# ATTACHMENT A1

# CONTAINER STORAGE

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## TABLE OF CONTENTS

Introduction ..... 4

A1-1 Container Storage ..... 4
- A1-1a Containers with Liquid ..... 4
- A1-1b Description of Containers ..... 4
  - A1-1b(1) CH TRU Mixed Waste Containers ..... 5
  - A1-1b(2) RH TRU Mixed Waste Containers ..... 5
  - A1-1b(3) Container Compatibility ..... 5
- A1-1c Description of the Container Storage Units ..... 5
  - A1-1c(1) Waste Handling Building Container Storage Unit (WHB Unit) ..... 5
  - A1-1c(2) Parking Area Container Storage Unit (PAU) ..... 14
- A1-1d Container Management Practices ..... 15
  - A1-1d(1) Derived Waste ..... 15
  - A1-1d(2) CH TRU Mixed Waste Handling ..... 16
  - A1-1d(3) RH TRU Mixed Waste Handling ..... 20
  - A1-1d(4) Handling Waste in Shielded Containers ..... 23
- A1-1e Inspections ..... 24
  - A1-1e(1) WHB Unit ..... 24
  - A1-1e(2) Parking Area Unit ..... 24
- A1-1f Containment ..... 26
  - A1-1f(1) Secondary Containment Requirements for the WHB Unit ..... 26
  - A1-1f(2) Secondary Containment Description ..... 27
- A1-1g Special Requirements for Ignitable, Reactive, and Incompatible Waste ..... 28
- A1-1h Closure ..... 28
- A1-1i Control of Run On ..... 28

References ..... 29

# LIST OF TABLES


| Table | Title |
|---|---|
| Table A1-1 | TRU Mixed Waste Containers |
| Table A1-2 | CH TRU Mixed Waste Handling Equipment Capacities |
| Table A1-3 | RH TRU Mixed Waste Handling Equipment Capacities |

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## Introduction

Management and storage of transuranic (**TRU**) mixed waste in the Waste Isolation Pilot Plant (**WIPP**) facility is subject to regulation under 20.4.1.500 New Mexico Administrative Code (**NMAC**). The technical requirements of 20.4.1.500 NMAC (incorporating Title 40 of the Code of Federal Regulations (**CFR**) §§264.170 to 264.178) are applied to the operation of the Waste Handling Building (**WHB**) Container Storage Unit (**WHB Unit**) (Figure M-1), and the Parking Area Container Storage Unit (**PAU**) (Figure M-2). This Permit Attachment describes the container storage units, the TRU mixed waste management facilities and operations, and compliance with the technical requirements of 20.4.1.500 NMAC. The configuration of the WIPP facility consists of completed structures, including buildings, systems, and components for the operation of the facility.

## A1-1 Container Storage

The waste containers used at the WIPP facility qualify as “containers,” in accordance with 20.4.1.101 NMAC (incorporating 40 CFR §260.10). That is, they are “portable devices in which a material is stored, transported, treated, disposed of, or otherwise handled.”

### A1-1a Containers with Liquid

The Permit Treatment, Storage, and Disposal Facility (**TSDF**) Waste Acceptance Criteria (**WAC**) and the Waste Analysis Plan (Permit Attachment C) prohibit the shipment of waste to the WIPP facility with liquid in excess of one percent of the volume of the waste container (e.g., drum, standard waste box (**SWB**), or canister). Since the maximum amount of liquid is one percent, calculations made to determine the secondary containment as required by 20.4.1.500 NMAC (incorporating §264.175) are based on ten percent of one percent of the volume of the containers, or one percent of the largest container, whichever is greater.

### A1-1b Description of Containers

The regulations at 20.4.1.500 NMAC (incorporating 40 CFR §264.171) require that containers holding waste be in good condition as provided in Permit Part 3, Section 3.3, *Condition of Containers*. Waste containers shall be in good condition (e.g., high integrity, intact, no severe rusting, no apparent structural defects, no signs of pressurization) prior to shipment from a generator site. The Manager of the U.S. Department of Energy (**DOE**) Carlsbad Field Office has the authority to suspend a generator’s certification to ship TRU mixed waste to the WIPP facility should the generator fail to meet this requirement. The level of rigor applied in these areas to ensure container integrity on both ends of the transportation process ensures that waste containers entering the waste management process line at the WIPP facility meet the applicable Resource Conservation and Recovery Act (**RCRA**) requirements for container condition.

Transuranic mixed waste containers meet the requirements for U.S. Department of Transportation (**DOT**) specification 7A regulations. These containers are required to be vented through one or more DOE-approved filter vents to prevent internal container pressurization caused by gas generation and to prevent radioactive particulate material from escaping.

### A1-1b(1) CH TRU Mixed Waste Containers

Contact-handled (**CH**) TRU mixed waste containers are either 55-gallon (**gal**) (208-liter (**L**)) drums singly or arranged into seven-packs, 85-gal (322-L) drums singly or arranged into four-packs, 100-gal (379 L) drums singly or arranged into three-packs, ten-drum overpacks (**TDOP**), standard large box 2s (**SLB2**), or SWBs. These CH mixed waste containers may be either direct-loaded or used to overpack CH TRU mixed containers that are leaking or are not in good condition. The CH TRU mixed waste containers are constructed of steel. Drums may also contain rigid, molded polyethylene (or other material compatible with TRU mixed waste) liners. A summary description of each CH TRU mixed waste container type is provided in Table A1-1, and the containers are illustrated in Figures M-3 through M-8. The maximum loaded, or gross, weights of these containers are listed in Table A1-2.

### A1-1b(2) RH TRU Mixed Waste Containers

Remote-handled (**RH**) TRU mixed waste containers include RH-TRU 72-B Canisters, which are received at the WIPP facility loaded singly in an RH-TRU 72-B cask; Facility Canisters, which are used to configure 55-gal (208-L) drums for emplacement; shielded containers, which are received in HalfPACTs; and 55-gal (208-L) drums, which are received in a CNS 10-160B cask. The RH TRU mixed waste containers are constructed of steel. The shielded container is constructed with approximately one inch of lead shielding on the sides and approximately three inches of steel on the top and bottom of the container and is used to emplace RH TRU mixed waste; however, the shielding allows it to be managed and stored in accordance with CH TRU mixed waste handling practices. A summary description of each RH TRU mixed waste container type is provided in Table A1-1, and the containers are illustrated in Figures M-9 through M-11. The maximum loaded, or gross, weights of these containers are listed in Tables A1-2 and A1-3.

### A1-1b(3) Container Compatibility

Containers are made of steel, and some contain rigid, molded polyethylene liners. The compatibility study, documented in Appendix C1 of the WIPP RCRA Part B Permit Application (DOE, 1997a), included container materials to assure containers are compatible with the waste. Therefore, these containers meet the requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.172).

## A1-1c Description of the Container Storage Units

### A1-1c(1) Waste Handling Building Container Storage Unit (WHB Unit)

The WHB is the surface facility where TRU mixed waste handling activities take place (Figure M-12). The WHB has a total area of approximately 84,000 square feet (**ft$^2$**) (7,804 square meters (**m$^2$**)) of which 32,307 ft$^2$ (3,001 m$^2$) are designated for the waste handling and container storage of CH TRU mixed waste and 17,403 ft$^2$ (1,617 m$^2$) are designated for handling and storage of RH TRU mixed waste, as shown in Figures M-1and M-13 through M-16. These areas comprise the WHB Unit. The concrete floors are sufficiently impervious to contain leaks and spills of TRU mixed waste to meet the requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.175(b)(1)). The concrete floors are sealed with a coating that has been demonstrated to be compatible with TRU mixed waste.

CH Bay Surge Storage Area

The Permittees coordinate shipments with the generator/storage sites in an attempt to minimize the use of surge storage. However, there may be circumstances causing shipments to arrive that would exceed the maximum capacity of the CH Bay Storage Area, as specified in Permit Part 3, Table 3.1.1, *WHB Unit*. The Permittees may use the CH Bay Surge Storage Area as specified in Permit Part 3, Section 3.1.1.3 (see Figure M-1) only when the maximum capacities in the CH Bay Storage Area (except for the Shielded Storage Room) and the Parking Area Unit are reached and at least one of the following conditions is met (as discussed in Section A1-1e(2), the PAU may not be full, but the shipping package has reached day 59 of its Nuclear Regulatory Commission (**NRC**) 60-day venting period limit, and the waste containers must be removed from the shipping package and placed into storage in the WHB Unit):

- Surface or underground waste handling equipment malfunctions prevent the Permittees from moving waste to disposal locations;
- Hoisting or underground ventilation equipment malfunctions prevent the Permittees from moving waste into the underground;
- Power outages cause a suspension of waste emplacement activities;
- Inbound shipment delays are imminent because the PAU Surge Storage is in use; or
- Onsite or offsite emergencies cause a suspension of waste emplacement activities.

The Permittees must notify the NMED and those on the e-mail notification list (as specified in Permit Part 1, Section 1.11 and Permit Part 3, Section 3.1.1.4) upon using the CH Bay Surge Storage Area and provide justification for its use.

CH TRU Mixed Waste

The CH packages used to transport TRU mixed waste containers are received through one of three air-lock entries to the CH Bay of the WHB Unit. The WHB heating, ventilation and air conditioning (**HVAC**) system maintains the interior of the WHB at a pressure lower than the ambient atmosphere to ensure that air flows into the WHB, preventing the inadvertent release of any hazardous or radioactive constituent contamination as the result of a contamination event. The doors at each end of the air lock are interlocked to prevent both from opening simultaneously and equalizing CH Bay pressure with outside atmospheric pressure.

- TRUPACT-II and HalfPACT Management

  The CH Bay houses two TRUPACT-II Docks (**TRUDOCKs**), each equipped with overhead cranes for opening and unloading CH packages. The TRUDOCKs are within the TRUDOCK Storage Area of the WHB Unit. The cranes are rated to lift the CH package lids and package contents. The cranes are designed to remain on their tracks and hold their load even in the event of a design-basis earthquake.

  Upon receipt and removal of CH TRU mixed waste containers from the CH package, the waste containers are visually inspected for physical damage and leakage to ensure they are in good condition prior to storage. Waste containers are also checked for

external radiological surface contamination through the use of swipes and radiation monitoring equipment, consistent with radiological control procedures pursuant to 10 CFR Part 835. Decontamination activities will not be conducted on containers that are not in good condition or are leaking. If the waste container is not in good condition, the Permittees will either overpack the container with another approved container, repair/patch the container in accordance with appropriate standards and guidance (e.g., 40 CFR §173.28), return the container to the generator, or send the CH package to a third-party contractor. If local decontamination activities are opted for, the work will be conducted in the WHB Unit, consistent with radiological control procedures.

Once unloaded from the CH package, CH TRU mixed waste containers (seven-packs, three-packs, four-packs, SWBs, or TDOPs) are placed in one of two positions on the facility pallet or on a containment pallet. The waste containers are stacked, on the facility pallets (one- or two-high, depending on weight considerations). Waste on containment pallets are stacked one-high. The use of facility or containment pallets elevates the waste at least 6 inches (**in.**) (15 centimeters (**cm**)) from the floor surface. Pallets of waste are then maintained in the CH Bay Storage Area of the WHB Unit for normal storage.

In addition, four CH packages, containing up to eight seven-packs, three-packs, four-packs, SWBs, or four TDOPs, may occupy positions at the TRUDOCKs. If waste containers are left in this area, they will be in the CH package with or without the shipping container lids removed.

- <u>TRUPACT-III Management</u>

The TRUPACT-III containing one SLB2 is transferred to a Yard Transfer Vehicle in the PAU using a forklift. The Yard Transfer Vehicle then transports the TRUPACT-III into the CH Bay through one of the airlocks and into Room 108 for unloading (Figure M-1). The TRUPACT-III is first transported to the bolting station where the overpack cover and closure lid are removed using a bolting robot, or manually as required, and a monorail hoist. The TRUPACT-III is then moved to the Payload Transfer Station where the SLB2 is removed from the TRUPACT-III.

The SLB2 is visually inspected for physical damage and leakage in a similar manner as containers removed from a TRUPACT-II or HalfPACT to ensure it is in good condition. The SLB2 is also checked for external radiological surface contamination through the use of swipes and radiation monitoring equipment, consistent with radiological control procedures pursuant to 10 CFR Part 835. Decontamination activities will not be conducted on containers that are not in good condition or are leaking. If the waste container is not in good condition, the Permittees will either repair/patch the container in accordance with appropriate standards and guidance (e.g., 49 CFR §173.28), return the container to the generator, or send the SLB2 to a third-party contractor. If local decontamination activities are opted for, the work will be conducted in the WHB Unit consistent with radiological control procedures pursuant to 10 CFR Part 835.

Once the SLB2 is unloaded from the TRUPACT-III in Room 108, it is placed on a facility pallet and moved to a pallet stand or floor storage location in the CH Bay or Room 108 for storage or to the conveyance loading room for waste emplacement.

As indicated in Figure M-1, the shaded areas of the CH Bay and Room 108 (CH Bay Storage Area) are available for TRU mixed waste storage as long as sufficient aisle space (i.e., minimum of 44 in. (1.1 m)) is maintained. Transuranic mixed waste may be stored in the CH Bay Storage Area of the WHB Unit in quantities not to exceed the maximum capacities specified in Permit Part 3, Table 3.1.1.

The Derived Waste Storage Area of the WHB Unit is on the north wall of the CH Bay. This area may contain containers up to the volume of an SWB for collecting derived waste from all TRU mixed waste handling processes in the WHB Unit. The Derived Waste Storage Area can accommodate containers in size up to an SWB to be used to accumulate derived waste. The TRU mixed waste volume stored in this area will not exceed the maximum capacity specified in Permit Part 3, Table 3.1.1. The derived waste containers in the Derived Waste Storage Area are stored on containment pallets, which are polyethylene trays with a grated deck, which elevate the derived waste containers at least 6 in. (15 cm) from the floor surface and provide approximately 50 gal (190 L) of secondary containment capacity.

The aisle space in the WHB Unit TRU mixed waste storage areas is adequate to allow unobstructed movement of fire-fighting personnel, spill-control equipment, and decontamination equipment that would be used in the event of an off-normal event. A minimum aisle spacing of 44 in. (1.1 m) between loaded facility pallets is maintained in the WHB Unit TRU mixed waste storage areas. ~~Concrete b~~Barriers provide added protection from equipment being utilized in adjacent rooms and buildings to the west of the CH-Bay wall in the WHB.

The WHB has been designed to meet DOE design and associated quality assurance requirements. The 2009 Amended Renewal Application, Chapter M1, Table M1-1 (DOE, 2009) provided a summary of basic design requirements, principal codes, and standards for the WIPP facility. Appendix D2 of the WIPP RCRA Part B Permit Application (DOE, 1997a) provided engineering design-basis earthquake and tornado reports. The design-basis earthquake report provides the basis for seismic design of WIPP facility structures, including the WHB foundation. The WIPP facility design-basis earthquake is 0.1 g peak ground acceleration. The WIPP facility design-basis tornado includes a maximum windspeed of 183 miles per hour (**mi/hr**) ((294.5 kilometers per hr (**km/hr**)), which is the vector sum of the velocity components. It is also limited to a translational velocity of 41 mi/hr (66 km/hr) and a tangential velocity of 124 mi/hr (200 km/hr). Other parameters are a radius of maximum wind of 325 ft (99 m), a pressure drop of 0.5 pounds per square inch (**lb/in.$^2$**) (3.4 kilopascals (**kPa**)), and a rate-of-pressure drop of 0.09 pounds per square inch per second (**lb/in.$^2$/s**) (0.6 kilopascals per second (**kPa/s**)). A design-basis flood report is not available because flooding is not a credible phenomenon at the WIPP facility. Design calculations for the probable maximum precipitation (**PMP**) event, provided in Appendix D7 of the WIPP RCRA Part B Permit Application (DOE, 1997a), illustrated run-on protection for the WIPP facility.

The WIPP facility does not lie within a 100-year floodplain. There are no major surface-water bodies within 5 miles (**mi**) (8 kilometers (**km**)) of the site, and the nearest river, the Pecos River, is approximately 12 mi (19 km) away. The general ground elevation in the vicinity of the surface facilities (approximately 3,400 feet (**ft**) (1,036 meters (**m**)) above mean sea level) is about 500 ft (152 m) above the riverbed and 400 ft (122 m) above the 100-year floodplain. Protection from flooding or ponding caused by PMP events is provided by the diversion of water away from the WIPP facility by a system of peripheral interceptor berms and dikes. Additionally, grade elevations of roads and surface facilities are designed so that storm water will not collect within the Property Protection Area under the most severe conditions.

The following are the major pieces of equipment that are used to manage CH TRU mixed waste in the container storage units. A summary of equipment capacities, as required by 20.4.1.500 NMAC is included in Table A1-2.

TRUPACT-II Type B Packaging

The TRUPACT-II (Figure M-17) is a cylindrical shipping container 8 ft (2.4 m) in diameter and 10 ft (3 m) high. It is an NRC-certified Type B package designed to meet the applicable requirements of 10 CFR Part 71 and has successfully completed rigorous container-integrity tests. The payload consists of approximately 7,265 pounds (**lb**) (3,300 kilograms (**kg**)) gross weight in up to fourteen 55-gal (208-L) drums, eight 85-gal (322-L) drums, six 100-gal (379-L) drums, two SWBs, or one TDOP.

HalfPACT Type B Packaging

The HalfPACT (Figure M-18) is a right cylindrical shipping container 8 ft (2.4 m) in diameter and 7.6 ft (2.3 m) high. It is an NRC-certified Type B package designed to meet the applicable requirements of 10 CFR Part 71 and has successfully completed rigorous container-integrity tests. The payload consists of approximately 7,600 lb (3,500 kg) gross weight in up to seven 55-gal (208-L) drums, one SWB, four 85-gal (322-L) drums, or three shielded containers.

TRUPACT-III Type B Packaging

The TRUPACT-III (Figure M-19) is an NRC-certified Type B package designed to meet the applicable requirements of 10 CFR Part 71. The nominal dimensions for a TRUPACT-III are 14 feet 1 inch long, 8 feet 2 inches wide and 8 feet 8 inches high. The TRUPACT-III is specifically certified to safely transport TRU wastes packaged in an SLB2.

This package, unlike the TRUPACT-II or HalfPACT, is horizontally loaded and is unloaded horizontally as well.

The TRUPACT-III has a bolted overpack cover that is secured to the TRUPACT-III container.

The maximum weight of a TRUPACT-III is 55,116 lb (25,000 kg) when loaded with the maximum allowable contents of 11,486 lb (5,210 kg).

Unloading Docks

Each TRUDOCK is designed to accommodate up to two CH packages. The TRUDOCK functions as a work platform, providing TRU mixed waste handling personnel easy access to the container during unloading operations (see Figure M-12).

The Payload Transfer Station serves as the unloading dock for TRUPACT-III and can accommodate a single TRUPACT-III package (see Figure M-20).

Forklifts

Forklifts may be used to transfer the CH packages into the WHB Unit and may be used to transfer palletized CH TRU mixed waste containers to the Facility Transfer Vehicle. Another forklift is used for general-purpose transfer operations. This forklift has attachments and adapters to handle individual TRU mixed waste containers, if required.

Cranes, Unloading Devices, and Lift Fixtures

At each TRUDOCK, an overhead bridge crane is used with a specially designed lift fixture for removing the lids and contents of the CH packages. Separate lifting attachments have been specifically designed to accommodate SWBs and TDOPs. The TRUPACT-III is unloaded horizontally in Room 108. The Payload Transfer Station, Yard Transfer Vehicle, Facility Transfer Vehicle, or forklift are used to perform the unloading and movement functions. The Payload Transfer Station includes retractable arms that are used to position the SLB2 onto the Facility Transfer Vehicle and facility pallet.

Facility or Containment Pallets

The facility pallet is a fabricated steel unit designed to support seven-packs, four-packs, or three-packs of drums, SWBs, TDOPs, an SLB2, or shielded container assemblies. The facility pallet can accommodate up to four seven-packs, four three-packs, or four four-packs of drums; four SWBs (in two stacks of two units); two TDOPs; one SLB2; or two shielded container three-pack assemblies. Loads are secured to the facility pallet during transport to the emplacement area. Facility pallets are shown in Figure M-21. Fork pockets in the side of the pallet allow the facility pallet to be lifted and transferred by forklift to prevent direct contact between TRU mixed waste containers and forklift tines. This arrangement reduces the potential for puncture accidents. Facility pallets may also be moved by facility transfer vehicles. WIPP facility operational documents define the operational load of the facility pallet to ensure that the rated load of a facility pallet is not exceeded.

Containment pallets are fabricated units having a containment capacity of at least ten percent of the volume of the containers and designed to support a minimum of either a single drum, a single SWB or a single TDOP. The pallets have a rated load capacity of equal to or greater than the gross weight limit of the container(s) to be supported on the pallet. Loads are secured to the containment pallet during transport. A typical containment pallet is shown in Figure M-22. Fork pockets in the side of the pallet allow the containment pallet to be lifted and transferred by forklift. WIPP facility operational documents define the operational load of the containment pallet to assure that the rated load of a containment pallet is not exceeded.

Facility Transfer Vehicle

The Facility Transfer Vehicle is an electric battery-powered automated vehicle with an on-board guidance system that allows the vehicle to operate on the floor of the WHB. It has a feature that allows it to lower integrated rail wheels so that it can operate on the Waste Hoist tracks. It is designed with a flat bed that has adjustable height capability that may be used to transfer waste payloads placed on facility pallets on or off the facility pallet stands in the CH Bay storage area or the Waste Shaft Conveyance by raising and lowering the bed (see Figure M-23).

Yard Transfer Vehicle

The Yard Transfer Vehicle (Figure M-24) is an electric battery-powered vehicle that transports the TRUPACT-III shipping container from the PAU into the WHB and into Room 108.

RH TRU Mixed Waste

The RH TRU mixed waste is handled and stored in the RH Complex of the WHB Unit which comprises the following locations: RH Bay, the Cask Unloading Room , the Hot Cell, the Transfer Cell (Figures M-1 and M-13 through M-15), and the Facility Cask Loading Room (Figure M-16). The maximum storage capacities of each of these locations are prescribed in Permit Part 3, Table 3.1.1.

The RH Bay (Figure M-13) is a high-bay area for receiving casks and subsequent handling operations. The trailer carrying the RH-TRU 72-B or CNS 10-160B shipping cask (Figures M-25 through M-28) enters the RH Bay through a set of double doors on the east side of the WHB. The RH Bay houses the Cask Transfer Car. The RH Bay is served by the RH Bay Overhead Bridge Crane used for cask handling and maintenance operations. Storage in the RH Bay occurs in the RH-TRU 72-B or CNS 10-160B casks. The storage occurs after the trailer containing the cask is moved into the RH Bay and prior to moving the cask into the Cask Unloading Room to stage the waste for disposal operations.

The Cask Unloading Room (Figure M-13) provides for transfer of the RH-TRU 72-B cask to the Transfer Cell, or the transfer of drums from the CNS 10-160B cask to the Hot Cell. Storage in the Cask Unloading Room occurs in the RH-TRU 72-B or CNS 10-160B casks. Storage in this area typically occurs to facilitate operations during a shift, at the end of a shift, or in an off-normal event that results in the suspension of waste handling operations.

The Hot Cell (Figure M-14) is a concrete shielded room in which drums of RH TRU mixed waste are transferred remotely from the CNS 10-160B cask, staged in the Hot Cell, and loaded into a Facility Canister. The loaded Facility Canister is then lowered from the Hot Cell into the Transfer Cell Shuttle Car containing a Shielded Insert. Storage in the Hot Cell occurs in either drums or Facility Canisters. Drums that are stored are either on the drum carriage unit that was removed from the CNS 10-160B cask or in Facility Canisters.

The Transfer Cell (Figure M-15) houses the Transfer Cell Shuttle Car, which moves the RH-TRU 72-B cask or Shielded Insert into position for transferring the canister to the Facility Cask. Storage in this area typically occurs to facilitate operations during a shift, at the end of a shift, or in an off-normal event that results in the suspension of a waste handling evolution.

The Facility Cask Loading Room (Figure M-16) provides for transfer of a canister to the Facility Cask (Figure M-29) for subsequent transfer to the Waste Shaft Conveyance and to the underground Hazardous Waste Disposal Unit (**HWDU**). The Facility Cask Loading Room also functions as an air lock between the Waste Shaft and the Transfer Cell. Storage in this area typically occurs to facilitate operations during a shift, at the end of a shift, or in an off-normal event that results in the suspension of waste handling operations.

Following is a description of major pieces of equipment that are used to manage RH TRU mixed waste in the WHB Unit. A summary of equipment capacities, as required by 20.4.1.500 NMAC, is included in Table A1-3.

Casks

The RH-TRU 72-B cask (Figure M-27) is a cylindrical NRC-certified Type B package designed to meet the applicable requirements of 10 CFR Part 71. It consists of a separate inner vessel

within a stainless steel, lead-shielded outer cask protected by impact limiters at each end, made of stainless-steel skins filled with polyurethane foam. The inner vessel is made of stainless steel and provides an internal containment boundary and a cavity for the payload. Neither the outer cask nor the inner vessel is vented. Payload capacity of each RH-TRU 72-B shipping cask is 8,000 lbs (3,628 kg). The payload consists of a canister of RH TRU mixed waste, which may contain up to 31.4 $ft^3$ (0.89 $m^3$) of directly loaded waste or waste in smaller containers.

The CNS 10-160B cask (Figure M-28) is an NRC-certified Type B package designed to meet the applicable requirements of 10 CFR Part 71. It consists of two carbon steel shells and a lead shield, welded to a carbon steel bottom plate. A 12-gauge stainless steel thermal shield surrounds the cask outer shell, which is equipped with two steel-encased, rigid polyurethane foam impact limiters attached to the top and bottom of the cask. The CNS 10-160B cask is not vented. Payload capacity of each CNS 10-160B cask is 14,500 lbs (6,577 kg). The payload consists of up to ten 55-gal (208-L) drums.

Shielded Insert

The Shielded Insert (Figure M-30) is specifically designed to be used in the Transfer Cell to hold and transport loaded Facility Canisters from the Hot Cell until loaded into the Facility Cask. The Shielded Insert, designed and constructed similar to the RH-TRU 72-B shipping cask, has a 29 in. inside diameter with an inside length of 130.5 in. (331.5 cm) to accommodate the Facility Canister. The Shielded Insert is installed on and removed from the Transfer Cell Shuttle Car in the same manner as the RH-TRU 72-B shipping cask.

CNS 10-160B Drum Carriage

The CNS 10-160B drum carriage (Figure M-31) is a steel device used to handle drums in the CNS 10-160B cask. The drum carriages are stacked two high in the CNS 10-160B cask during shipment. They are removed from the cask using a below-the-hook lifting device termed a pentapod. The drum carriage is rated to lift up to five drums.

RH Bay Overhead Bridge Crane

In the RH Bay, an overhead bridge crane is used to lift the cask from the trailer and place it on the Cask Transfer Car. It is also used to remove the impact limiters from the casks and may be used to remove the outer lid of the RH-TRU 72-B cask.

Cask Lifting Yoke

The lifting yoke is a lifting fixture that attaches to the RH Bay Overhead Bridge Crane and is designed to lift and rotate the RH-TRU 72-B cask onto the Cask Transfer Car.

Cask Transfer Cars

The Cask Transfer Cars (Figures M-32 and M-33) are self-propelled, rail-guided vehicles that transport casks between the RH Bay and the Cask Unloading Room.

6.25 Ton Grapple Hoist

A 6.25 Ton Grapple Hoist is used to hoist the canister from the Transfer Cell Shuttle Car into the Facility Cask.

Facility Canister

The Facility Canister is a cylindrical container designed to hold three 55-gal (208-L) drums of either RH TRU waste or dunnage (Figure M-9).

Facility Cask

The Facility Cask, or Light Weight Facility Cask, body consists of two concentric steel cylinders. The annulus between the cylinders is filled with lead, and gate shield valves are located at either end. Figure M-29 provides an outline configuration of the Facility Cask. The canister is placed inside the Facility Cask for shielding during canister transfer from the RH Complex to the underground HWDU for emplacement.

Facility Cask Transfer Car

The Facility Cask Transfer Car (Figure M-34) is a self-propelled rail car that is used to move the Facility Cask between the Facility Cask Loading Room and the Shaft Station in the underground.

Hot Cell Bridge Crane

The Hot Cell Bridge Crane, outfitted with a rotating block and the Hot Cell Facility Grapple, is used to lift the CNS 10-160B lid and the drum carriage units from the cask located in the Cask Unloading Room, into the Hot Cell. The Hot Cell Bridge Crane is also used to lift the empty Facility Canisters into place within the Hot Cell, move loaded drums into the Facility Canister, and lower loaded Facility Canisters into the Transfer Cell.

Overhead Powered Manipulator

The Overhead Powered Manipulator is used in the Hot Cell to lift individual drums from the drum carriage unit and lower each drum into the Facility Canister and support miscellaneous Hot Cell operations.

Manipulators

There is a maximum of two operational sets of fixed Manipulators in the Hot Cell. The Manipulators are used to collect swipes of drums as they are being lifted from the drum carriage unit, transfer the swipes to the Shielded Material Transfer Drawer for pertinent analysis, and support Hot Cell operations.

Shielded Material Transfer Drawer

The Shielded Material Transfer Drawer is used to transfer swipe samples obtained by the fixed Manipulators to the Hot Cell Gallery for radiological counting and transferring small equipment into and out of the Hot Cell.

Closed-Circuit Television Cameras

The Closed-Circuit Television Camera system is used to monitor operations throughout the Hot Cell and Transfer Cell. These cameras are used to perform inspections of waste containers and waste management areas. This camera system is operated from the shielded room in the

Facility Cask Loading Room, Cask Unloading Room, and Hot Cell Gallery. The camera system has a video recording capability as an operational aid.

Transfer Cell Shuttle Car

The Transfer Cell Shuttle Car (Figure M-35) positions the loaded RH-TRU 72-B cask and Shielded Insert within the Transfer Cell.

Cask Unloading Room Crane

The Cask Unloading Room Crane lifts and suspends the RH-TRU 72-B cask or Shielded Insert from the Transfer Car and lowers the cask or Shielded Insert into the Transfer Cell Shuttle Car.

Facility Cask Rotating Device

The Facility Cask Rotating Device, a floor mounted hydraulically operated structure, is designed to rotate the Facility Cask from the horizontal position to the vertical position for waste canister loading and then back to the horizontal position after the waste canister has been loaded into the Facility Cask (Figure M-36).

## A1-1c(2) Parking Area Container Storage Unit (PAU)

The parking area south of the WHB (see Figure M-2) is used for storage of waste containers within sealed shipping containers awaiting unloading. The area extending south from the WHB within the security-fenced enclosure identified as the Controlled Area is defined as the PAU. ~~Concrete b~~Barriers provide protection from vehicles and equipment for the interior of the south side of the WHB. The PAU provides storage space for up to 6,734 $ft^3$ (191 $m^3$) of TRU mixed waste, contained in up to 40 loaded CH packages and eight RH packages. Secondary containment and protection of the waste containers from standing liquid are provided by the CH or RH packaging. Wastes placed in the PAU remain sealed in their CH or RH packages while in this area.

The NRC Certificate of Compliance requires that sealed CH or RH packages containing waste be vented every 60 days to avoid unacceptable levels of internal pressure. Any off-normal event which results in the need to store a waste container in the PAU for a period of time approaching 59 days shall be handled in accordance with Section A1-1e(2) of this Permit Attachment. Under no circumstances shall a CH or RH package be stored in the PAU for more than 59 days after the date that the CH or RH package was sealed at the generator site, as recorded in the Inner Containment Vessel (**ICV**) Closure Date field of the WIPP Waste Information System (**WWIS**) database.

Parking Area Unit Surge Storage Area

The Permittees coordinate shipments with the generator/storage sites in an attempt to minimize the use of surge storage. However, there may be circumstances causing shipments to arrive that would exceed the maximum capacity of the PAU, as specified in Permit Part 3, Table 3.1.2, *Parking Area Unit*. The Permittees may use the PAU Surge Storage Area as specified in Permit Part 3, Section 3.1.2.3 (see Figure M-2) only when the maximum capacity in the PAU is reached and at least one of the following conditions is met:

- Surface or underground waste handling equipment malfunctions prevent the Permittees from moving waste to disposal locations;
- Hoisting or underground ventilation equipment malfunctions prevent the Permittees from moving waste into the underground;
- Power outages cause a suspension of waste emplacement activities;
- Inbound shipment delays are imminent because the PAU is full; or
- Onsite or offsite emergencies cause a suspension of waste emplacement activities.

The Permittees must notify NMED and those on the e-mail notification list (as specified in Permit Part 1, Section 1.11 and Permit Part 3, Section 3.1.2.4) upon using the PAU Surge Storage Area and provide justification for its use.

## A1-1d Container Management Practices

20.4.1.500 NMAC (incorporating 40 CFR §264.173) requires that containers be managed in a manner that does not result in spills or leaks. Because containers at the WIPP facility contain radioactive waste, safety concerns require that containers be continuously vented to prevent the buildup of gases within the container. These gases could result from radiolysis, which is the breakdown of moisture by radiation. The vents are generally installed on or near the lids of the containers. These vents are filtered so that gas can escape while radioactive particulates are retained.

TRU mixed waste containers, containing off-site waste, are never opened at the WIPP facility. Derived waste containers are kept closed at all times unless waste is being added or removed.

Off-normal (unplanned) events could interrupt normal operations in the waste management process line. Shipments of waste from the generator sites will be stopped in an off-normal event which results in an interruption to normal waste handling operations that exceeds three days and could potentially cause the maximum permitted storage capacities and/or time limits to be exceeded. These off-normal events typically fall into the following categories:

- Waste management system equipment malfunctions that prevent unloading or downloading waste to the underground
- Waste shipments with unacceptable levels of surface contamination that prevent unloading or downloading waste to the underground
- Hazardous Waste Manifest discrepancies that are not immediately resolved and prevent unloading or downloading waste to the underground
- A suspension of emplacement activities for regulatory reasons

### A1-1d(1) Derived Waste

The WIPP facility operational philosophy is to introduce no new hazardous chemical components into TRU mixed waste or TRU mixed waste residues that could be present in the

controlled area. This is accomplished principally through written procedures and the use of Safe Work Permits (**SWP**)[1] and Radiological Work Permits (**RWP**)[2] which govern the activities within a controlled area involving TRU mixed waste. The purpose of this operating philosophy is to avoid generating TRU mixed waste that is compositionally different than the TRU mixed waste shipped to the WIPP facility for disposal.

Some additional TRU mixed waste, such as used personal protective equipment, swipes, and tools, may result from decontamination operations and off-normal events. Such waste will be assumed to be contaminated with RCRA-regulated hazardous constituents in the TRU mixed waste containers from which it was derived. Derived waste may be generated as the result of decontamination activities during the waste handling process. Should radiological decontamination activities be performed, the work will be conducted consistent with radiological control procedures pursuant to 10 CFR Part 835. For decontamination of hazardous waste constituents, water and a cleaning agent such as those listed in Permit Attachment D will be used. Derived waste will be considered acceptable for management at the WIPP facility because any TRU mixed waste shipped to the facility will have already been determined to be acceptable and because no new hazardous waste constituents will be added. Data on the derived waste will be entered into the WWIS database. Derived waste will be contained in standard DOT approved Type A containers.

As each derived waste container is filled, it is closed with a lid containing a high efficiency particulate air (**HEPA**)-grade filter and moved to an underground HWDU using the same equipment used for handling TRU mixed waste.

A1-1d(2) CH TRU Mixed Waste Handling

Contact-handled TRU mixed waste containers arrive by tractor-trailer at the WIPP facility in sealed shipping containers (e.g., TRUPACT-IIs, HalfPACTs, or TRUPACT-IIIs) (see Figure M-37). Prior to unloading the packages from the trailer, they undergo security and radiological checks and shipping documentation reviews. A forklift removes the CH packages which are transported by forklift or Yard Transfer Vehicle through an air lock that is designed to maintain differential pressure in the WHB. The forklift places the shipping containers at either one of the two TRUDOCKs in the TRUDOCK Storage Area of the WHB Unit, or the Yard Transfer Vehicle locates the TRUPACT-III at the bolting station in Room 108. An external survey of the CH package ICV lid (Figure M-17 and M-18) is performed as the Outer Confinement Vessel (**OCV**) lid is removed. The ICV lid or closure lid is lifted under the Vent Hood System (**VHS**), and the contents are surveyed during and after this process is complete. The VHS[3] is attached to the

[1] SWPs are prepared to assure that any hazardous work (not already covered by a procedure) is performed with due precaution. SWPs are issued by the Permittees after a job supervisor completes the proper form detailing the job location, work description, personnel involved, specific hazards involved, and protective requirements. The Permittees review the form, check on the adequacy of the protective measures, and if sufficient, approve the work permit. Conditions of the SWPs must be met while any hazardous work is proceeding. Examples of activities covered by the SWP program include confined space entry, overhead work, and work on energized equipment.

[2] RWPs are used to control entry into and performance of work within a controlled area (**CA**). Managers responsible for work within a CA must generate a work permit that specifies the work scope, limiting conditions, dosimetry, respiratory protection, protective clothing, specific worker qualifications, and radiation safety technician support. RWPs are approved by the Permittees after thorough review. No work can proceed in a CA without a valid RWP.

[3] The TRU mixed waste container headspace may contain radiologically contaminated airborne dust particles.

CH package to provide atmospheric control and confinement of headspace gases at their source. It also prevents potential personnel exposure and facility contamination due to the spread of radiologically contaminated airborne dust particles and minimizes personnel exposure to VOCs.

Contamination surveys at the WIPP facility are based in part on radiological surveys used to indicate potential releases of hazardous constituents from containers by virtue of detection of radioactive contamination (see Permit Attachment G3). Radiological surveys may be applicable to most hazardous constituent releases except the release of gaseous VOCs from TRU mixed waste containers. Radiological surveys provide the WIPP facility with a very sensitive method of indicating the potential release of nongaseous hazardous constituents through the use of surface sampling (swipes) and radioactivity counting. Radiological surveys are used in addition to the more conventional techniques such as visual inspection to identify spills.

Under normal operations, it is not expected that the waste containers will be externally contaminated pursuant to 10 CFR Part 835. However, should there be contamination in excess of the radiological control limits pursuant to 10 CFR Part 835, the shipping package or the waste container will be managed in accordance with radiological control procedures pursuant to 10 CFR Part 835. Decontamination activities will not be conducted on containers that are not in good condition or are leaking. Containers that are not in good condition, and containers that are leaking, will be overpacked (if applicable) in an approved container, repaired/patched in accordance with appropriate standards and guidance (e.g., 49 CFR §173.28), returned to the generator, or sent to a third-party contractor. In addition, if during the waste handling process at the WIPP facility, a waste container is breached, it will be overpacked (if applicable) in an approved container, repaired/patched in accordance with appropriate standards and guidance (e.g., 49 CFR §173.28), or managed in accordance with radiological control procedures pursuant to 10 CFR Part 835. The overpacked or repaired container will be labeled and emplaced in an underground HWDU for disposal. Should WIPP facility structures or equipment become contaminated, waste handling operations in the affected area will be managed in accordance with standard operating procedures, and the contaminated structures or equipment will be managed consistent with radiological control procedures pursuant to 10 CFR Part 835.

Hazardous waste decontamination activities will use water and cleaning agents (see Permit Attachment D) so as to not generate any waste that cannot be considered derived waste. Items that are radiologically contaminated are also assumed to be contaminated with the hazardous wastes that are in the container involved in the spill or release. A complete listing of these waste components can be obtained from the WWIS, as described in Permit Attachment C, for the purpose of characterizing derived waste.

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1. Without the VHS, a potential mechanism will exist to spread contamination (if present) in the immediate CH TRU mixed waste handling area, because lid removal will immediately expose headspace gases to prevailing air currents induced by the building ventilation system.
2. With the VHS, a confined and controlled set of prevailing air currents will be induced by the system blower. The VHS will function as a local exhaust system to effectively control radiologically contaminated airborne dust particles (and VOCs) at essentially atmospheric pressure conditions.
Functionally, the VHS will draw the TRU mixed waste container headspace gases, convey them through a HEPA filter, and ultimately duct them through the WHB exhaust ventilation system. VOCs will pass through the HEPA filter and will be conveyed to the ventilation exhaust duct system. The system principally consists of a functional aggregation of 1) vent hood assembly, 2) HEPA filter assemblies (to capture any airborne radioactive particles), 3) blower (to provide forced airflow), 4) ductwork, and 5) flexible hose.

It is assumed that the process of localized surface decontamination will remove the hazardous waste constituents along with the radioactive waste constituents. Therefore, waste containers will be emplaced in the underground HWDUs without further action once localized radiological contamination is removed unless there is visible evidence of hazardous waste spills or hazardous waste on the container. Hazardous waste decontamination will be conducted, if necessary, in accordance with the requirements of the Permit and the standards of 20.4.1.500 NMAC (incorporating 40 CFR Part 264).In the event of area contamination, a radiological boundary will be established in accordance with radiological control procedures. Inside this boundary, cleanup activities are controlled with protocols for the cleanup of spills and releases. As dictated by cleanup protocols, decontamination will be managed consistent with radiological control procedures pursuant to 10 CFR Part 835. Once the area is cleaned up and is shown to be radiologically clean, it will be sampled for the presence of hazardous waste residues. Hazardous waste decontamination will be conducted in accordance with the requirements of the Permit and the standards of 20.4.1.500 NMAC (incorporating 40 CFR Part 264). A sampling plan will be developed, as needed, which incorporates the guidance of SW-846 (EPA, 2015) in selecting random samples over large areas. Selection of constituents for sampling analysis will be based on information (in the WWIS) about the waste that was spilled and information on cleanup procedures. If the results of the analysis show that residual contamination remains, a decision will be made whether further cleaning will be beneficial or whether final clean-up will be deferred until closure. Appropriate notations will be entered into the Operating Record to assure proper consideration of formerly contaminated areas at the time of closure. Furthermore, measures such as covering, barricading, and/or placarding will be used as needed to mark areas that remain contaminated.

In the event that extensive area contamination is discovered within a CH package during unloading, the waste will be left in the CH package and the shipping container will be resealed. The DOE considers such contamination problems the responsibility of the shipping site. If an incident occurs involving the release of contamination within a shipping container or which compromises the integrity of the shipping container associated with TRU mixed waste shipped to the WIPP facility and the incident is reported under DOE Order 232.2A, then the Permittees will provide the Secretary with a report prepared to evaluate the incident and the results of any follow-up actions required of the generator/storage sites to prevent the recurrence of the incident. ~~The Permittees must perform a root cause analysis on generation, transport, or disposal activities for the following reasons: (1) contamination may have occurred within the shipping container; (2) a shipping container may be compromised; or (3) at any time when directed by the NMED. Once a root cause analysis is required on a specific shipment or waste stream, the shipment or waste stream may not be disposed of at the WIPP facility until the root cause analysis is completed and corrective measures are implemented to prevent such concerns in the future. Prior to submitting the root cause analysis and corrective measures to the NMED for review and approval, the Permittees shall provide a copy of the root cause analysis and corrective measures to all generator/storage sites that ship waste to the WIPP facility. When submitting the root cause analysis and corrective measures to the NMED for review and approval, t~~The ~~Permittees~~DOE shall ensure that the generator/storage sites enter the report into their respective required reading programs. The Permittees shall provide a ~~certification signed by responsible officials~~evidence ~~from each organization~~ that the ~~root cause~~ analysis and corrective measures were received by a responsible official at the generator/storage sites. The DOE will make the analysis available to the audit team prior to the next audit. The shipping package will be dispositioned according to the following options:

- The CH Package can be returned to the shipper for decontamination and repackaging of the waste. Such waste would have to be re-approved prior to shipment to the WIPP.

- Shipment to another DOE site for management in the event the original shipper does not have suitable facilities for decontamination. If the repairing site wishes to return the waste to WIPP, the site will have to meet the characterization requirements of the Waste Analysis Plan.

- The waste could go to a third (non-DOE) party for decontamination. In such cases, the repaired shipment would go to the original shipper and be recertified prior to shipment to the WIPP.

Written procedures specify materials, protocols, and steps needed to put an object into a safe configuration for decontamination of surfaces. TRU mixed waste products from decontamination will be managed as derived waste and in accordance with radiological control and waste handling procedures.

The TRUPACT-II may hold up to two seven-packs, two four-packs, and two three-packs of drums; two SWBs; or one TDOP. A HalfPACT may hold seven 55-gal (208-L) drums, one SWB, three shielded containers, or four 85-gal drums. The TRUPACT-III holds a single SLB2. An overhead bridge crane or Payload Transfer Station is used to remove the contents of the CH package and place them on a facility pallet.

For inventory control purposes, TRU mixed waste container identification numbers are verified in accordance with Permit Attachment C, Section C-5b(1). Inconsistencies will be resolved with the generator before TRU mixed waste is emplaced. Discrepancies that are not resolved within 15 days will be reported to the NMED in accordance with 20.4.1.500 NMAC (incorporating 40 CFR §264.72).

Each facility pallet has two recessed pockets to accommodate two sets of seven-packs (see Figure M-21), two sets of four-packs, two sets of three-packs; two sets of SWBs stacked two-high; two TDOPs; two shielded container assemblies, or three-packs; or any combination thereof. Each facility pallet will accommodate one SLB2. Each stack of waste containers is secured prior to transport underground. A forklift or the Facility Transfer Vehicle will transport the loaded facility pallet to the conveyance loading room located adjacent to the Waste Shaft. The conveyance loading room serves as an air lock between the CH Bay and the Waste Shaft, preventing excessive air flow between the two areas. The Facility Transfer Vehicle is driven onto the Waste Shaft Conveyance deck, where the loaded facility pallet is transferred to the Waste Shaft Conveyance, and the Facility Transfer Vehicle is backed off. Containers of CH TRU mixed waste (55-gal (208-L) drums, SWBs, 85-gal (322-L) drums, 100-gal (379-L) drums, and TDOPs) or shielded container assemblies can be handled individually, if needed, using the forklift and lifting attachments (i.e., drum handlers, parrot beaks).

The Waste Shaft Conveyance will lower the loaded facility pallet to the Waste Shaft Station underground. From there, an underground transporter is used to transport the CH TRU mixed waste to the underground HWDU. Figures M-38 and M-39 are flow diagrams of the CH TRU mixed waste handling process.

## A1-1d(3) RH TRU Mixed Waste Handling

The RH TRU mixed waste that is not in a shielded container will be received in the RH-TRU 72-B cask or CNS 10-160B cask loaded on a trailer, as illustrated in process flow diagrams in Figures M-40 and M-41, respectively. Remote-handled TRU mixed waste received in shielded containers is managed and stored as CH TRU mixed waste. Prior to unloading the cask from the trailer, external radiological surveys, security checks, shipping documentation reviews are performed, and the Uniform Hazardous Waste Manifest is signed. The generator's copy of the Uniform Hazardous Waste Manifest is returned to the generator. Should the results of the contamination survey exceed acceptable levels, the shipping cask and transport trailer remain outside the WHB in the PAU, and the appropriate radiological boundaries (i.e., ropes, placards) are erected around the shipping cask and transport trailer. A determination will be made whether to return the cask to the originating site or to decontaminate the cask.

Following cask inspections, the shipping cask and trailer are moved into the RH Bay or held in the PAU. The waste handling process begins in the RH Bay where the impact limiter(s) are removed from the shipping cask while it is on the trailer. Additional radiological surveys are conducted on the end of the cask previously protected by the impact limiter(s) to verify the absence of contamination. The cask is unloaded from the trailer using the RH Bay Overhead Bridge Crane and placed on a Cask Transfer Car.

Whenever RH TRU mixed waste is present, differential air pressure between the RH TRU mixed waste handling locations in the RH Complex protects workers and prevents potential spread of contamination during handling of RH TRU mixed waste. Airflow between key rooms in the WHB is controlled by maintaining differential pressures between the rooms. The CH Receiving Bay is maintained with a negative pressure relative to outside atmosphere. The RH Receiving Bay is maintained with a requirement to be positive pressure relative to the CH Receiving Bay. The RH Hot Cell is maintained with a negative differential pressure relative to the RH Receiving Bay. The Hot Cell ventilation is exhausted through high-efficiency particulate air filters prior to venting through the WHB filtered exhaust.

### RH-TRU 72-B Cask Unloading

The Cask Transfer Car moves the RH-TRU 72-B cask to a work stand in the RH Bay. The work stand allows access to the head area of the RH-TRU 72-B cask for conducting radiological surveys, performing physical inspections or minor maintenance, and decontamination, if necessary. The outer lid bolts on the RH-TRU 72-B cask are removed, after which the outer lid is removed to provide access to the lid of the cask inner vessel. The RH-TRU 72-B cask is moved into the Cask Unloading Room by a Cask Transfer Car and is positioned under the Cask Unloading Room Bridge Crane. The Cask Unloading Room Bridge Crane attaches to the RH-TRU 72-B cask and lifts and suspends the cask to clear the Cask Transfer Car. The suspended RH-TRU 72-B cask is then aligned over the Cask Unloading Room port.

The Cask Unloading Room shield valve is opened, and the cask is lowered through the port into the Transfer Cell Shuttle Car. The Cask Unloading Room Bridge Crane is unhooked and retracted, and the Cask Unloading Room shield valve is closed. After the cask is lowered into the Transfer Cell Shuttle Car, the bolts on the lid of the cask inner vessel are loosened by a robotic Manipulator. The Transfer Cell Shuttle Car is then aligned directly under the Transfer Cell shield valve in preparation for removing the inner-vessel lid and transferring the canister to the Facility Cask. Operations in the Transfer Cell are monitored by closed-circuit video cameras.

Using the remotely-operated fixed 6.25 Ton Grapple Hoist in the Facility Cask Loading Room, the inner-vessel lid is lifted clear of the RH-TRU 72-B cask, and a robotic Manipulator takes swipe samples and places them in a swipe delivery system for counting outside the Transfer Cell. If found to be contaminated above acceptable surface contamination levels as described in 10 CFR Part 835, the Permittees have the option to decontaminate consistent with radiological control procedures, return the RH TRU Canister to the generator/storage site or another site for remediation, or manage the RH TRU Canister consistent with radiological control procedures pursuant to 10 CFR Part 835. Hazardous waste decontamination, if needed, will be conducted in accordance with the requirements of the Permit and the standards of 20.4.1.500 NMAC (incorporating 40 CFR Part 264). If no contamination is found, the Transfer Cell Shuttle Car moves a short distance, and the inner-vessel lid is lowered onto a stand on the Transfer Cell Shuttle Car, after which the canister is transferred to the Facility Cask as described below.

CNS 10-160B Cask Unloading

After the lid bolts are removed, the CNS 10-160B cask is moved using the Cask Transfer Car from the RH Bay into the Cask Unloading Room and centered beneath the Hot Cell shield plug port. The Cask Unloading Room shield door is closed, and the inner and outer Hot Cell shield plugs are removed simultaneously and set aside on the floor of the Hot Cell using the remotely operated Hot Cell Bridge Crane. The Hot Cell Bridge Crane is then lowered through the Hot Cell port and is connected to the CNS 10-160B cask lid rigging or lifting device. The Hot Cell Bridge Crane lifts the CNS 10-160B cask lid through the Hot Cell port and sets the lid aside on the Hot Cell floor.

Operations in the Hot Cell are monitored by closed-circuit television cameras. The drum carriage unit lifting fixture (hereafter referred to as lifting fixture) is attached to the Hot Cell Bridge Crane and lowered through the Hot Cell port. The lifting fixture is connected to the upper drum carriage unit contained in the CNS 10-160B cask. The Hot Cell Bridge Crane lifts the upper drum carriage unit from the CNS 10-160B cask through the port into the Hot Cell and sets it near the Hot Cell inspection station. The Hot Cell Bridge Crane again lowers the lifting fixture through the Hot Cell port and connects to the lower drum carriage unit. The Hot Cell Bridge Crane lifts the lower drum carriage unit from the CNS 10-160B cask through the port into the Hot Cell and sets it near the upper drum carriage unit.

The Hot Cell Bridge Crane lifts the CNS 10-160B cask lid from the Hot Cell floor, lowers it through the Hot Cell port and onto the top of the CNS 10-160B cask. The inner and outer Hot Cell shield plugs are replaced simultaneously. The Cask Unloading Room shield door is opened, and the CNS 10-160B cask is moved into the RH Bay using the Cask Transfer Car. The CNS 10-160B cask is inspected and surveyed, the lid and impact limiter are reinstalled on the CNS 10-160B cask, and it is prepared for transportation off-site.

The Hot Cell Bridge Crane connects to an empty Facility Canister, places it into a sleeve at the inspection station, and removes the canister lid. The Overhead Powered Manipulator or Hot Cell Crane lifts one drum from the drum carriage unit. The Hot Cell Manipulators collect swipe samples from the drum and transfer the swipes via the Transfer Drawer to the Hot Cell Gallery for counting. If the 55-gal (208-L) drums are contaminated, the Permittees may decontaminate the 55-gal (208-L) drums or return them to the generator/storage site or another site for remediation. The drum identification number is recorded, and the recorded numbers are verified against the WWIS. If there are any discrepancies, the drum(s) in question are stored within the Hot Cell, and the generator/storage site is contacted for resolution. Discrepancies that are not

resolved within 15 days will be reported to the NMED as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.72).

Either the Overhead Powered Manipulator or Hot Cell Bridge Crane lowers the drum into the Facility Canister. This process is repeated to place three drums in the Facility Canister. The Hot Cell Bridge Crane or powered Manipulator lifts the canister lid and places it onto the Facility Canister. The lid is locked in place using a Manipulator. Each CNS 10-160B cask shipment will contain up to ten drums. Drums are managed in sets of three. If there is a tenth drum, it will be placed in a Facility Canister or stored until receipt of the next CNS 10-160B cask shipment at the WIPP facility. The Hot Cell Bridge Crane lifts the Facility Canister and lowers it into the Transfer Cell.

To prepare to transfer a loaded Facility Canister from the Hot Cell to the Transfer Cell, a Shielded Insert is placed onto a Cask Transfer Car in the RH Bay. The Cask Transfer Car is then moved into the Cask Unloading Room and positioned under the Cask Unloading Room Bridge Crane. The Bridge Crane attaches to the Shielded Insert. The Cask Unloading Room Bridge Crane lifts and suspends the Shielded Insert clear of the Cask Transfer Car. The Shielded Insert is aligned over the Cask Unloading Room port. The floor valve is opened, and the Shielded Insert is lowered into the Transfer Cell Shuttle Car. The Cask Unloading Room Bridge Crane is unhooked and retracted, and the Cask Unloading Room shield valve is closed. The Shielded Insert is positioned under the Hot Cell port.

The Hot Cell Bridge Crane lifts a loaded, closed Facility Canister and positions it over the Hot Cell port. The Hot Cell shield valve is opened, and the crane lowers the Facility Canister through the port into the Shielded Insert positioned in the Transfer Cell Shuttle Car in the Transfer Cell. The Hot Cell Bridge Crane is disconnected from the Facility Canister and raised until the crane hook clears the Hot Cell shield valve. The Hot Cell shield valve is then closed.

Transfer of Disposal Canister into the Facility Cask

The transfer of a canister into the Facility Cask from the Transfer Cell is monitored by closed-circuit television cameras. The Transfer Cell Shuttle Car positions the RH-TRU 72-B cask or Shielded Insert under the Facility Cask Loading Room port and the shield valve is opened. Then the remotely operated 6.25 Ton Grapple Hoist attaches to the canister, and the canister is lifted through the open shield valve into the vertically-oriented Facility Cask located on the Facility Cask Transfer Car in the Facility Cask Loading Room. During this cask-to-cask transfer, the telescoping port shield is in contact with the underside of the Facility Cask to assure shielding continuity, as does the shield bell located above the Facility Cask.

For canisters received at the WIPP facility from the generator site in a RH-TRU 72-B cask, the identification number is verified using cameras, which also provide images of the canister surfaces during the lifting operation. Identification numbers are verified in accordance with Permit Attachment C, Section C-5b(1). If there are any discrepancies, the canister is returned to the RH-TRU 72-B cask, returned to the PAU, and the generator is contacted for resolution. Discrepancies that are not resolved within 15 days will be reported to the NMED as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.72). As the canister is being lifted from the RH-TRU 72-B cask into the Facility Cask, additional swipe samples may be taken.

Transfer of the Canister to the Underground

When the canister is fully within the Facility Cask, the lower shield valve is closed. The 6.25 Ton Grapple Hoist detaches from the canister and is raised until the 6.25 Ton Grapple Hoist clears the Facility Cask, at which time the upper shield valve is closed. The 6.25 Ton Grapple Hoist and shield bell are then raised clear of the Facility Cask, and the telescoping port shield is retracted. The Facility Cask Rotating Device rotates the Facility Cask until it is in the horizontal position on the Facility Cask Transfer Car. The shield doors on the Facility Cask Loading Room are opened, and the Facility Cask Transfer Car moves onto the Waste Shaft Conveyance and is lowered to the Waste Shaft Station underground. At the Waste Shaft Station underground, the Facility Cask Transfer Car moves the Facility Cask from the Waste Shaft Conveyance. A forklift is used to remove the Facility Cask from the Facility Cask Transfer Car and to transport the Facility Cask to the underground HWDU.

Returning the Empty Cask

The empty RH-TRU 72-B cask or Shielded Insert is returned to the RH Bay by reversing the process. In the RH Bay, swipe samples are collected from inside the empty cask. If necessary, the inside of the cask is decontaminated. The RH-TRU 72-B cask lids are replaced, and the cask is replaced on the trailer using the RH Bay Bridge Crane. The impact limiters are replaced, and the trailer and the RH-TRU 72-B cask are then moved out of the RH Bay. The Shielded Insert is stored in the RH Bay until needed.

## A1-1d(4) Handling Waste in Shielded Containers

Remote-handled TRU mixed waste received at the WIPP facility in shielded containers are managed, stored, and emplaced as CH TRU mixed waste using the CH TRU mixed waste handling equipment described in this Permit. Shielded containers with RH TRU mixed waste will arrive by tractor-trailer at the WIPP facility in sealed HalfPACTs. Prior to unloading the packages from the trailer, they will undergo security and radiological checks and shipping documentation reviews. Consistent with the handling of HalfPACT shipping packages in Section A1-1d(2), a forklift will remove the HalfPACT and transport it into the WHB and place the HalfPACT at either one of the two TRUDOCKs in the TRUDOCK Storage Area of the WHB Unit.

An external survey of the HalfPACT ICV lid is performed as the OCV lid is removed. The ICV lid is lifted under the VHS, and the contents are surveyed during and after this process is complete. A description of the VHS and criteria that are applied if radiological contamination is detected are discussed in Section A1-1d(2).

Shielded containers are received as three-pack assemblies in HalfPACTs. An overhead bridge crane is used to remove the shielded container assembly and place them on a facility pallet. The containers are visually inspected for physical damage and leakage to ensure they are in good condition prior to storage. Waste containers are also checked for external radiological surface contamination through the use of swipes and radiation monitoring equipment, consistent with radiological control procedures pursuant to 10 CFR Part 835. If a primary waste container is not in good condition, the Permittees will either overpack the container with another approved container, repair/patch the container in accordance with appropriate standards and guidance (e.g., 40 CFR §173.28), return the container to the generator, or send the HalfPACT to a third-party contractor. If local decontamination activities are opted for, the work will be conducted in the WHB Unit, consistent with radiological control procedures.

Once the shielded container assembly is on the facility pallet, the TRU mixed waste container identification numbers are verified in accordance with Permit Attachment C, Section C-5b(1). Inconsistencies will be resolved as discussed in Section A1-1d(2) of this Permit Attachment. Up to two three-pack assemblies of shielded containers are placed on a facility pallet. The use of facility pallets elevates the waste at least 6 in. (15 cm) from the floor surface. Pallets of waste are then maintained in the CH Bay Storage Area of the WHB Unit for normal storage or are transported to the conveyance loading room as described in Section A1-1d(2).

## A1-1e Inspections

Inspection of containers and container storage area are required by 20.4.1.500 NMAC (incorporating 40 CFR §264.174). These inspections are described in this section.

### A1-1e(1) WHB Unit

The waste containers in storage are inspected visually or by closed-circuit television camera prior to each movement and, at a minimum, weekly, to ensure that the waste containers are in good condition and that there are no signs that a release has occurred. This visual inspection of CH TRU mixed waste containers shall not include the center drums of seven-packs and waste containers positioned such that visual observation is precluded due to the arrangement of waste assemblies on the facility pallets. If waste handling operations should stop for any reason with containers located at the TRUDOCK while still in the CH package, primary waste container inspections will not be accomplished until waste handling operations are resumed and the containers of waste are removed from the CH package. If the lid to the CH package ICV is removed, radiological checks (swipes of CH package inner surfaces) are used to determine if there is contamination within the CH package. Such contamination could indicate a possible waste container leak or spill. Using radiological surveys, a detected spill or leak of a radioactive contamination from a waste container will also be assumed to be a hazardous waste spill or release.

Loaded RH-TRU 72-B and CNS 10-160B casks are inspected when present in the RH Bay. Physical or closed-circuit television camera inspections of the RH Complex are conducted as described in Table E-1a. Canisters loaded in an RH-TRU 72-B cask are inspected in the Transfer Cell during transfer from the cask to the Facility Cask. Waste containers received in CNS 10-160B casks are inspected in the Hot Cell during transfer from the cask to the Facility Canister by camera and/or visual inspection (through shield windows).

### A1-1e(2) Parking Area Unit

Inspections are conducted in the PAU at a frequency not less than once weekly when waste is present. These inspections are applicable to loaded, stored CH and RH packages. The perimeter fence located at the lateral limit of the PAU, coupled with personnel access restrictions into the WHB, provides the needed security. The perimeter fence and the southern border of the WHB shall mark the lateral limit of the PAU (Figure M-2). Inspections of the CH or RH packages stored in the PAU focus on the inventory and integrity of the shipping containers and the spacing between CH or RH packages. This spacing is maintained at a minimum of four feet.

Inspection of waste containers is not possible when the containers are in their shipping container. Inspections can be accomplished by bringing the shipping containers into the WHB

Unit and opening them and removing the waste containers for inspection. The DOE, however, believes that removing containers strictly for the purposes of inspection results in unnecessary worker exposures and subjects the waste to additional handling. The DOE has proposed that waste containers need not be inspected until they are ready to be removed from the shipping container for emplacement underground. Because shipping containers are sealed and are of robust design, no harm can come to the waste while in the shipping containers and the waste cannot leak or otherwise be released to the environment. The longest amount of time waste containers would be uninspected would be for 59 days after the ICV Closure Date, as recorded in the WWIS. The following strategy will be used for inspecting waste containers that will be retained within their shipping containers for an extended period of time; this will minimize the amount of shipping and waste handling, while maintaining a reasonable inspection schedule:

- If the reason for retaining the TRU mixed waste containers in the shipping container is due to an unresolved manifest discrepancy, the DOE will return the shipment to the generator prior to the expiration of the 60-day NRC venting period or within 30 days after receipt at the WIPP facility, whichever comes sooner. In this case, no inspections of the internal containers will be performed. The stored CH or RH package will be inspected weekly as described above.

- If the reason for retaining the TRU mixed waste containers in the CH or RH package is due to an equipment malfunction that prevents unloading the waste in the WHB Unit, the DOE will return the shipment to the generator prior to the expiration of the 60-day NRC venting period. In this case, the DOE would have to ship the TRU mixed waste containers back with sufficient time for the generator to vent the shipment within the 60-day NRC venting period. In this case, no inspections of the internal containers will be performed. The stored CH or RH package will be inspected weekly as described above.

- If the reason for retaining the TRU mixed waste containers is due to an equipment malfunction that prevents the timely movement of the waste containers into the underground, the waste containers may be kept in the CH or RH package no longer than day 59 of the 60-day NRC venting period. At that time the CH or RH package will be moved into the WHB Unit. Contact-handled TRU mixed waste containers will be removed from their shipping package; if the maximum capacity of the CH Bay Storage Area has been reached, the Permittees may implement CH Bay Surge Storage in accordance with the notification requirements of Permit Part 3, Section 3.1.1.3. The RH package will be vented, however, the containers will not be removed from the shipping package. If there is no additional space within the permitted storage areas of the WHB Unit, the Permittees will discuss an emergency permit with the NMED for the purposes of storing the waste. Waste containers will be inspected when removed from the CH packaging and weekly while in storage in the WHB Unit. The CH or RH packages will be inspected weekly while they contain TRU mixed waste containers as discussed above.

## A1-1f Containment

The WHB Unit has concrete floors, which are sealed with a coating that is designed to resist all but the strongest oxidizing agents. Such oxidizing agents do not meet the TSDF-WAC and are not accepted in TRU mixed waste at the WIPP facility. Therefore, TRU mixed wastes pose no compatibility problems with respect to the WHB Unit floor. During normal operations, the storage areas within the WHB Unit are visually inspected on a weekly basis to verify that the concrete floor is in good condition and free of obvious cracks and gaps. Floor areas of the WHB Unit in use during off-normal events are inspected prior to use and weekly thereafter. Transuranic mixed waste containers located in the permitted storage areas are elevated at least 6 in. (15 cm) from the surface of the floor. TRU mixed waste containers that have been removed from CH or RH packages are stored inside the WHB Unit so as to preclude exposure to the elements.

Secondary containment at the CH Bay Storage Area inside the WHB Unit is provided by the WHB Unit concrete floor (See Figure M-1). The WHB Unit is engineered such that during normal operations, the floor capacity is sufficient to contain liquids upon release. Secondary Containment at the Derived Waste Storage Area of the WHB Unit is provided by a polyethylene containment pallet. The PAU and TRUDOCK Storage Area of the WHB Unit require no engineered secondary containment since no waste is to be stored there unless it is protected by the CH or RH packaging.

Calculations to determine the floor surface area required to provide secondary containment in the event of a release are based on the maximum quantity of liquid which could be present within ten percent of one percent of the volume of the containers or one percent of the capacity of the largest single container, whichever is greater.

Secondary containment at storage locations inside the RH Bay and Cask Unloading Room is provided by the cask. Secondary containment at storage locations inside the Transfer Cell is provided by the RH-TRU 72-B cask or Shielded Insert. Secondary containment at storage locations in the Facility Cask Loading Room is provided by the Facility Cask. In the Hot Cell, waste containers are stored in either the drum carriage unit or in Facility Canisters. The Lower Hot Cell provides secondary containment as described in section A1-f(2). In addition, the RH Bay, Hot Cell, and Transfer Cell contain 220-gal (833-L) (Hot Cell), 11,400-gal (43,152-L) (RH Bay), and 220-gal (833-L) (Transfer Cell) sumps, respectively, to collect any liquids.

### A1-1f(1) Secondary Containment Requirements for the WHB Unit

The maximum TRU mixed waste volume on facility pallets that could be stored in the CH Bay Storage and Surge Storage Areas of the WHB is 18 facility pallets @ 2 TDOPs per pallet = 36 TDOPs of waste. 36 TDOPs @ 1,200 gal (4,540 L) per TDOP = 43,200 gal (163,440 L) waste container capacity. 43,200 gal (163,440 L) x ten percent of the total volume = 4,320 gal (16,344 L) of waste. Since 4,320 gal (16,344 L) is greater than 1,200 gal (4,540 L), the configuration of possible TDOPs in the storage area is used for the calculation of secondary containment requirements. 4,320 gal (16,344 L) of liquid x one percent liquids = 43.2 gal (163.4 L) of liquid for which secondary containment is needed.

The maximum TRU mixed waste volume that could be stored in the Derived Waste Storage Area of the WHB Unit is one SWB. 1 SWBs @ 496 gal (1,878 L) per SWB = 496 gal (1,878 L) waste container capacity. Since the maximum storage volume of 496 gal (1,878 L) is equal to

the volume of the largest single container, the volume of a single SWB is used for the calculation of secondary containment requirements. 496 gal (1,878 L) of liquid x one percent liquids = 4.96 gal (18.8 L) of liquid for which secondary containment is needed.

The maximum TRU mixed waste volume that could be stored in the Hot Cell is 13 RH TRU drums @ 55 gal (210 L) per drum = 715 gal (2,730 L) of waste in drums. 715 gal (2,730 L) of waste x ten percent of total volume = 71.5 gal (273 L) of waste. Secondary containment for liquids will need to have a capacity of 71.5 gal (273 L). Since 71.5 gal (273 L) is less than the volume of the single container of 235 gal (890 L) therefore, the larger volume is used for determining the secondary containment requirements. 235 gal (890 L) of waste x one percent liquids = 2.35 gal (8.9 L) of liquid needed for secondary containment.

The maximum TRU mixed waste volume that could be stored in the Transfer Cell is one RH-TRU 72-B Canister or one Facility Canister @ 235 gal (890 L) per canister x ten percent of total volume = 23.5 gal (8.90 L) of waste. Since 23.5 gal (8.90 L) is less than the volume of the single container of 235 gal (890 L) therefore, the larger volume is used for determining the secondary containment requirements. 235 gal (890 L) of waste x one percent liquids = 2.35 gal (8.9 L) of liquid needed for secondary containment.

A1-1f(2) Secondary Containment Description

The following is a calculation of the surface area the quantities of liquid would cover. Using a conversion factor of 0.1337 $ft^3$/gal (0.001 $m^3$/L) and assuming the spill is 0.0033 ft (0.001 m) thick, the following calculation can be used:

gallons × cubic feet per gallon ÷ thickness in feet = area covered in square feet

CH Bay Storage Area

43.2 gal × 0.1337 $ft^3$/gal ÷ 0.0033 ft = 1,750 $ft^2$ (162.7 $m^2$)

Hot Cell

2.35 gal × 0.1337 $ft^3$/gal ÷ 0.0033 ft = 95 $ft^2$ ( 8.8 $m^2$)

Transfer Cell

2.35 gal × 0.1337 $ft^3$/gal ÷ 0.0033 ft = 95 $ft^2$ ( 8.8 $m^2$)

The WHB Unit has 33,175 $ft^2$ (3,082 $m^2$) of floor space, the CH Bay Storage Area has 26,151 $ft^2$ (2,430 $m^2$) of floor space. The CH Bay Storage Area requires 1,750 $ft^2$ (162.7 $m^2$) for containment, Thus, the floor area of the CH Bay Storage Area of the WHB Unit provide sufficient secondary containment to contain a release of ten percent of one percent of the volume of the containers, or one percent of the capacity of the largest container, whichever is greater.

The Hot Cell and Transfer Cell are the only portions of the RH Complex managing RH TRU mixed waste outside of casks or canisters. The Hot Cell has 1,841 $ft^2$ (171 $m^2$) of floor space and the Transfer Cell has 1,003 $ft^2$ (93 $m^2$) of floor space. The Hot Cell and Transfer Cell require

only 95 $ft^2$ for containment, therefore there is sufficient floor space to contain a release of ten percent of one percent of containers in these storage areas.

In addition, both the Hot Cell and the Transfer Cell each contain a 220 gal (833 L) sump that will collect liquids that spill from containers.

Derived Waste Storage Area

The derived waste containers in the Derived Waste Storage Area are stored on containment pallets, which provides approximately 50 gal (190 L) of secondary containment capacity. Thus, the secondary containment capacity of the containment pallet is sufficient to contain a release of ten percent of one percent of the largest container (4.96 gal or 18.8 L).

Parking Area Unit

Containers of TRU mixed waste to be stored in the PAU are in CH or RH packages. There are no additional requirements for engineered secondary containment systems.

## A1-1g Special Requirements for Ignitable, Reactive, and Incompatible Waste

Special requirements for ignitable, reactive, and incompatible waste are addressed in 20.4.1.500 NMAC (incorporating 40 CFR §§264.176 and 264.177). Permit Part 2 precludes ignitable, reactive, or incompatible waste at the WIPP facility. No additional measures are required.

## A1-1h Closure

Clean closure is planned in accordance with 20.4.1.500 NMAC (incorporating 40 CFR §264.178) for permitted container storage areas. The applicable areas and the plans for clean closure are detailed in Permit Attachment G.

## A1-1i Control of Run On

The WHB Unit is located indoors which prevents run-on from a precipitation event. In addition, the CH TRU containers are stored on facility pallets or containment pallets, which elevate the CH TRU mixed waste containers at least 6 in. (15 cm) off the floor, or in CH or RH packages, so that any firewater released in the building will not pool around containers. Within the RH Bay, Cask Unloading Room, Transfer Cell, and Facility Cask Loading Room, waste containers are stored in casks or Shielded Inserts and protected from any potential run on. Any firewater released in the building will not pool around the waste containers as they are stored in casks, or Shielded Inserts. Within the Hot Cell, there is no source of water during operations. However, control of run-on is provided by the Lower Hot Cell, which lies below a sloped floor surrounded by a grating and Facility Canisters in the Hot Cell above.

In the PAU, the containers of TRU mixed waste are always in CH or RH packages which protect them from precipitation and run on. Therefore, the WIPP facility container storage units will comply with the requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.175(b)(4)).

## References

DOE, 1997a. Resource Conservation and Recovery Act Part B Permit Application, Waste Isolation Pilot Plant (WIPP), Carlsbad, New Mexico, Rev. 6.5, 1997.

DOE, 2009. WIPP Hazardous Waste Facility Permit Amended Renewal Application, Carlsbad, New Mexico, September 2009.

EPA. 2015. SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*. Office of Solid Waste and Emergency Response, Washington, D.C.

# TABLES

**Table A1-1**
**TRU Mixed Waste Containers[a]**

| DESCRIPTION | VOLUME | | DIMENSIONS (inches) | | | LINER | USE FOR DERIVED WASTE | FIGURE |
|---|---|---|---|---|---|---|---|---|
| | CUBIC FEET | CUBIC METERS | LENGTH | WIDTH OR DIAMETER | HEIGHT | | | |
| 55-gal (208-L) drum | 7.4 | 0.21 | N/A | 24 | 35 | Optional | Yes | M-3 |
| Standard waste box | 66.3 | 1.88 | 71 | 54 | 36 | No | Yes | M-4 |
| Ten-drum overpack | 160 | 4.5 | N/A | 72 | 73 | No | Yes, in under-ground | M-5 |
| 85-gal (322-L) drum | 11.4 | 0.32 | N/A | 26 | 36 | Optional | Yes | M-6 |
| 100-gal (379-L) drum | 13.4 | 0.38 | N/A | 32 | 35 | Optional | No | M-7 |
| Standard large box 2 | 261 | 7.39 | 108 | 69 | 73 | No | No | M-8 |
| Facility canister | 31.4 | 0.89 | N/A | 28 | 117 | No | No | M-9 |
| RH TRU canister | 31.4 | 0.89 | N/A | 26 | 120 | Insert optional | No | M-10 |
| Shielded container | 7.4 | 0.21 | N/A | 23 | 36 | 1 inch of lead shielding | No | M-11 |

N/A Not applicable to drums

[a] TRU mixed waste containers may also be used to overpack waste containers that, upon removal from the shipping package, have been determined to be leaking or not in good condition.

**Table A1-2**
**CH TRU Mixed Waste Handling Equipment Capacities**

| CAPACITIES FOR EQUIPMENT (lb) | |
|---|---|
| CH Bay overhead bridge crane | 12,000 |
| Surface forklifts | 26,000 (CH Bay forklift)<br>70,000 (TRUPACT-III Handler forklift) |
| Facility Pallet | 25,000 |
| LIft Fixture | 10,000 |
| Facility Transfer Vehicle | 30,000 |
| Yard Transfer Vehicle | 60,000 |
| **MAXIMUM GROSS WEIGHTS OF CONTAINERS (lb)** | |
| Seven-pack of 55-gal (208-L) drums | 7,000 |
| Four-pack of 85-gal (322-L) drums | 4,000 |
| Three-pack of 100-gal (379-L) drums | 3,000 |
| Ten-drum overpack | 6,700 |
| Standard waste box | 4,000 |
| Standard large box 2 | 10,500 |
| Shielded container | 2,260 |
| Three-pack of shielded containers | 7,000 |
| **MAXIMUM NET EMPTY WEIGHTS OF EQUIPMENT (lb)** | |
| TRUPACT-II | 13,140 |
| HalfPACT | 10,500 |
| TRUPACT-III | 43,600 |
| Lift Fixture | 2,500 |
| Facility pallet | 4,120 |

**Table A1-3**
**RH TRU Mixed Waste Handling Equipment Capacities**

| CAPACITIES FOR EQUIPMENT (tons) | |
|---|---|
| RH Bay Overhead Bridge Crane | 140 main hoist<br>25 auxiliary hoist |
| RH-TRU 72-B Cask Transfer Car | 20 |
| CNS 10-160B Cask Transfer Car | 35 |
| Transfer Cell Shuttle Car | 29 |
| Hot Cell Bridge Crane | 15 |
| Overhead Powered Manipulator | 2.5 |
| Facility Cask Rotating Device | No specific load rating |
| Cask Unloading Room Crane | 25 |
| 6.25 Ton Grapple Hoist | 6.25 |
| Facility Cask Transfer Car | 40 |
| **MAXIMUM GROSS WEIGHTS OF RH TRU CONTAINERS (lb)** | |
| RH TRU Canister | 8,000 |
| 55-gal (208-L) Drum | 1,000 |
| Facility Canister | 10,000 |
| **MAXIMUM NET EMPTY WEIGHTS OF EQUIPMENT (lb)** | |
| RH-TRU 72-B Cask | 37,000 |
| CNS 10-160B Cask | 57,500 |
| Facility Cask | 67,700 |
| Light Weight Facility Cask | 48,450 |
| Shielded Insert | 26,300 |