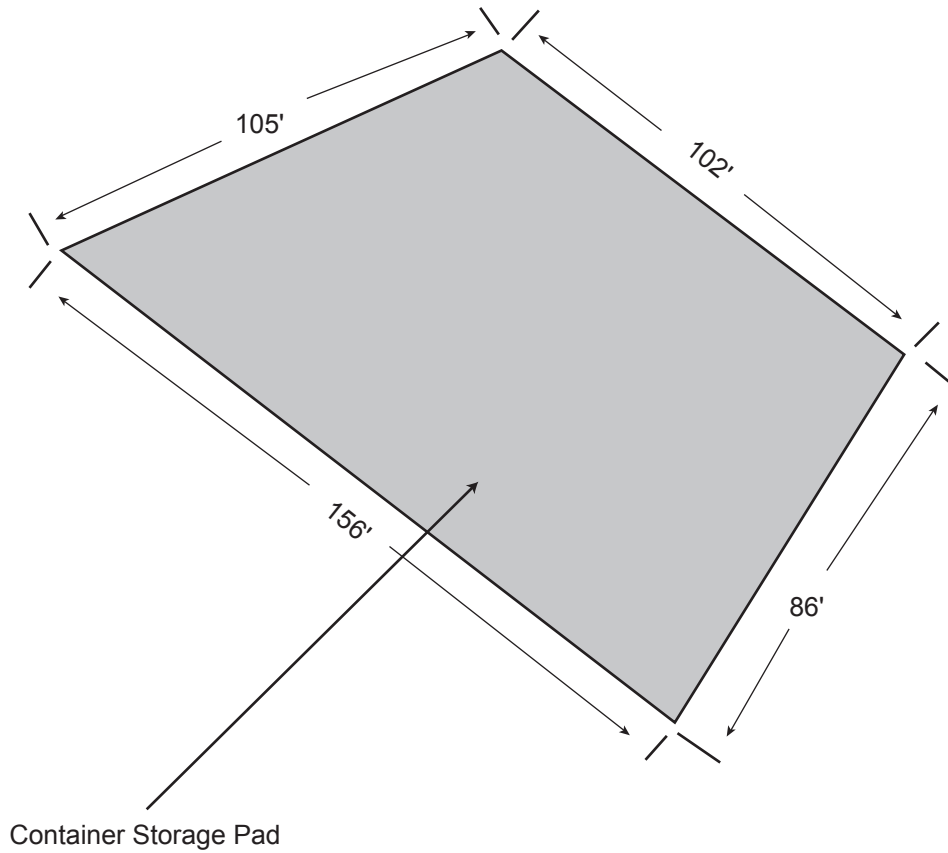
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LEGEND

 Designates Waste Management Unit



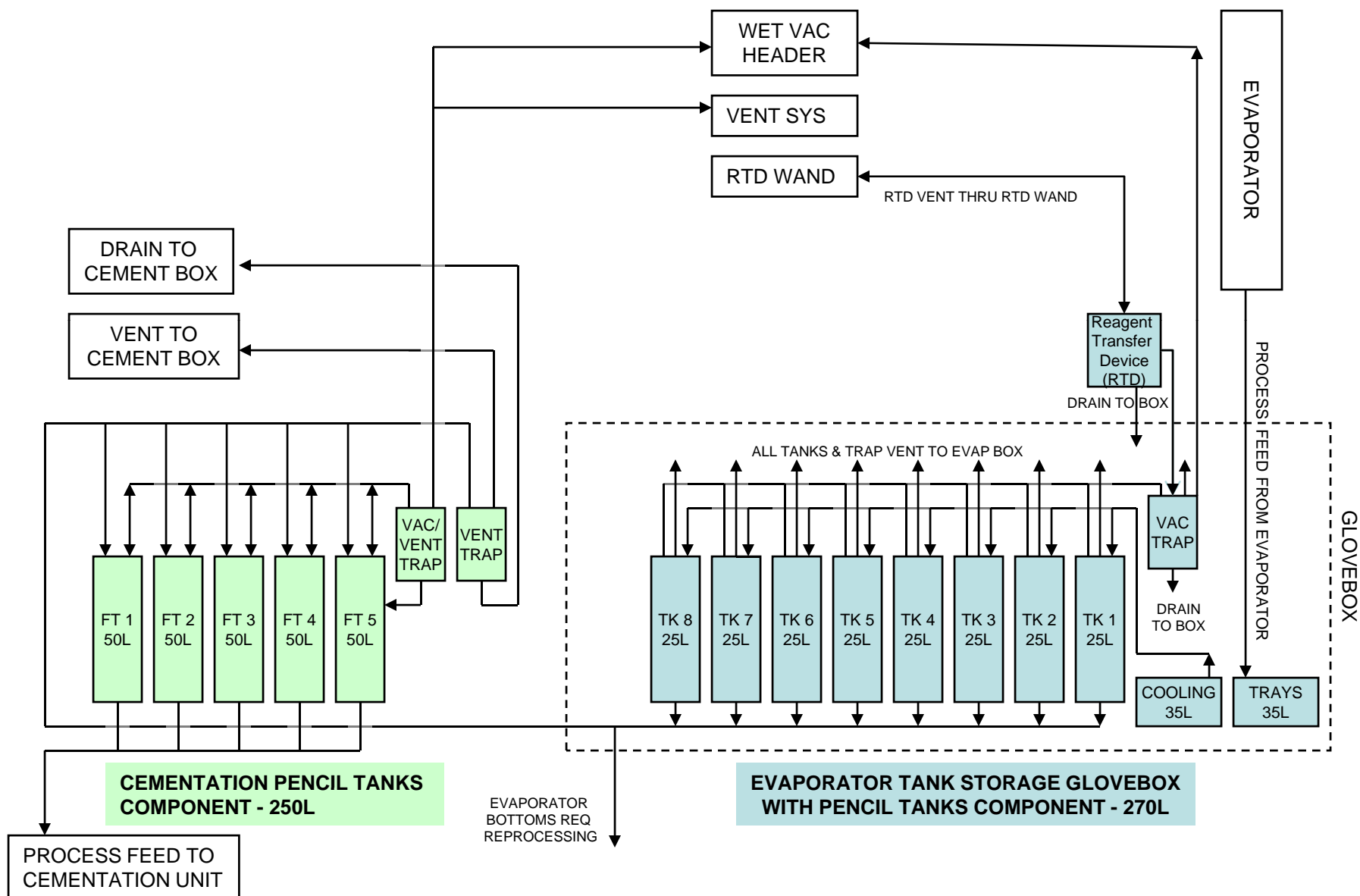
Note: TA-55-4 is located approximately 140 feet east of this container storage pad. Refer to Figure 39 for the general location of this container storage pad in relation to other buildings/structures at TA-55.

NOT TO SCALE

Figure 45
Technical Area (TA)-55, Building 4, Outdoor Container Storage Pad

Figure 46 Removed December 2015

Figure 47: TA-55, Building 4, Room 401, Storage Tank System Process Flow Diagram



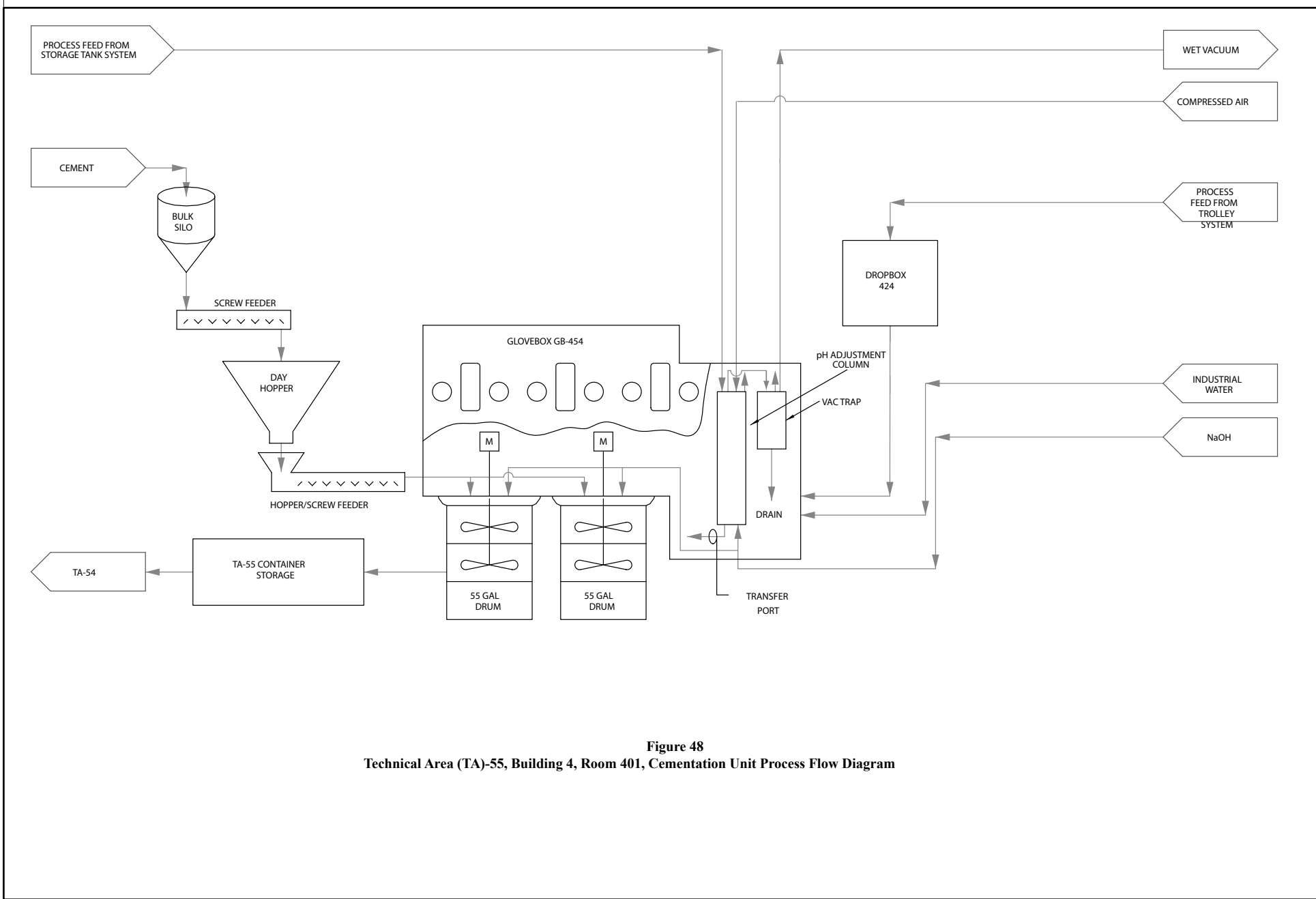


Figure 48
Technical Area (TA)-55, Building 4, Room 401, Cementation Unit Process Flow Diagram

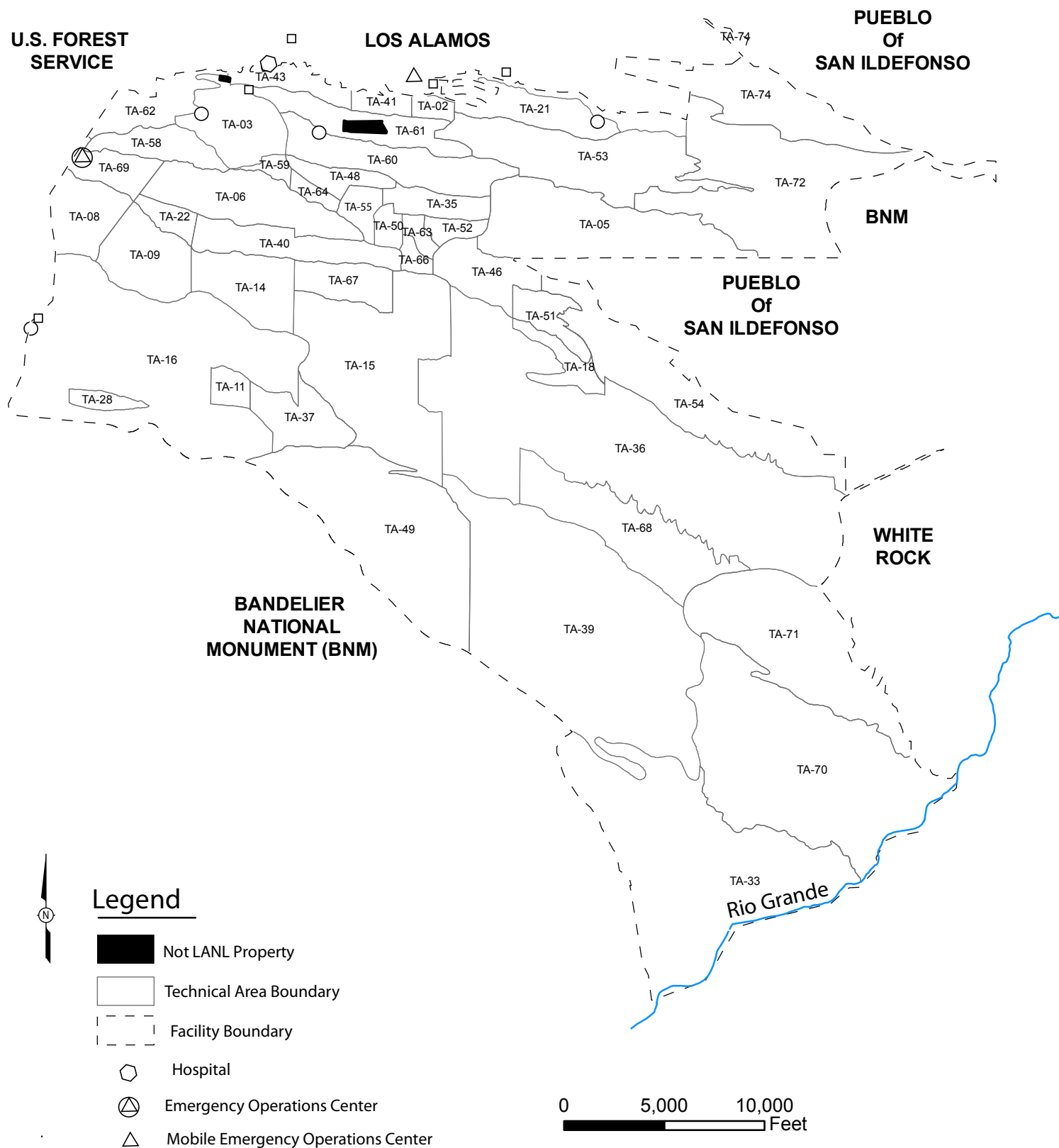
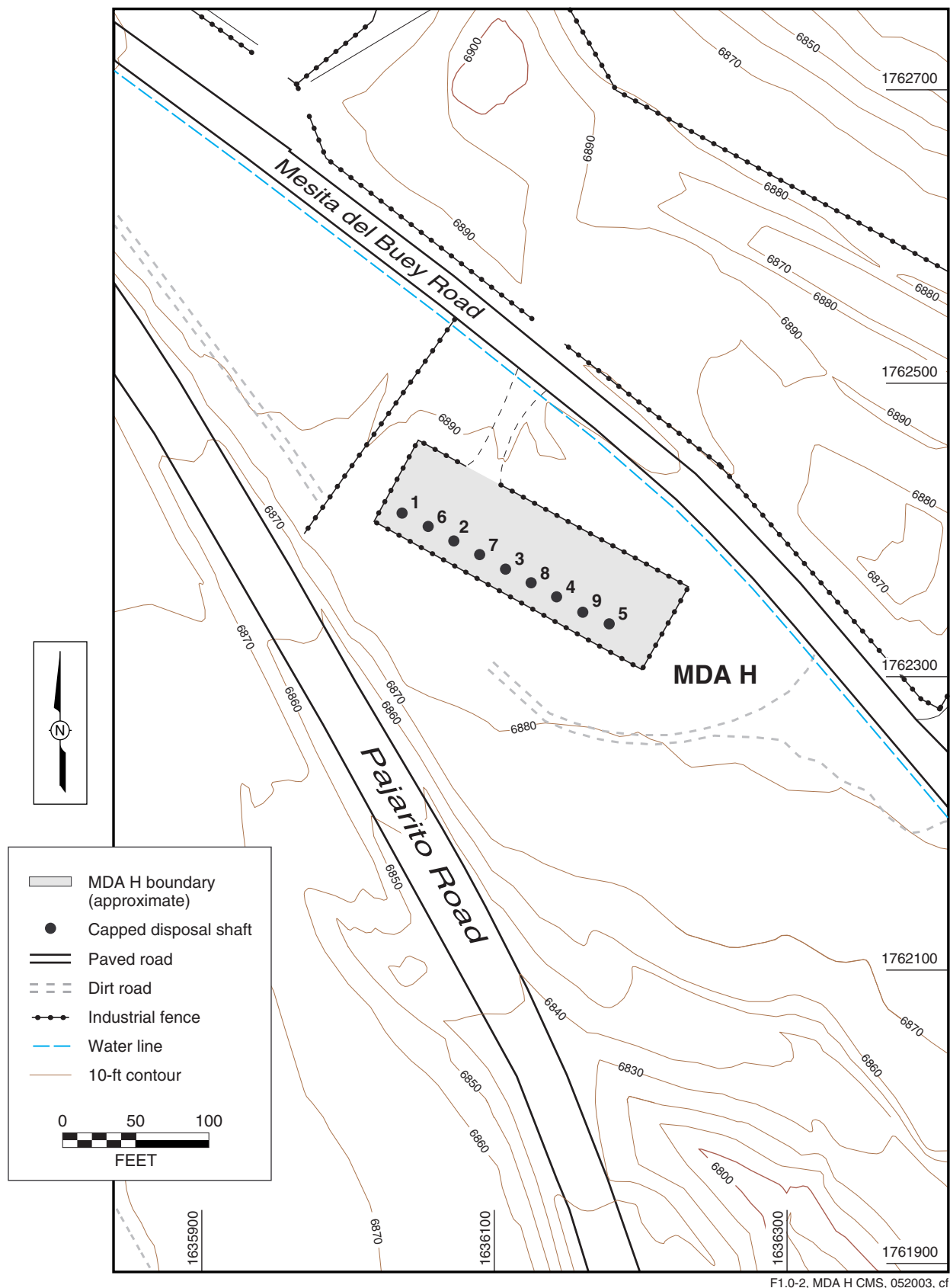


Figure 49:
Emergency Facilities at Los Alamos National Laboratory (LANL)



F1.0-2, MDA H CMS, 052003, cf

Figure 50:
Technical Area (TA)-54, Material Disposal Area (MDA) H

FIGURE 51 – RESERVED

FIGURE 52 – RESERVED

FIGURE 53 – RESERVED

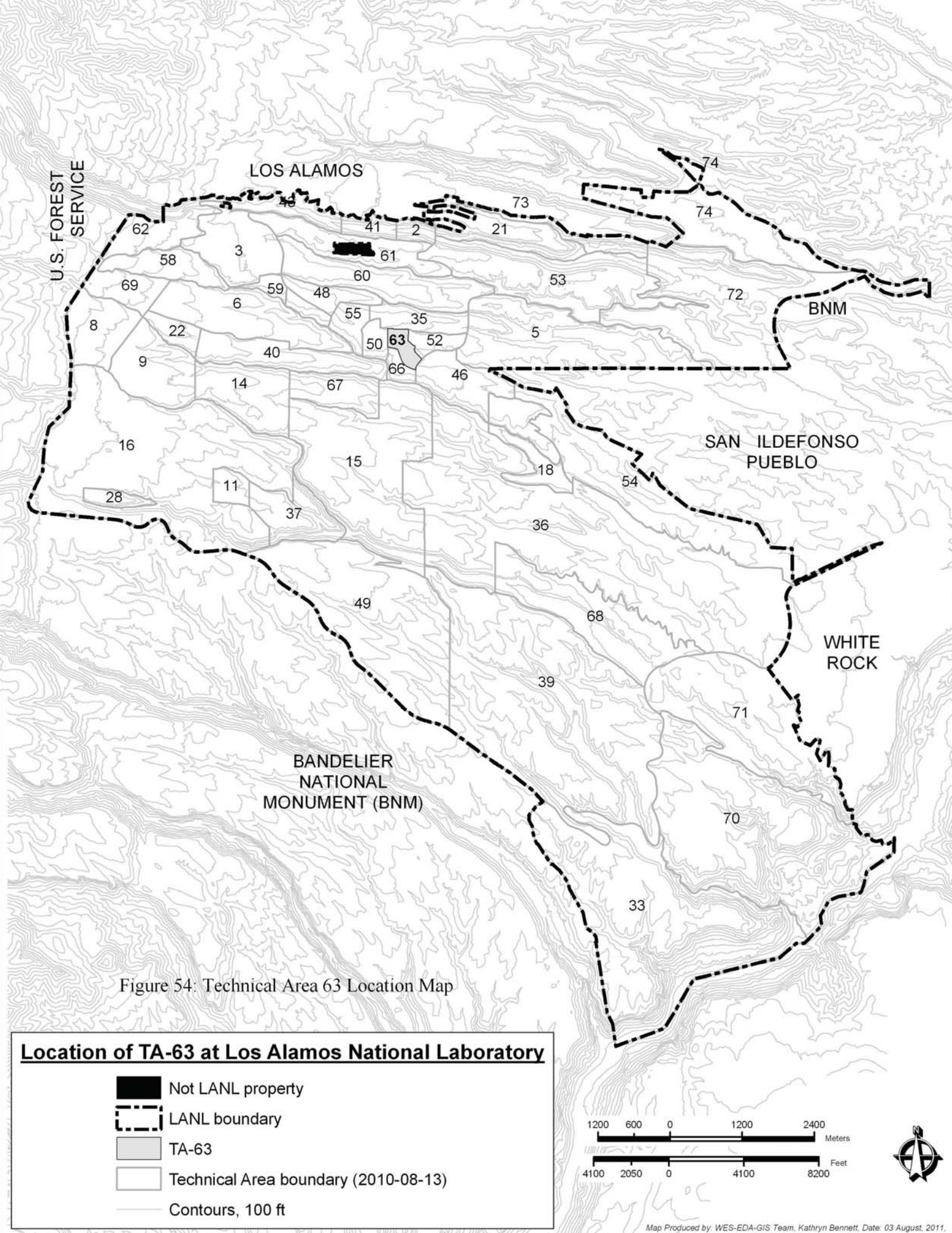





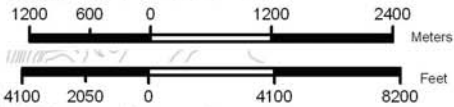


Figure 54: Technical Area 63 Location Map

Location of TA-63 at Los Alamos National Laboratory

-  Not LANL property
-  LANL boundary
-  TA-63
-  Technical Area boundary (2010-08-13)
-  Contours, 100 ft



TA-63









**TWF
Permitted
Unit**

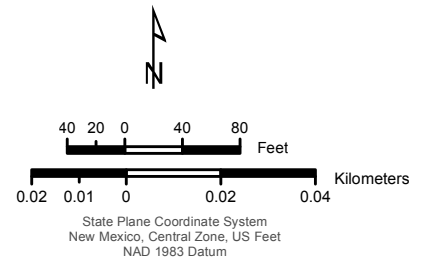
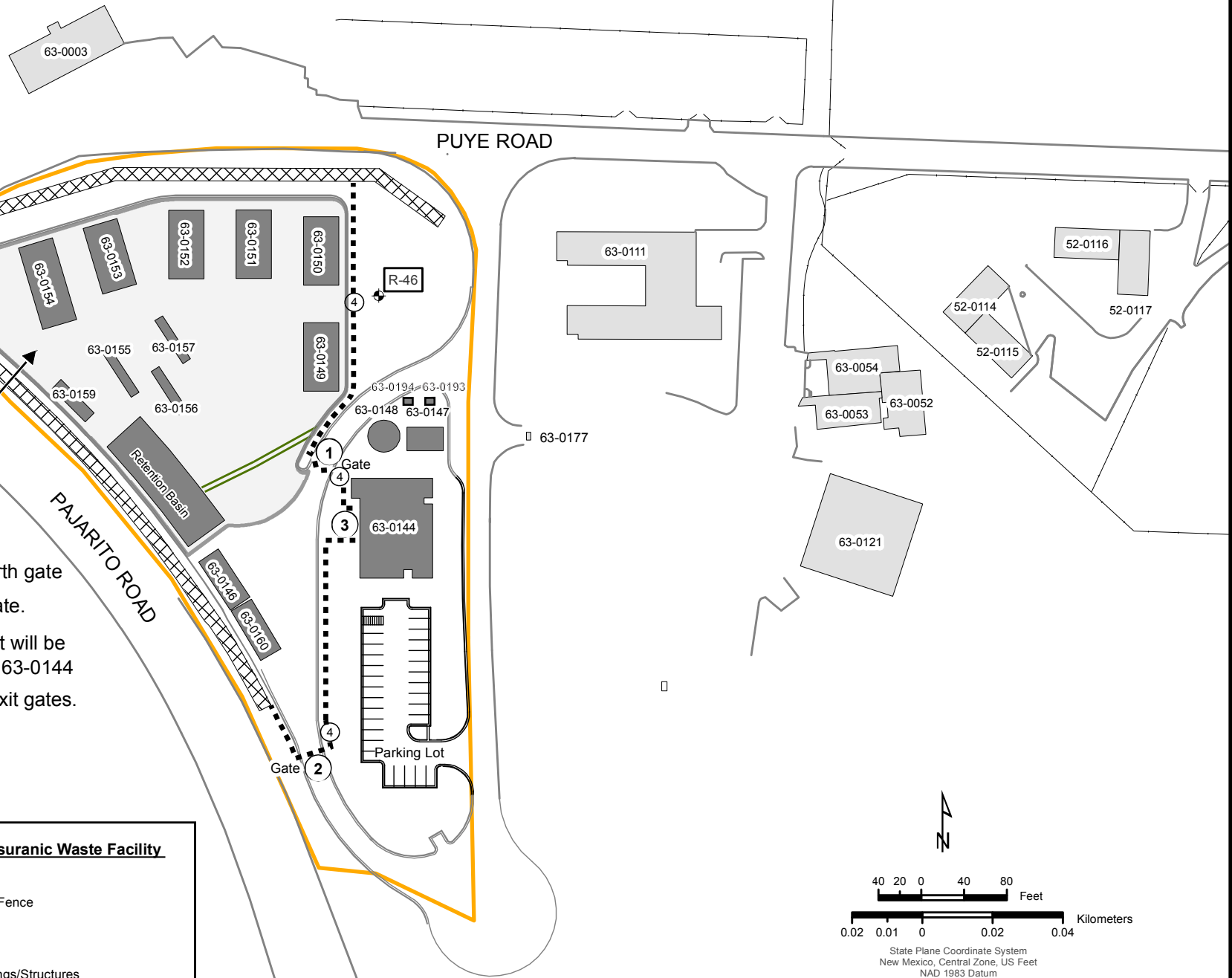
KEYED NOTES:

- ① Vehicle entrance via north gate
- ② Vehicle exit via south gate.
- ③ Personnel entry and exit will be via Operations Building 63-0144
- ④ Emergency personnel exit gates.

FIGURE 55.

Technical Area (TA) 63 Transuranic Waste Facility

-  Regional Well
-  TWF Security Fence
-  Valley Gutter
-  Vehicle Barrier
-  Existing Buildings/Structures
-  TWF Building and Structures
-  TWF Permitted Unit
-  TWF Site boundary



Map Produced by: J. Stockum, Date: 18 June, 2014,
Map Reference Number: 14-0051
This map was created for RCRA TWF permit. All other uses for this map
should be confirmed with LANL ENV-RCRA staff.

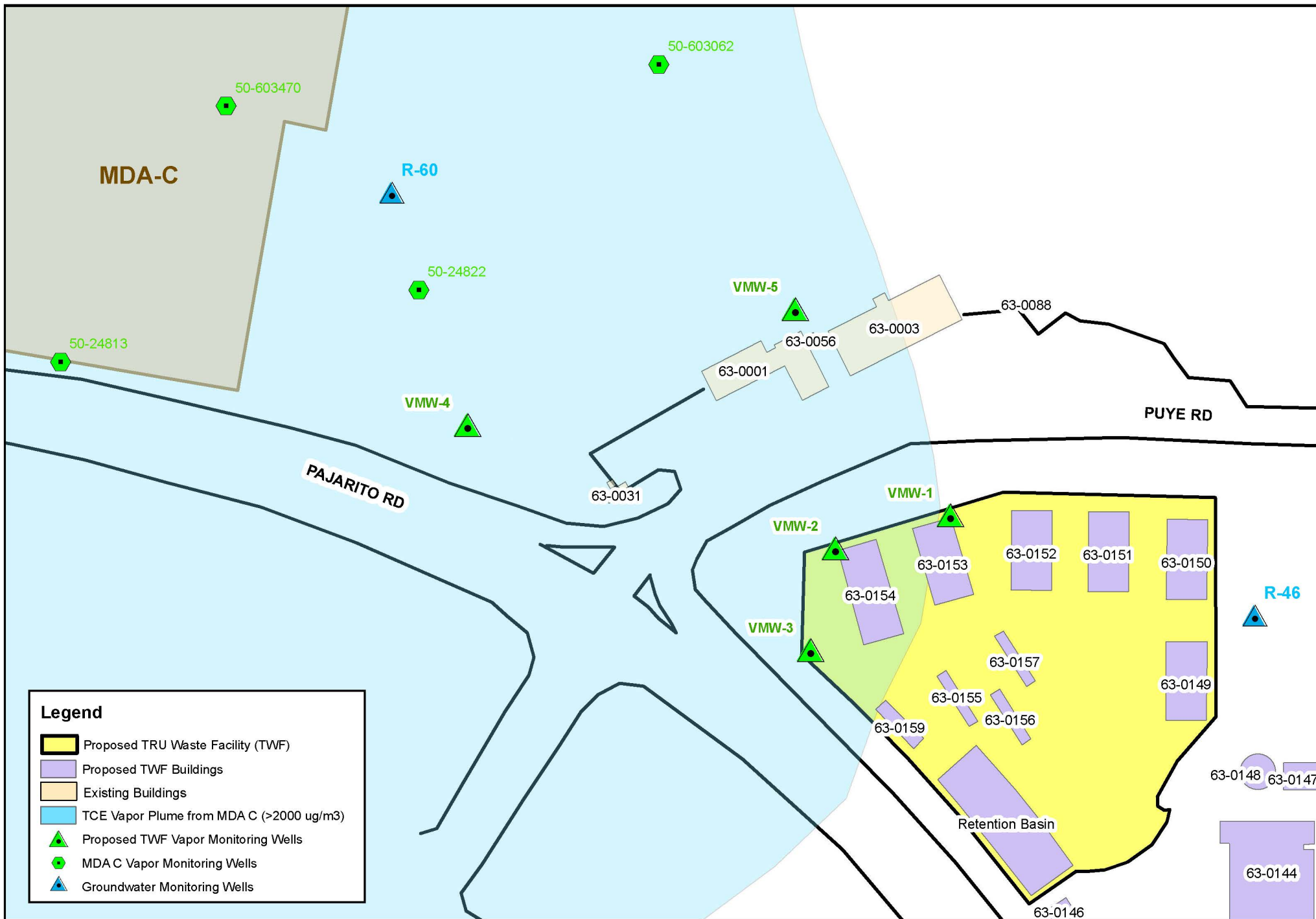


Figure 56

Transuranic Waste Facility Subsurface Vapor Monitoring Network

1:1,200
0 25 50 100 150 200 Feet



Figure 57 – TA-55, Building 4, Room B13

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Figure 58 – TA-55, Building 4, Room G12

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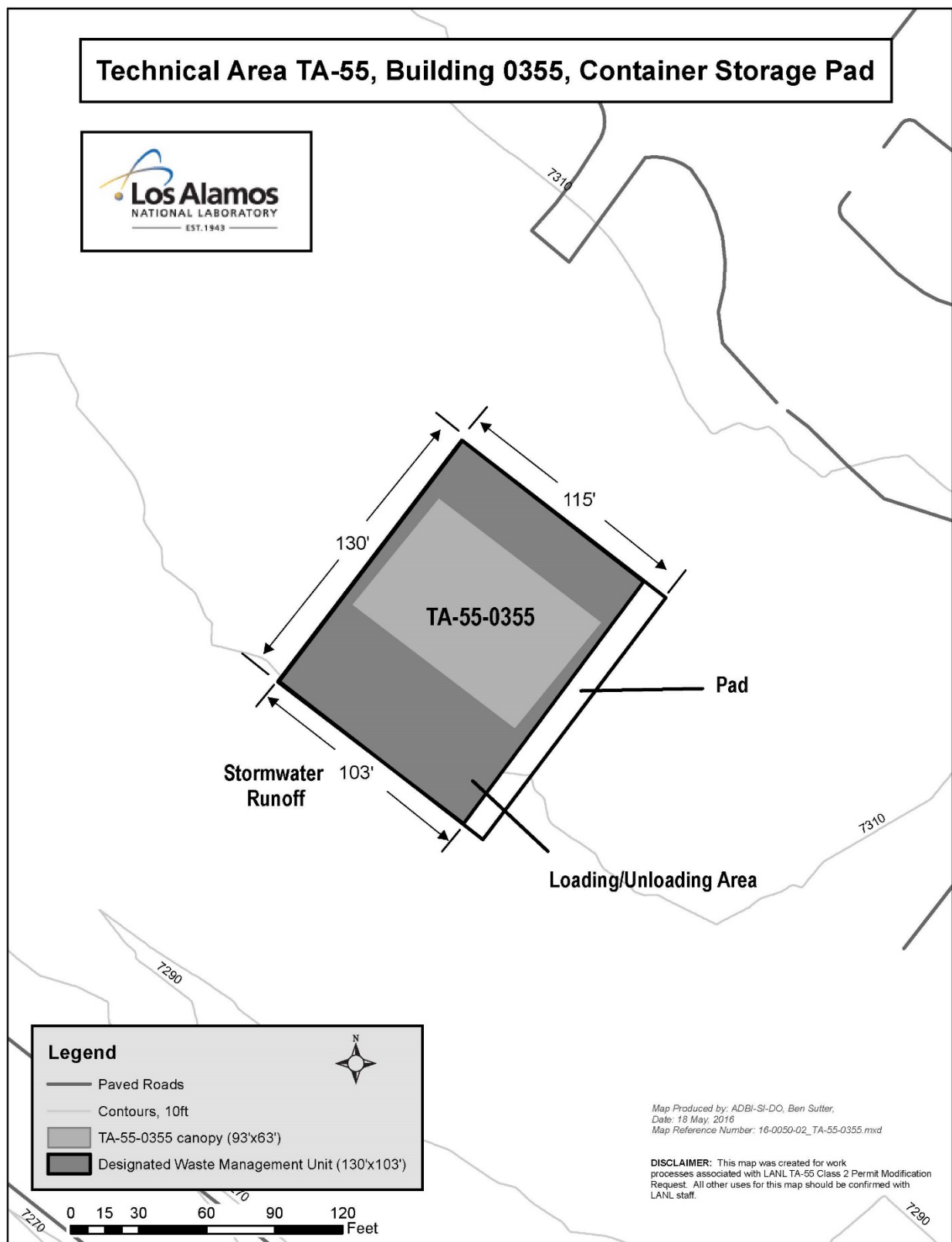


Figure 59
Technical Area (TA)-55-355 Pad

Figure 57 – TA-55, Building 4, Room B13

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Figure 58 – TA-55, Building 4, Room G12

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