

PERMIT ATTACHMENT M1

CONTAINER STORAGE

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1 Introduction

2 Management and storage of transuranic (**TRU**) mixed waste in the Waste Isolation Pilot Plant
3 (**WIPP**) facility is subject to regulation under Title 20 of the New Mexico Administrative Code,
4 Chapter 4, Part 1 (20.4.1 NMAC), Subpart V. The technical requirements of 20.4.1.500 NMAC
5 (incorporating 40 CFR §§264.170 to 264.178 are applied to the operation of the Waste Handling
6 Building Container Storage Unit (**WHB Unit**)(Figure M1-1), and the Parking Area Container
7 Storage Unit (**Parking Area Unit**)(Figure M1-2). This Permit Attachment describes the container
8 storage units, the TRU mixed waste management facilities and operations, and compliance with
9 the technical requirements of 20.4.1 NMAC. The configuration of the WIPP facility consists of
10 completed structures, including all buildings and systems for the operation of the facility.

11 M1-1 Container Storage

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

15 M1-1a Containers with Residual Liquids

16 The Permit Treatment, Storage, and Disposal Facility (**TSDF**) Waste Acceptance Criteria (**WAC**)
17 and the Waste Analysis Plan (Permit Attachment B) prohibit the shipment of liquid waste to the
18 WIPP. This prohibition is enforced as a maximum residual liquids requirement. In no case shall
19 the total liquid equal or exceed one volume percent of the waste container (e.g., drum, ~~or~~
20 standard waste box [**SWB**], or canister). Since the maximum amount of liquid is one percent,
21 calculations made to determine the secondary containment as required by 20.4.1.500 NMAC
22 (incorporating §264.175) are based on ten percent of one percent of the volume of the
23 containers, or one percent of the largest container, whichever is greater.

24 M1-1b Description of Containers

25 20.4.1.500 NMAC (incorporating 40 CFR §264.171) requires that containers holding waste be in
26 good condition. Waste containers shall be in good condition prior to shipment from the
27 generator sites, i.e., containers will be of high integrity, intact, and free of surface contamination
28 above DOE limits. The Manager of the DOE Carlsbad Field Office has the authority to suspend
29 a generator's certification to ship TRU mixed waste to the WIPP facility should the generator fail
30 to meet this requirement. The containers will be certified free of surface contamination above
31 DOE limits upon shipment. This condition shall be verified upon receipt of the waste at WIPP.
32 The level of rigor applied in these areas to ensure container integrity and the absence of
33 external contamination on both ends of the transportation process will ensure that waste
34 containers entering the waste management process line at WIPP meet the applicable Resource
35 Conservation and Recovery Act (**RCRA**) requirements for container condition.

1 M1-1b(1) CH TRU Mixed Waste Containers

2 Contact handled (**CH**) TRU mixed waste containers will be either 55-gal (208-L) drums singly or
3 arranged into 7-packs, 85-gal (321-L) drums singly or arranged into 4-packs, 100-gal (379 L)
4 drums singly or arranged into 3-packs, ten-drum overpacks (**TDOP**), or SWBs. A summary
5 description of each **CH TRU mixed waste** container type is provided below.

6 Standard 55-Gallon Drums

7 Standard 55-gal (208-L) drums meet the requirements for U.S. Department of Transportation
8 (**DOT**) specification 7A regulations.

9 A standard 55-gal (208-L) drum has a gross internal volume of 7.4 cubic feet (ft³) (0.210 cubic
10 meters (m³)). Figure M1-3 shows a standard TRU mixed waste drum. One or more filtered vents
11 (as described in Section M1-1d(1)) will be installed in the drum lid to prevent the escape of any
12 radioactive particulates and to eliminate any potential of pressurization.

13 Standard 55-gal (208-L) drums are constructed of mild steel and may also contain rigid, molded
14 polyethylene (or other compatible material) liners. These liners are procured to a specification
15 describing the functional requirements of fitting inside the drum, material thickness and
16 tolerances, and quality controls and required testing. A quality assurance surveillance program
17 is applied to all procurements to verify that the liners meet the specification.

18 Standard 55-gal (208-L) drums may be used to collect derived waste.

19 Standard Waste Boxes

20 The SWBs meet all the requirements of DOT specification 7A regulations.

21 One or more filtered vents (as described in Section M1-1d(1)) will be installed in the SWB body
22 and located near the top of the SWB to prevent the escape of any radioactive particulates and
23 to eliminate any potential of pressurization. They have an internal volume of 66.3 ft³ (1.88 m³).
24 Figure M1-4 shows a SWB.

25 The SWB is the largest container that may be used to collect derived waste.

26 Ten-Drum Overpack

27 The TDOP is a metal container, similar to a SWB, that meets DOT specification 7A and is
28 certified to be noncombustible and to meet all applicable requirements for Type A packaging.
29 The TDOP is a welded-steel, right circular cylinder, approximately 74 inches (in.) (1.9 meters
30 (m)) high and 71 in. (1.8 m) in diameter (Figure M1-5). The maximum loaded weight of a TDOP
31 is 6,700 pounds (lbs) (3,040 kilograms (kg)). A bolted lid on one end is removable; sealing is
32 accomplished by clamping a neoprene gasket between the lid and the body. One or more filter
33 vents are located near the top of the TDOP on the body to prevent the escape of any
34 radioactive particulates and to eliminate any potential of pressurization. A TDOP may contain up
35 to ten standard 55-gal (208-L) drums or one SWB. TDOPs may be used to overpack drums or

1 SWBs containing CH TRU mixed waste. The TDOP may also be direct loaded with CH TRU
2 mixed waste. Figure M1-5 shows a TDOP.

3 Eighty-Five Gallon Drum

4 The 85-gal (321-L) drums meet the requirements for DOT specification 7A regulations. One or
5 more filtered vents (as described in Section M1-1d(1)) will be installed in the 85-gal drum to
6 prevent the escape of any radioactive particulates and to eliminate any potential of
7 pressurization.

8 85-gal (321-L) drums are constructed of mild steel and may also contain rigid, molded
9 polyethylene (or other compatible material) liners. These liners are procured to a specification
10 describing the functional requirements of fitting inside the drum, material thickness and
11 tolerances, and quality controls and required testing. A quality assurance surveillance program
12 is applied to all procurements to verify that the liners meet the specification.

13 The 85-gal (321-L) drum, which is shown in Figure M1-6, will be used for overpacking
14 contaminated 55-gal (208 L) drums at the WIPP facility. The 85-gal drum may also be direct
15 loaded with CH TRU mixed waste.

16 85-gal (321-L) drums may be used to collect derived waste.

17 100-Gallon Drum

18 100-gal (379-L) drums meet the requirements for DOT specification 7A regulations.

19 A 100-gal (379-L) drum has a gross internal volume of 13.4 ft³ (0.38 m³). One or more filtered
20 vents (as described in Section M1-1d(1)) will be installed in the drum lid or body to prevent the
21 escape of any radioactive particulates and to eliminate any potential of pressurization.

22 100-gal (379-L) drums are constructed of mild steel and may also contain rigid, molded
23 polyethylene (or other compatible material) liners. These liners are procured to a specification
24 describing the functional requirements of fitting inside the drum, material thickness and
25 tolerances, and quality controls and required testing. A quality assurance surveillance program
26 is applied to all procurements to verify that the liners meet the specification.

27 100-gal (379-L) drums may be direct loaded.

28 M1-1b(2) RH TRU Mixed Waste Containers

29 Remote-Handled (RH) TRU mixed waste containers include canisters, which are received at
30 WIPP loaded singly in an RH-TRU 72-B cask, and drums, which are received in a CNS 10-160B
31 cask.

32 RH TRU Canister

33 The RH TRU canister is a steel single shell container which is constructed to be of high
34 integrity. An example canister is depicted in Figure M1-16a. The RH TRU canister is vented and

1 will have a nominal internal volume of 31.4 ft³ (0.89 m³) and shall contain waste packaged in
2 small containers (e.g., drums) or waste loaded directly into the canister.

3 RH TRU Facility Canister

4 The RH TRU Facility Canister is a cylindrical container designed to hold up to three 55-gallon
5 drums (Figure M1-16).

6 Standard 55-Gallon Drums

7 Standard 55-gal (208-L) drums meet the requirements for U.S. Department of Transportation
8 (DOT) specification 7A regulations. A detailed description of a standard 55-gallon drum is
9 provided above. Up to ten 55-gallon drums containing RH TRU mixed waste are arranged on
10 two drum carriage units in the CNS 10-160B cask (up to five drums per drum carriage unit). The
11 drums are transferred to an RH TRU mixed waste Facility Canister that will contain up to three
12 drums.

13 M1-1b(3) Container Compatibility

14 All containers will be made of steel, and some will contain rigid, molded polyethylene liners. The
15 compatibility study, documented in Appendix C1 of the WIPP RCRA Part B Permit Application
16 (DOE, 1997a), included container materials to assure containers are compatible with the waste.
17 Therefore, these containers meet the requirements of 20.4.1.500 NMAC (incorporating 40 CFR
18 §264.172).

19 M1-1c Description of the Container Storage Units

20 M1-1c(1) Waste Handling Building Container Storage Unit (WHB Unit)

21 The Waste Handling Building (**WHB**) is the surface facility where TRU mixed waste handling
22 activities will take place (Figure M1-1). The WHB has a total area of approximately 84,000
23 square feet (ft²) (7,804 square meters (m²)) of which ~~33,175~~ 25,650 ft² (~~3,082~~ 2,383 m²) are
24 designated for the waste handling and container storage of CH TRU mixed waste and 17,403 ft²
25 (1,617 m²) are designated for handling and storage of RH TRU mixed waste, as shown in
26 Figures M1-1 and M1-17a, b and c. ~~This area is~~ These areas are being permitted as the WHB
27 Unit. The concrete floors are sealed with a coating that is sufficiently impervious to the
28 chemicals in TRU mixed waste to meet the requirements of 20.4.1.500 NMAC (incorporating 40
29 CFR §264.175(b)(1)).

30 CH TRU Mixed Waste

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

1 pressure. The CH Bay houses two TRUPACT-II Docks (**TRUDOCKs**), each equipped with
2 overhead cranes for opening and unloading Contact-Handled Packages. The TRUDOCKs are
3 within the TRUDOCK Storage Area of the WHB Unit.

4 The cranes are rated to lift the Contact-Handled Packaging lids as well as their contents. The
5 cranes are designed to remain on their tracks and hold their load even in the event of a design-
6 basis earthquake.

7 Upon receipt and removal of CH TRU mixed waste containers from the Contact-Handled
8 Packaging, the waste containers are required to be in good condition as provided in Permit
9 Module III. The waste containers will be visually inspected for physical damage (severe rusting,
10 apparent structural defects, signs of pressurization, etc.) and leakage to ensure they are good
11 condition prior to storage. Waste containers will also be checked for external surface
12 contamination. If a primary waste container is not in good condition, the Permittees will
13 overpack the container, repair/patch the container in accordance with 49 CFR §173 and §178
14 (e.g., 49 CFR §173.28), or return the container to the generator. The Permittees may initiate
15 local decontamination, return unacceptable containers to a DOE generator site or send the
16 Contact-Handled Package to the third party contractor. Decontamination activities will not be
17 conducted on containers which are not in good condition, or which are leaking. If local
18 decontamination activities are opted for, the work will be conducted in the WHB Unit on the
19 TRUDOCK. These processes are described in Section M1-1d. The area previously designated
20 as the Overpack and Repair Room will not be used for TRU mixed waste management in any
21 instances.

22 Once unloaded from the Contact-Handled Packaging, CH TRU mixed waste containers (7-
23 packs, 3-packs, 4-packs, SWBs, or TDOPs) are placed in one of two positions on the facility
24 pallet **or on a containment pallet**. The waste containers are stacked, on the facility pallets (one-
25 or two-high, depending on weight considerations). **Waste on containment pallets will be stacked**
26 **one-high**. The use of facility **or containment** pallets will elevate the waste at least 6 in. (15 cm)
27 from the floor surface. Pallets of waste will then be relocated to the ~~Northeast (NE)~~ **CH Bay**
28 Storage Area of the WHB Unit for normal storage. This ~~NE CH Bay~~ Storage Area, which is
29 shown in Figure M1-7, will be clearly marked to indicate the lateral limits of the storage area.
30 This ~~NE CH Bay~~ Storage Area will have a maximum capacity of **seventeen** pallets (~~1,856~~ **5,440**
31 **ft³ [52.6-154 m³]**) of TRU mixed waste containers during normal operations. These pallets will
32 typically be staged in this area for a period of up to five days.

33 In addition, four Contact-Handled Packages, containing up to eight 7-packs, 3-packs, 4-packs,
34 SWBs, or four TDOPs, may occupy the staging positions at the TRUDOCK Storage Area of the
35 WHB Unit. If waste containers are left in this area, they will be in the Contact-Handled Package
36 with or without the shipping container lids removed. The maximum volume of waste in
37 containers in four Contact-Handled Packages is ~~530.4~~ **640** ft³ (~~15~~ **18.1** m³).

38 The Derived Waste Storage Area of the WHB Unit is on the north wall of the CH Bay. This area
39 will contain containers up to the volume of a SWB for collecting derived waste from all TRU
40 mixed waste handling processes in the WHB Unit. The Derived Waste Storage Area is being
41 permitted to allow containers in size up to a SWB to be used to accumulate derived waste. The
42 volume of TRU mixed waste stored in this area will be up to 66.3 ft³ (1.88 m³). The derived
43 waste containers in the Derived Waste Storage Area will be stored on standard drum pallets,

1 which are polyethylene trays with a grated deck, which will elevate the derived waste containers
2 approximately 6 in. (15 cm) from the floor surface, and provide approximately 50 gal (190 L) of
3 secondary containment capacity.

4 An area has also been designated for the temporary storage of waste containers for which
5 manifest discrepancies were noted after the Contact-Handled Package was opened. Discrepant
6 payloads will be placed either in the Shielded Storage Area of the WHB Unit on a facility pallet
7 or inside a Contact-Handled Package, depending on when the discrepancy is discovered. In
8 either case the waste containers will be elevated approximately six inches from the floor
9 surface. The storage capacity of this area is one pallet load of TRU mixed waste containers
10 (i.e., 4 SWBs, 2 TDOPs, or 28 drums, or combinations of all three).

11 Aisle space shall be maintained in all WHB Unit TRU mixed waste storage areas. The aisle
12 space shall be adequate to allow unobstructed movement of fire-fighting personnel, spill-control
13 equipment, and decontamination equipment that would be used in the event of an off-normal
14 event. An aisle space of 44 in. (1.1 m) between facility pallets will be maintained in all WHB Unit
15 TRU mixed waste storage areas.

16 The WHB has been designed to meet DOE design and associated quality assurance
17 requirements. Table M1-1 summarizes basic design requirements, principal codes, and
18 standards for the WIPP facility. Appendix D2 of the WIPP RCRA Part B Permit Application
19 (DOE, 1997a) provided engineering design-basis earthquake and tornado reports. The design-
20 basis earthquake report provides the basis for seismic design of WIPP facility structures,
21 including the WHB foundation. The WIPP design-basis earthquake is 0.1 g. The WIPP design-
22 basis tornado includes a maximum windspeed of 183 mi per hr (mi/hr) (294.5 km/hr), which is
23 the vector sum of all velocity components. It is also limited to a translational velocity of 41 mi/hr
24 (66 km/hr) and a tangential velocity of 124 mi/hr (200 km/hr). Other parameters are a radius of
25 maximum wind of 325 ft (99 m), a pressure drop of 0.5 lb per in.² (3.4 kilopascals [kPa]), and a
26 rate-of-pressure drop of 0.09 lb/in.²/s (0.6 kPa/s). A design-basis flood report is not available
27 because flooding is not a credible phenomenon at the WIPP facility. Design calculations for the
28 probable maximum precipitation (**PMP**) event, provided in Appendix D7 of the WIPP RCRA Part
29 B Permit Application (DOE, 1997a), illustrated run-on protection for the WIPP facility.

30 The following are the major pieces of equipment that will be used to manage CH TRU **mixed**
31 waste in the container storage units. A summary of equipment capacities, as required by
32 20.4.1.500 NMAC is included in Table M1-2.

33 TRUPACT-II Type B Packaging

34 The TRUPACT-II (Figure M1-8a) is a double-contained cylindrical shipping container 8 ft (2.4 m)
35 in diameter and 10 ft (3 m) high. It meets NRC Type B shipping container requirements and has
36 successfully completed rigorous container-integrity tests. The payload consists of approximately
37 7,265 lbs (3,300 kg) gross weight in up to fourteen 55-gal (208-L) drums, eight 85-gal (322-L)
38 drums, six 100-gal (379-L) drums, two SWBs, or one TDOP.

1 HalfPACT Type B Packaging

2 The HalfPACT (Figure M1-8b) is a double-contained right cylindrical shipping container 7.8
3 ft (2.4 m) in diameter and 7.6 ft (2.3 m) high. It meets NRC Type B shipping container
4 requirements and has successfully completed rigorous container-integrity tests. The payload
5 consists of approximately 7,600 lbs (3,500 kg) gross weight in up to seven 55-gal (208-L)
6 drums, one SWB, or four 85-gallon drums.

7 Unloading Docks

8 Each TRUDOCK is designed to accommodate up to two Contact-Handled Packages. The
9 TRUDOCK functions as a work platform, providing TRU mixed waste handling personnel easy
10 access to the container during unloading operations (see Figure M1-9) (Also see
11 Drawing 41-M-001-W in Appendix D3 of the WIPP RCRA Part B Permit Application (DOE,
12 1997a)).

13 Forklifts

14 Forklifts will be used to transfer the Contact-Handled Packages into the WHB Unit and may be
15 used to transfer palletized CH TRU mixed waste containers to the facility transfer vehicle.
16 Another forklift will be used for general-purpose transfer operations. This forklift has
17 attachments and adapters to handle individual TRU mixed waste containers, if required.

18 Cranes and Adjustable Center-of-Gravity Lift Fixtures

19 At each TRUDOCK, an overhead bridge crane is used with a specially designed lift fixture for
20 disassembly of the Contact-Handled Packages. Separate lifting attachments have been
21 specifically designed to accommodate SWBs and TDOPs. The lift fixture, attached to the crane,
22 has built-in level indicators and two counterweights that can be moved to adjust the center of
23 gravity of unbalanced loads and to keep them level.

24 Facility or Containment Pallets

25 The facility pallet is a fabricated steel unit designed to support 7-packs, 4-packs, or 3-packs of
26 drums, SWBs, or TDOPs, and has a rated load of 25,000 lbs. (11,430 kg). The facility pallet will
27 accommodate up to four 7-packs, four 3-packs, or four 4-packs of drums or four SWBs (in two
28 stacks of two units), two TDOPs, or any combination thereof. Loads are secured to the facility
29 pallet during transport to the emplacement area. Facility pallets are shown in Figure M1-10.
30 Fork pockets in the side of the pallet allow the facility pallet to be lifted and transferred by forklift
31 to prevent direct contact between TRU mixed waste containers and forklift tines. This
32 arrangement reduces the potential for puncture accidents. Facility pallets may also be moved by
33 facility transfer vehicles. WIPP facility operational documents define the operational load of the
34 facility pallet to ensure that the rated load of a facility pallet is not exceeded.

35 **Containment pallets are fabricated units having a containment capacity of at least ten percent of**
36 **the volume of the containers and designed to support a minimum of either a single drum, a**
37 **single SWB or a single TDOP. The pallets will have a rated load capacity of equal to or greater**
38 **than the gross weight limit of the container(s) to be supported on the pallet. Loads are secured**

1 to the containment pallet during transport. A typical containment pallet is shown in Figure M1-
2 10a. Fork pockets in the side of the pallet allow the containment pallet to be lifted and
3 transferred by forklift. WIPP facility operational documents define the operational load of the
4 containment pallet to assure that the rated load of a containment pallet is not exceeded.

5 Facility Transfer Vehicle

6 The facility transfer vehicle is a battery or electric powered automated vehicle that either
7 operates on tracks or has an on-board guidance system that allows the vehicle to operate on
8 the floor of the WHB. An integrated or removable roller bed will be used to move pallets on and
9 off the vehicle. It is designed with a flat bed that has adjustable height capability and will transfer
10 waste payloads on facility pallets to the storage areas be used to transfer the facility pallets on
11 or off the pallet support stands in the waste hoist cage by raising and lowering the bed (see
12 Figure M1-11).

13 RH TRU Mixed Waste

14 The RH TRU mixed waste is handled and stored in the RH Complex of the WHB Unit which
15 comprises the following locations: RH Bay (12,552 ft² (1,166 m²)), the Cask Unloading Room
16 (382 ft² (36 m²)), the Hot Cell (1,841 ft² (171 m²)), the Transfer Cell (1,003 ft² (93 m²)) (Figures
17 M1-17a, b and c), and the Facility Cask Loading Room (1,625 ft² (151 m²)).

18 The RH Bay (Figure M1-14a) is a high-bay area for receiving casks and subsequent handling
19 operations. The trailer carrying the RH-TRU 72-B or CNS 10-160B shipping cask (Figures M1-
20 18, M1-19, M1-20 and M1-21) enters the RH Bay through a set of double doors on the east side
21 of the WHB. The RH Bay houses the cask transfer car. The RH Bay is served by the RH Bay
22 Overhead Bridge Crane used for cask handling and maintenance operations. Storage in the RH
23 Bay occurs in the RH-TRU 72-B or CNS 10-160B casks. The storage occurs after the trailer
24 containing the cask is moved into the RH Bay and prior to moving the cask into the Cask
25 Unloading Room to stage the waste for disposal operations. A maximum of two loaded casks
26 (147 ft³ (4.2 m³)) and one 55-gallon drum for derived waste may be stored in the RH Bay.

27 The Cask Unloading Room (Figure M1-17a) provides for transfer of the RH-TRU 72-B cask to
28 the Transfer Cell, or the transfer of drums from the CNS 10-160B cask to the Hot Cell. Storage
29 in the Cask Unloading Room will occur in the RH-TRU 72-B or CNS 10-160B casks. Storage in
30 this area typically occurs at the end of a shift or in an off-normal event that results in the
31 suspension of waste handling operations. A maximum of one cask (74 ft³ (2.1 m³)) may be
32 stored in the Cask Unloading Room.

33 The Hot Cell (Figure M1-17b) is a concrete shielded room in which drums of RH TRU mixed
34 waste will be transferred remotely from the CNS 10-160B cask, staged in the Hot Cell, and
35 loaded into a facility canister. The loaded facility canister is then lowered from the Hot Cell into
36 the Transfer Cell shuttle car containing a shielded insert. Storage in the Hot Cell occurs in either
37 drums or facility canisters. Drums that are stored are either on the drum carriage unit that was
38 removed from the CNS 10-160B cask or in a facility canister. A maximum of 10 drums and 6
39 loaded facility canisters (262 ft³ (7.4 m³)) and one 55-gallon drum for derived waste may be
40 stored in the Hot Cell.

1 The Transfer Cell (Figure M1-17c) houses the Transfer Cell Shuttle Car, which moves the RH-
2 TRU 72-B cask or shielded insert into position for transferring the canister to the facility cask.
3 Storage in this area typically occurs at the end of a shift or in an off-normal event that results in
4 the suspension of a waste handling evolution. A maximum of one canister (31.4 ft³ (0.89 m³))
5 may be stored in the Transfer Cell in the Transfer Cell Shuttle Car.

6 The Facility Cask Loading Room (Figure M1-17d) provides for transfer of a canister to the
7 facility cask for subsequent transfer to the waste hoist and to the Underground Hazardous
8 Waste Disposal Unit (**HWDU**). The Facility Cask Loading Room also functions as an air lock
9 between the Waste Shaft and the Transfer Cell. Storage in this area typically occurs at the end
10 of a shift or in an off-normal event that results in the suspension of waste handling operations. A
11 maximum of one canister (31.4 ft³ (0.89 m³)) may be stored in the Facility Cask (Figure M1-23)
12 in the Facility Cask Loading Room.

13 Following is a description of major pieces of equipment that are used to manage RH TRU mixed
14 waste in the WHB Unit. A summary of equipment capacities, as required by 20.4.1.500 NMAC,
15 is included in Table M1-3.

16 Casks

17 The RH-TRU 72-B cask (Figure M1-20) is a cylinder designed to meet U.S. Department of
18 Transportation (**DOT**) Type B shipping container requirements. It consists of a separate inner
19 vessel within a stainless steel, lead-shielded outer cask protected by impact limiters at each
20 end, made of stainless steel skins filled with polyurethane foam. The inner vessel is made of
21 stainless steel and provides an internal containment boundary and a cavity for the payload.
22 Neither the outer cask nor the inner vessel is vented. Payload capacity of each RH-TRU 72-B
23 shipping cask is 8,000 lbs (3,628 kg). The payload consists of a canister of RH TRU mixed
24 waste, which may contain up to 31.4 ft³ (0.89 m³) of directly loaded waste or waste in smaller
25 containers.

26 The CNS 10-160B cask (Figure M1-21) is designed to meet DOT Type B container
27 requirements and consists of two carbon steel shells and a lead shield, welded to a carbon steel
28 bottom plate. A 12-gauge stainless steel thermal shield surrounds the cask outer shell, which is
29 equipped with two steel-encased, rigid polyurethane foam impact limiters attached to the top
30 and bottom of the cask. The CNS 10-160B cask is not vented. Payload capacity of each CNS
31 10-160B cask is 14,500 lbs (6,577 kg). The payload consists of up to ten 55-gallon drums.

32 CNS 10-160B Drum Carriage

33 The CNS 10-160B drum carriage (Figure M1-25) is a steel device used to handle drums in the
34 CNS 10-160B cask. The drum carriages are stacked two high in the CNS 10-160B cask during
35 shipment. They are removed from the cask using a below-the-hook lifting device termed a
36 pentapod. The drum carriage is rated to lift up to five drums with a maximum weight of 1000
37 pounds each.

1 RH Bay Overhead Bridge Crane

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

5 Cask Lifting Yoke

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

8 Cask Transfer Car

9 The Cask Transfer Car (Figure M1-22 and M1-24) is a self-propelled, rail-guided vehicle, that
10 transports the cask between the RH Bay and the Cask Unloading Room.

11 6.25 Ton Grapple Hoist

12 A 6.25 Ton Grapple Hoist is used to hoist the canister from the Transfer Cell Shuttle Car into the
13 facility cask.

14 Facility Cask

15 The facility cask body consists of two concentric steel cylinders. The annulus between the
16 cylinders is filled with lead, and gate shield valves are located at either end. Figure M1-23
17 provides an outline configuration of the facility cask. The canister is placed inside the facility
18 cask for shielding during canister transfer from the RH Complex to the Underground HWDU for
19 emplacement.

20 Facility Cask Transfer Car

21 The Facility Cask Transfer Car (Figure M1-24) is a self-propelled rail car that is used to move
22 the facility cask between the Facility Cask Loading Room and the Shaft Station in the
23 underground.

24 Hot Cell Bridge Crane

25 The Hot Cell Overhead Bridge Crane, outfitted with a rotating block and the Facility Grapple, will
26 be used to lift the CNS 10-160B lid and the drum carriage units from the cask located in the
27 Cask Unloading Room, into the Hot Cell. The Hot Cell Overhead Bridge Crane is also used to
28 lift the empty disposal canisters into place within the Hot Cell, move loaded drums into the
29 facility canister, and lower loaded canisters into the Transfer Cell.

30 Overhead Powered Manipulator

31 The Overhead Powered Manipulator is used in the Hot Cell to lift individual drums from the drum
32 carriage unit and lower each drum into the facility canister and support miscellaneous Hot Cell
33 operations.

1 Manipulators

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

5 Shielded Material Transfer Drawer

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

9 Closed-Circuit Television Camera

10 The Closed-Circuit Television Camera monitors Hot Cell and Transfer Cell operations. These
11 operations are observed from the shielded room in the Facility Cask Loading Room and Hot Cell
12 Gallery.

13 Transfer Cell Shuttle Car

14 The Transfer Cell Shuttle Car positions the loaded RH-TRU 72-B cask and shielded insert within
15 the Transfer Cell.

16 Cask Unloading Room Crane

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

19 M1-1c(2) Parking Area Container Storage Unit (Parking Area Unit)

20 The parking area south of the WHB (see Figure M1-2) will be used for storage of waste
21 containers within sealed shipping containers awaiting unloading. The area extending south from
22 the WHB within the fenced enclosure identified as the Controlled Area on Figure M1-2 is
23 defined as the Parking Area Unit. The Parking Area Unit provides storage space for up to
24 7,160 ft³ (203 m³) of TRU mixed waste, contained in up to 50 loaded Contact-Handled
25 Packages and 14 Remote-Handled Packages, corresponding to 1,591 ft³ (45 m³) of CH TRU
26 mixed waste. Secondary containment and protection of the waste containers from standing
27 liquid are provided by the Contact-Handled or Remote-Handled Packaging. Wastes placed in
28 the Parking Area Unit will remain sealed in their Contact-Handled or Remote-Handled
29 Packages, at all times while in this area.

30 The maximum number of Contact-Handled Packages that will be stored in the parking area is
31 twelve, containing a maximum of 1,591 ft³ (45 m³) of CH TRU mixed waste. The Nuclear
32 Regulatory Commission (NRC) Certificate of Compliance requires that sealed Contact-Handled
33 or Remote-Handled Packages which contain waste be vented every 60 days to avoid
34 unacceptable levels of internal pressure. During normal operations the maximum residence time
35 of any one container in the Parking Area Unit is typically five days. Therefore, during normal
36 waste handling operations, no Contact-Handled or Remote-Handled Packages will require

1 venting while located in the Parking Area Unit. Any off-normal event which results in the need to
2 store a waste container in the Parking Area Unit for a period of time approaching fifty-nine (59)
3 days shall be handled in accordance with Section M1-1e(2) of this Permit Attachment. Under no
4 circumstances shall a Contact-Handled or Remote-Handled Package be stored in the Parking
5 Area Unit for more than fifty-nine (59) days after the date that the inner containment vessel of
6 the Contact-Handled or Remote-Handled Packages was sealed at the generator site.

7 M1-1d Container Management Practices

8 20.4.1.500 NMAC (incorporating 40 CFR §264.173) requires that containers be managed in a
9 manner that does not result in spills or leaks. Containers are required to be closed at all times,
10 unless waste is being placed in the container or removed. Because containers at the WIPP will
11 contain radioactive waste, safety concerns require that containers be continuously vented to
12 obviate the buildup of gases within the container. These gases could result from radiolysis,
13 which is the breakdown of moisture by radiation. The vents, which are nominally 0.75 in. (1.9
14 centimeters [cm]) in diameter, are generally installed on or near the lids of the containers. These
15 vents are filtered so that gas can escape while particulates are retained.

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

18 ~~The typical processing rate for CH TRU mixed waste is 14 Contact-Handled Packages per day,~~
19 ~~or seven pallet loads, and the maximum is 28 per day. Two shifts per day are planned, four~~
20 ~~days per week. The fifth day is for equipment maintenance with weekends available for more~~
21 ~~extensive maintenance, when necessary.~~

22 Off-normal events could interrupt normal operations in the waste management process line.
23 These off normal events fall into the following categories:

- 24 ● Waste management system equipment malfunctions
- 25 ● Waste shipments with unacceptable levels of surface contamination
- 26 ● Hazardous Waste Manifest discrepancies that are not immediately resolved
- 27 ● A suspension of emplacement activities for regulatory reasons

28 Shipments of waste from the generator sites will be stopped in any event which results in an
29 interruption to normal waste handling operations that exceeds three days.

30 Prior to receipt of TRU mixed waste at the WIPP facility, waste operators will be thoroughly
31 trained in the safe use of TRU mixed waste handling and transport equipment. The training will
32 include both classroom training and on-the-job training.

1 M1-1d(1) Derived Waste

2 The WIPP facility operational philosophy is to introduce no new hazardous chemical
3 components into TRU mixed waste or TRU mixed waste residues that could be present in the
4 controlled area. This will be accomplished principally through written procedures and the use of
5 Safe Work Permits (**SWP**)¹ and Radiological Work Permits (**RWP**)² which govern the activities
6 within a controlled area involving TRU mixed waste. The purpose of this operating philosophy is
7 to avoid generating TRU mixed waste that is compositionally different than the TRU mixed
8 waste shipped to the WIPP facility for disposal.

9 Some additional TRU mixed waste, such as used personal protective equipment, swipes, and
10 tools, may result from decontamination operations and off-normal events. Such waste will be
11 assumed to be contaminated with RCRA-regulated hazardous constituents in the TRU mixed
12 waste containers from which it was derived. Derived waste may be generated as the result of
13 decontamination activities during the waste handling process. Should decontamination activities
14 be performed, water and a cleaning agent such as those listed in Permit Attachment F will be
15 used. Derived waste will be considered acceptable for management at the WIPP facility,
16 because any TRU mixed waste shipped to the facility will have already been determined to be
17 acceptable and because no new constituents will be added. Data on the derived waste will be
18 entered into the WWIS database. Derived waste will be contained in standard DOT approved
19 Type A containers.

20 The Safety Analysis Report (DOE 1997b) for packaging requires the lids of TRU mixed waste
21 containers to be vented through high efficiency particulate air (**HEPA**)-grade filters to preclude
22 container pressurization caused by gas generation and to prevent particulate material from
23 escaping. Filtered vents used in CH TRU mixed waste containers (55-gal (208-L) drums, 85-gal
24 (321 L) drums, 100-gal (379-L) drums, TDOPs, and SWBs) have an orifice approximately 0.375-
25 in. (9.53-millimeters) in diameter through which internally generated gas may pass. The filter
26 media can be any material (e.g., composite carbon, sintered metal).

27 As each derived waste container is filled, it will be closed with a lid containing a HEPA-grade.
28 filter and moved to an Underground Hazardous Waste Disposal Unit (**HWDU**) using the same
29 equipment used for handling TRU mixed waste.

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. 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.

1 M1-1d(2) CH TRU Mixed Waste Handling

2 CH TRU mixed waste containers will arrive by tractor-trailer at the WIPP facility in sealed
3 shipping containers (e.g., TRUPACT-IIs or HalfPACTs) (see Figure M1-12), at which time they
4 will undergo security and radiological checks and shipping documentation reviews. A forklift will
5 remove the Contact-Handled Packages and will transport them a short distance through an air
6 lock that is designed to maintain differential pressure in the WHB. The forklift will place the
7 shipping containers at one of the two TRUDOCKs in the TRUDOCK Storage Area of the WHB
8 Unit, where an external survey of the Contact-Handled Package inner vessel (see Figure M1-8a
9 and M1-8b) will be performed as the outer containment vessel lid is lifted. The inner vessel lid
10 will be lifted under the TRUDOCK Vent Hood System (**VHS**), and the contents will be surveyed
11 during and after this lift. The TRUDOCK VHS³ is attached to the Contact-Handled Package to
12 provide atmospheric control and confinement of headspace gases at their source. It also
13 prevents potential personnel exposure and facility contamination due to the spread of
14 radiologically contaminated airborne dust particles and minimizes personnel exposure to VOCs.

15 Contamination surveys at the WIPP facility are based in part on radiological surveys used to
16 indicate potential releases of hazardous constituents from containers by virtue of detection of
17 radioactive contamination (see Permit Attachment I3). Radiological surveys may be applicable
18 to most hazardous constituent releases except the release of gaseous VOCs from TRU mixed
19 waste containers. Radiological surveys provide the WIPP facility with a very sensitive method of
20 indicating the potential release of nongaseous hazardous constituents through the use of
21 surface sampling (swipes) and radioactivity counting. Radiological surveys are used in addition
22 to the more conventional techniques such as visual inspection to identify spills.

23 Under normal operations, it is not expected that the waste containers will be externally
24 contaminated or that removable surface contamination on the shipping package or the waste
25 containers will be in excess of the DOE's free release limits (i.e.; < 20 disintegrations per minute
26 (**dpm**)⁴ per 100 cm² alpha or < 200 dpm per 100 cm² beta/gamma). In such a case, no further
27 decontamination action is needed. The shipping package and waste container will be handled
28 through the normal process. However, should the magnitude of contamination exceed the free
29 release limits, yet still fall within the criteria for small area "spot" decontamination (i.e., less than

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

1. Without the TRUDOCK 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 TRUDOCK 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 TRUDOCK 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.

⁴ The unit "dpm" stands for "disintegration per minute" and is the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

1 or equal to 100 times the free release limit and less than or equal to 6 ft² [0.56 m²]), the shipping
2 package or the waste container will be decontaminated. Decontamination activities will not be
3 conducted on containers which are not in good condition, or containers which are leaking.
4 Containers which are not in good condition, and containers which are leaking, will be
5 overpacked, repaired/patched in accordance with 49 CFR §173 and §178 (e.g., 49 CFR
6 §173.28), or returned to the generator. In addition, if during the waste handling process at the
7 WIPP a waste container is breached, it will be overpacked, repaired/patched in accordance with
8 49 CFR §173 and §178 (e.g., 49 CFR §173.28), or returned to the generator. Should WIPP
9 structures or equipment become contaminated, waste handling operations in the affected area
10 will be immediately suspended.

11 Decontamination activities will use water and cleaning agents (see Permit Attachment F) so as
12 to not generate any waste that cannot be considered derived waste. Items that are radiologically
13 contaminated are also assumed to be contaminated with the hazardous wastes that are in the
14 container involved in the spill or release. A complete listing of these waste components can be
15 obtained from the WIPP Waste Identification System (**WWIS**), as described in Permit
16 Attachment B, for the purpose of characterizing derived waste.

17 It is assumed that the process of decontamination will remove the hazardous waste constituents
18 along with the radioactive waste constituents. To provide verification of the effectiveness of the
19 removal of hazardous waste constituents, once a contaminated surface is demonstrated to be
20 radiologically clean, the "swipe" will be sent for analysis for hazardous constituents. The use of
21 these confirmation analyses is as follows:

22 **For waste containers**, the analyses becomes documentation of the condition of the container
23 at the time of emplacement. The presence of hazardous waste constituents on a container after
24 decontamination will be at trace levels and will likely not be visible and will not pose a threat to
25 human health or the environment. These containers will be placed in the underground without
26 further action once the radiological contamination is removed unless there is visible evidence of
27 hazardous waste spills or hazardous waste on the container and this contamination is
28 considered likely to be released prior to emplacement in the underground.

29 **For area contamination**, once the area is cleaned up and is shown to be radiologically clean, it
30 will be sampled for the presence of hazardous waste residues. If the area is large, a sampling
31 plan will be developed which incorporates the guidance of EPA's SW 846 in selecting random
32 samples over large areas. Selection of constituents for sampling analysis will be based on
33 information (in the WWIS) about the waste that was spilled and information on cleanup
34 procedures. If the area is small, swipes will be used. If the results of the analysis show that
35 residual contamination remains, a decision will be made whether further cleaning will be
36 beneficial or whether final clean up shall be deferred until closure. For example, if hazardous
37 constituents react with the floor coating and are essentially nonremovable without removing the
38 coating, then clean up will be deferred until closure when the coatings will be stripped. In any
39 case, appropriate notations will be entered into the operating record to assure proper
40 consideration of formerly contaminated areas at the time of closure. Furthermore, measures
41 such as covering, barricading, and/or placarding will be used as needed to mark areas that
42 remain contaminated.

1 Small area decontamination, if needed, will occur in the area in which it is detected for
2 contamination that is less than 6 ft² (0.56 m²) in area and is less than 100 times the free release
3 limit. The free release limit is defined by DOE Orders as alpha contamination less than 20
4 dpm/100 cm² and beta-gamma contamination less than 200 dpm/100 cm². Overpacking would
5 occur in the event the WIPP staff damages an otherwise intact container during handling
6 activities. In such a case, a radiological boundary will be established, inside which all activities
7 are carefully controlled in accordance with the protocols for the cleanup of spills or releases. A
8 plan of recovery will be developed and executed, including overpacking the damaged container
9 in either a 85-gal (321 L) drum, SWB, or a TDOP. The overpacked container will be properly
10 labeled and sent underground for disposal. The area will then be decontaminated and verified to
11 be free of contamination using both radiological and hazardous waste sampling techniques
12 (essentially, this is done with "swipes" of the surface for counting in sensitive radiation detection
13 equipment or, if no radioactivity is present, by analysis for hazardous waste by an offsite
14 laboratory).

15 In the event a large area contamination is discovered within a Contact-Handled Package during
16 unloading, the waste will be left in the Contact-Handled Package and the shipping container will
17 be resealed. The DOE considers such contamination problems the responsibility of the shipping
18 site. Therefore, the shipper will have several options for disposition. These are as follows:

- 19 ● The Contact-Handled Package can be returned to the shipper for decontamination
20 and repackaging of the waste. Such waste would have to be re-approved prior to
21 shipment to the WIPP.
- 22 ● Shipment to another DOE site for management in the event the original shipper
23 does not have suitable facilities for decontamination. If the receiving site wishes to
24 return the waste to WIPP, the site will have to meet the characterization
25 requirements of the WAP.
- 26 ● The waste could go to a third (non-DOE) party for decontamination. In such cases,
27 the repaired shipment would go to the original shipper and be recertified prior to
28 shipment to the WIPP.

29 Written procedures specify materials, protocols, and steps needed to put an object into a safe
30 configuration for decontamination of surfaces. A RWP will always be prepared prior to
31 decontamination activities. TRU mixed waste products from decontamination will be managed
32 as derived waste.⁵

33 The TRUPACT-II may hold up to two 7-packs, two 4-packs, two 3-packs, two SWBs, or one
34 TDOP. A HalfPACT may hold seven 55-gal (208-L) drums, one SWB, or four 85-gallon drums.
35 An overhead bridge crane will be used to remove the contents of the Contact-Handled Package
36 and place them on a facility pallet. The containers will be visually inspected for physical damage
37 (severe rusting, apparent structural defects, signs of pressurization, etc.) and leakage to ensure

⁵ Note that the DOE had previously proposed use of an Overpack and Repair Room to deal with major decontamination and overpacking activities. The DOE has eliminated the need for this area by: 1) limiting the size of contamination events that will be dealt with as described in this section, and 2) by performing overpacking at the point where a need for overpacking is identified instead of moving the waste to another area of the WHB. This strategy minimizes the spread of contamination.

1 they are in good condition prior to storage. Waste containers will also be checked for external
2 surface contamination. If a primary waste container is not in good condition, the Permittees will
3 overpack the container, repair/patch the container in accordance with 49 CFR §173 and §178
4 (e.g., 49 CFR §173.28), or return the container to the generator.

5 For inventory control purposes, TRU mixed waste container identification numbers will be
6 verified against the Uniform Hazardous Waste Manifest and the WWIS. Inconsistencies will be
7 resolved with the generator before TRU mixed waste is emplaced. Discrepancies that are not
8 resolved within 15 days will be reported to the NMED in accordance with 20.4.1.500 NMAC
9 (incorporating 40 CFR §264.72).

10 Each facility pallet has two recessed pockets to accommodate two sets of 7-packs, two sets of
11 4-packs, two sets of 3-packs, or two SWBs stacked two-high, two TDOPs, or any combination
12 thereof. Each stack of waste containers will be secured prior to transport underground (see
13 Figure M1-10). A forklift or the facility transfer vehicle will transport the loaded facility pallet to
14 the conveyance loading room located adjacent to the Waste Shaft. The conveyance loading
15 room serves as an air lock between the CH Bay and the Waste Hoist Shaft, preventing
16 excessive air flow between the two areas. The facility transfer vehicle will be driven onto the
17 waste hoist deck, where the loaded facility pallet will be transferred to the waste hoist, and the
18 facility transfer vehicle will be backed off. Containers of CH TRU mixed waste (55-gal (208 L)
19 drums, SWBs, 85-gal (321 L) drums, 100-gal (379-L) drums, and TDOPs) can be handled
20 individually, if needed, using the forklift and lifting attachments (i.e., drum handlers, parrot
21 beaks).

22 The waste hoist will lower the loaded facility pallet to the Underground HWDUs. Figure M1-13 is
23 a flow diagram of the CH TRU mixed waste handling process.

24 M1-1d(3) RH TRU Mixed Waste Handling

25 The RH TRU mixed waste will be received in the RH-TRU 72-B cask or CNS 10-160B cask
26 loaded on a trailer, as illustrated in process flow diagrams in Figures M1-26 and M1-27,
27 respectively. These are shown schematically in Figures M1-28 and M1-29. Upon arrival at the
28 gate, external radiological surveys, security checks, and shipping documentation reviews are
29 performed. Upon completion of these checks, the Uniform Hazardous Waste Manifest is signed,
30 and the generator's copy of the Uniform Hazardous Waste Manifest is returned to the generator.
31 Should the surface dose rate exceed acceptable levels, the shipping cask and transport trailer
32 remain outside the WHB in the Parking Area Unit, and the appropriate radiological boundaries
33 (i.e., ropes, placards) are erected around the shipping cask and transport trailer. A
34 determination will be made whether to return the cask to the originating site or to decontaminate
35 the cask.

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

RH-TRU 72-B Cask Unloading

The Cask Transfer Car then 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, and the outer lid is removed to provide access to the lid of the cask inner containment 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 RH-TRU 72-B cask to clear the Cask Transfer Car. The RH-TRU 72-B cask is 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 containment 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 the 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 levels, a determination is made whether to return the canister and cask to the originating site or to overpack the canister. 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. 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 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

1 Crane lifts the lower drum carriage unit from the CNS 10-160B cask through the port into the
2 Hot Cell and sets it near the upper drum carriage unit.

3 The Hot Cell Bridge Crane lifts the CNS 10-160B cask lid from the Hot Cell floor, lowers it
4 through the Hot Cell port and onto the top of the CNS 10-160B cask. The inner and outer Hot
5 Cell shield plugs are replaced. The Cask Unloading Room shield door is opened, and the CNS
6 10-160B cask is moved into the RH Bay using the Cask Transfer Car. The CNS 10-160B cask is
7 inspected and surveyed, the lid and impact limiter are reinstalled on the CNS 10-160B cask, and
8 it is prepared for transportation off-site.

9 The Hot Cell Bridge Crane connects to an empty facility canister, places it into a sleeve at the
10 inspection station, and removes the canister lid. The Overhead Powered Manipulator or Hot Cell
11 Crane lifts one drum from the drum carriage unit. The Hot Cell Manipulators collect swipe
12 samples from the drum and transfer the swipes via the Transfer Drawer to the Hot Cell Gallery
13 for counting. The drum identification number is recorded, and the recorded numbers are verified
14 against the **WWIS**. If there are any discrepancies, the drum(s) in question are stored within the
15 Hot Cell, and the generator/storage site is contacted for resolution. Discrepancies that are not
16 resolved within 15 days will be reported to the **NMED** as required by 20.4.1.500 NMAC
17 (incorporating 40 CFR §264.72).

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

26 To prepare to transfer a loaded facility canister from the Hot Cell to the Transfer Cell, a shielded
27 insert is placed onto a Cask Transfer Car in the RH Bay. The Cask Transfer Car is then moved
28 into the Cask Unloading Room and positioned under the Cask Unloading Room Bridge Crane.
29 The Bridge Crane attaches to the shielded insert. The Cask Unloading Room Bridge Crane lifts
30 and suspends the shielded insert clear of the Cask Transfer Car. The shielded insert is aligned
31 over the Cask Unloading Room port. The floor valve is opened, and the shielded insert is
32 lowered into the Transfer Cell Shuttle Car. The Cask Unloading Room Bridge Crane is
33 unhooked and retracted, and the Cask Unloading Room shield valve is closed. The shielded
34 insert is positioned under the Hot Cell port.

35 The Hot Cell Bridge Crane lifts a loaded, closed facility canister and positions it over the Hot
36 Cell port. The Hot Cell shield valve is opened, and the crane lowers the canister through the
37 port into the shielded insert positioned in the Transfer Cell Shuttle Car in the Transfer Cell. The
38 Hot Cell Bridge Crane is disconnected from the facility canister and raised until the crane hook
39 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 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 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 against the WWIS. If there are any discrepancies, the canister is returned to the RH-TRU 72-B cask, returned to the Parking Area Staging Area, 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 hoist 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 hoist 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.

M1-1e 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.

1 M1-1e(1) WHB Unit

2 The waste containers in storage will be visually inspected **visually or by closed-circuit television**
3 **camera** prior to each movement and, at a minimum, weekly, to ensure that the waste containers
4 are in good condition and that there are no signs that a release has occurred. Waste containers
5 will be visually inspected for physical damage (severe rusting, apparent structural defects, signs
6 of pressurization, etc.) and leakage. If a primary waste container is not in good condition, the
7 Permittees will overpack the container, repair/patch the container in accordance with 49 CFR
8 §173 and §178 (e.g., 49 CFR §173.28), or return the container to the generator. This visual
9 inspection **of CH TRU mixed waste containers** shall not include the center drums of 7-packs and
10 waste containers positioned such that visual observation is precluded due to the arrangement of
11 waste assemblies on the facility pallets. If waste handling operations should stop for any reason
12 with containers located in the TRUDOCK Storage Area in the Contact-Handled Package,
13 primary waste container inspections will not be accomplished until the containers of waste are
14 removed from the Contact-Handled Package. If the lid to the Contact-Handled Package inner
15 container vessel is removed, radiological checks (swipes of Contact-Handled Package inner
16 surfaces) will be used to determine if there is contamination within the Contact-Handled
17 Package. Such contamination could indicate a waste container leak or spill. Using radiological
18 surveys, a detected spill or leak of a radioactive contamination from a waste container will also
19 be assumed to be a hazardous waste spill or release.

20 Inspections of the Shielded Storage Area designated for holding waste while manifest
21 discrepancies are resolved, are performed prior to use and weekly thereafter, so long as waste
22 containers reside in the Shielded Storage Area. Waste containers residing within a Contact-
23 Handled Package are not inspected, as described in the first bullet in Section M1-1e(2).

24 Waste containers will be inspected prior to reentering the waste management process line for
25 downloading to the underground. Waste containers stored in this area will be inspected at least
26 once weekly.

27 **Loaded RH-TRU 72-B and CNS 10-160B casks will be inspected when present in the RH Bay.**
28 **Physical or closed-circuit television camera inspections of the RH Complex are conducted as**
29 **described in Table D-1a. Canisters loaded in an RH-TRU 72-B cask are inspected in the**
30 **Transfer Cell during transfer from the cask to the facility cask. Waste containers received in**
31 **CNS 10-160B casks are inspected in the Hot Cell during transfer from the cask to the CNS 10-**
32 **160B facility canister by camera and/or visual inspection (through shield windows).**

33 M1-1e(2) Parking Area Unit

34 Inspections will be conducted in the Parking Area Unit at a frequency not less than once weekly
35 **when waste is present.** These inspections are applicable to loaded, stored Contact-Handled **and**
36 **Remote-Handled** Packages. The perimeter fence located at the lateral limit of the Parking Area
37 Unit, coupled with personnel access restrictions into the WHB, will provide the needed security.
38 The perimeter fence and the southern border of the WHB shall mark the lateral limit of the
39 Parking Area Unit (Figure M1-2). Inspections of the Contact-Handled **or Remote-Handled**
40 Packages stored in the Parking Area Unit will focus on the inventory and integrity of the
41 shipping containers and the spacing between Contact-Handled **and Remote-Handled**
42 Packages. This spacing will be maintained at a minimum of four feet.

1 Contact-Handled and Remote-Handled Packages located in the Parking Area Unit will be
2 inspected weekly during use and prior to each reuse.

3 Inspection of waste containers is not possible when the containers are in their shipping
4 container (e.g., casks, TRUPACT-II or HalfPACTs). Inspections can be accomplished by
5 bringing the shipping containers into the WHB Unit and opening them and lifting the waste
6 containers out for inspection. The DOE, however, believes that removing containers strictly for
7 the purposes of inspection results in unnecessary worker exposures and subjects the waste to
8 additional handling. The DOE has proposed that waste containers need not be inspected at all
9 until they are ready to be removed from the shipping container for emplacement underground.
10 Because shipping containers are sealed and are of robust design, no harm can come to the
11 waste while in the shipping containers and the waste cannot leak or otherwise be released to
12 the environment. Contact-Handled or Remote-Handled Packages shall be opened every 60
13 days for the purposes of venting, so that the longest waste would be uninspected would be for
14 60 days from the date that the inner containment vessel of the Contact-Handled or Remote-
15 Handled Package was closed at the generator site. Venting the Contact-Handled or Remote-
16 Handled Packages involves removing the outer lid and installing a tool in the port of the inner
17 lid.

18 The following strategy will be used for inspecting waste containers that will be retained within
19 their shipping containers for an extended period of time:

20 C If the reason for retaining the TRU mixed waste containers in the shipping
21 container is due to an unresolved manifest discrepancy, the DOE will return the
22 shipment to the generator prior to the expiration of the 60 day NRC venting period
23 or within 30 days after receipt at the WIPP, whichever comes sooner. In this case,
24 no inspections of the internal containers will be performed. The stored Contact-
25 Handled or Remote-Handled Package will be inspected weekly as described
26 above.

27 C If the reason for retaining the TRU mixed waste containers in the Contact-Handled
28 or Remote-Handled Package is due to an equipment malfunction that prevents
29 unloading the waste in the WHB Unit, the DOE will return the shipment to the
30 generator prior to the expiration of the 60 day NRC venting period. In this case, the
31 DOE would have to ship the TRU mixed waste containers back with sufficient time
32 for the generator to vent the shipment within the 60 day limit. In this case, no
33 inspections of the internal containers will be performed. The stored Contact-
34 Handled or Remote-Handled Package will be inspected weekly as described
35 above.

36 C If the reason for retaining the TRU mixed waste containers is due to an equipment
37 malfunction that prevents the timely movement of the waste containers into the
38 underground, the waste containers will be kept in the Contact-Handled or Remote-
39 Handled Package until day 30 (after receipt at the WIPP) or the expiration of the
40 60 day limit, whichever comes sooner. At that time the Contact-Handled or
41 Remote-Handled Package will be moved into the WHB and the TRU mixed waste
42 containers removed and placed in one of the permitted storage areas in the WHB
43 Unit. If there is no additional space within the permitted storage areas of the WHB

1 Unit, the DOE will discuss an emergency permit with the NMED for the purposes
2 of storing the waste elsewhere in the WHB Unit. Waste containers will be
3 inspected when removed from the Contact-Handled Packaging and weekly while
4 in storage in the WHB Unit. Contact-Handled or Remote-Handled Packages will be
5 inspected weekly while they contain TRU mixed waste containers as discussed
6 above.

7 The DOE believes that this strategy minimizes both the amount of shipping that is necessary
8 and the amount of waste handling, while maintaining a reasonable inspection schedule. The
9 DOE will stop shipments of waste for any equipment outage that will extend beyond three days.

10 M1-1f Containment

11 The WHB Unit has concrete floors, which are sealed with a coating that is designed to resist all
12 but the strongest oxidizing agents. Such oxidizing agents do not meet the TSDf-WAC and will
13 not be accepted in TRU mixed waste at the WIPP facility. Therefore, TRU mixed wastes pose
14 no compatibility problems with respect to the WHB Unit floor. The floor coating consists of
15 Carboline® 1340 clear primer-sealer on top of prepared concrete, Carboline® 191 primer
16 epoxy, and Carboline® 195 surface epoxy. The manufacturer's chemical resistance guide
17 shows "Very Good" for acids and "Excellent" for alkalis, solvents, salt, and water. Uses are
18 indicated for nuclear power plants, industrial equipment and components, chemical processing
19 plants, and pulp and paper mills for protection of structural steel and concrete. During the
20 Disposal Phase, should the floors need to be re-coated, any floor coating used in the WHB Unit
21 TRU mixed waste handling areas will be compatible with the TRU mixed waste constituents and
22 will have chemical resistance at least equivalent to the Carboline® products. Figure M1-14 is a
23 plan view of the WHB, showing areas ~~shows~~ where CH TRU mixed waste handling activities
24 discussed in this section occur.

25 During normal operations, the floor of the storage areas within the WHB Unit shall be visually
26 inspected on a weekly basis to verify that it is in good condition and free of obvious cracks and
27 gaps. Floor areas of the WHB Unit in use during off-normal events will be inspected prior to use
28 and weekly thereafter. All TRU mixed waste containers located in the permitted storage areas
29 shall be elevated at least 6 in. (15 cm) from the surface of the floor. TRU mixed waste
30 containers that have been removed from Contact-Handled or Remote-Handled Packaging shall
31 be stored at a designated storage area inside the WHB Unit so as to preclude exposure to the
32 elements.

33 Secondary containment at the NE CH Bay Storage Area and the Shielded Storage Area inside
34 the WHB Unit shall be provided by the WHB Unit floor (See Figure M1-1). The WHB Unit is
35 engineered such that during normal operations, the floor capacity is sufficient to contain liquids
36 upon release. Secondary Containment at the Derived Waste Storage Area of the WHB Unit will
37 be provided by a polyethylene standard drum pallet. The Parking Area Unit and TRUDOCK
38 Storage Area of the WHB Unit require no engineered secondary containment since no waste is
39 to be stored there unless it is protected by the Contact-Handled or Remote-Handled Packaging.

40 Calculations to determine the floor surface area required to provide secondary containment in
41 the event of a release are based on the maximum quantity of liquid which could be present

1 within ten percent of one percent of the volume of all the containers or one percent of the
2 capacity of the largest single container, whichever is greater.

3 Secondary containment at storage locations inside the RH Bay and Cask Unloading Room is
4 provided by the cask. Secondary containment at storage locations inside the Transfer Cell is
5 provided by the RH-TRU 72-B cask or shielded insert. Secondary containment at storage
6 locations in the Facility Cask Loading Room is provided by the facility cask. In the Hot Cell,
7 waste containers are stored in either the drum carriage unit or in canister sleeves. The Lower
8 Hot Cell provides secondary containment as described in section M1-f(2). In addition, the RH
9 Bay, Hot Cell, and Transfer Cell contain 220-gallon (833-L) (Hot Cell), 11,400-gallon (43,152-L)
10 (RH Bay), and 220-gallon (833-L) (Transfer Cell) sumps, respectively, to collect any liquids.

11 M1-1f(1) Secondary Containment Requirements for the WHB Unit

12 The maximum volume of TRU mixed waste on facility pallets that will be stored in the CH Bay
13 Storage Area, and Shielded Storage Area of the WHB is 18 facility pallets @ 2 TDOPs per
14 pallet = 36 TDOPs of waste. 36 TDOPs @ 1,200 gal (4,540 L) per TDOP = 43,200 gal
15 (163,440L) waste container capacity. 43,200 gal (163,440 L) x ten percent of the total volume =
16 4,320 gal (16,344 L) of waste. Since 4,320 gal (16,344 L) is greater than 1,200 gal (4,540 L),
17 the configuration of possible TDOPs in the storage area is used for the calculation of secondary
18 containment requirements. 4,320 gal (16,344 L) of liquid x one percent liquids = 43.2 gal (163.4
19 L) of liquid for which secondary containment is needed.

20 ~~The maximum volume of TRU mixed waste that will be stored in the NE Storage Area of the~~
21 ~~WHB Unit is seven facility pallets @ 4 SWBs per pallet = 28 SWBs of waste. 28 SWBs @ 496~~
22 ~~gal (1,878 L) per SWB = 13,888 gal (52,570 L) waste container capacity. 13,888 gal (52,570 L)~~
23 ~~x ten percent of the total volume = 1,389 gal (5,258 L) of waste. Since 1,389 gal (5,263 L) is~~
24 ~~greater than 496 gal (1,878 L), the volume of the largest single container, the configuration of all~~
25 ~~SWBs in the storage area is used for the calculation of secondary containment requirements:~~
26 ~~1,389 gal (5,258 L) of liquid x one percent liquids = 13.9 gal (52.6 L) of liquid for which~~
27 ~~secondary containment is needed.~~

28 ~~The maximum volume of TRU mixed waste that will be stored in the Shielded Storage Area of~~
29 ~~the WHB Unit is one facility pallet @ 4 SWBs per pallet = 4 SWBs of waste. 4 SWBs @ 496 gal~~
30 ~~(1,878 L) per SWB = 1,984 gal (7,510 L) waste container capacity. 1,984 gal (7,510 L) x ten~~
31 ~~percent of the total volume = 198.4 gal (751 L) of waste. Since 198.4 gal (751 L) is less than~~
32 ~~496 gal (1,878 L), the volume of the largest single container, the volume of the largest container~~
33 ~~(an SWB) in the storage area is used for the calculation of secondary containment~~
34 ~~requirements. 496 gal (1,878 L) of liquid x one percent liquids = 4.96 gal (18.8 L) of liquid for~~
35 ~~which secondary containment is needed.~~

36 The maximum volume of TRU mixed waste that will be stored in the Derived Waste Storage
37 Area of the WHB Unit is one SWB. 1 SWBs @ 496 gal (1,878 L) per SWB = 496 gal (1,878 L)
38 waste container capacity. Since the maximum storage volume of 496 gal (1,878 L) is equal to
39 the volume of the largest single container, the volume of the a single SWB is used for the
40 calculation of secondary containment requirements. 496 gal (1,878 L) of liquid x one percent
41 liquids = 4.96 gal (18.8 L) of liquid for which secondary containment is needed.

1 The maximum volume of TRU mixed waste that will be stored in the Hot Cell is 10 RH TRU
2 drums @ 55 gal (210 L) per drum = 550 gal (2100 L) of waste in drums. Additionally, 6 RH TRU
3 facility canisters @ 235 gal (891L) per canister = 1,410 gal (5,346 L) of waste in canisters for a
4 combined total 1,960 gal (7,419L). And 1,960 gal (7,419 L) of waste x ten percent of total
5 volume = 196 gal (741.9 L) of waste. Secondary containment for liquids will need to have a
6 capacity 196 gal (741.9L). Since 196 gal (741.9 L) is less than the volume of the single
7 container of 235 gal (890 L) therefore, the larger volume is used for determining the secondary
8 containment requirements. 235 gal (890 L) of waste x one percent liquids = 2.35 gal (8.9 L) of
9 liquid needed for secondary containment.

10 The maximum volume of TRU mixed waste that will be stored in the Transfer Cell is one RH
11 TRU canister or one RH TRU facility canister @ 235 gal (890 L) per canister x ten percent of
12 total volume = 23.5 gal (8.90 L) of waste. Since 23.5 gal (8.90 L) is less than the volume of the
13 single container of 235 gal (890 L) therefore, the larger volume is used for determining the
14 secondary containment requirements. 235 gal (890 L) of waste x one percent liquids = 2.35 gal
15 (8.9 L) of liquid needed for secondary containment.

16 M1-1f(2) Secondary Containment Description

17 The following is a calculation of the surface area the quantities of liquid would cover. Using a
18 conversion factor of 0.1337 ft³/gal (0.001 m³/L) and assuming the spill is 0.0033 ft (0.001 m)
19 thick, the following calculation can be used:

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

21 ~~NE Storage Area~~ CH Bay Storage Area and Shielded Storage Area

22 ~~13.9~~ 43.2 gal x 0.1337 ft³/gal ÷ 0.0033 ft = ~~563~~ 1,750 ft² (~~52.3~~ 162.7 m²)

23 ~~Shielded Storage Area~~

24 ~~4.96~~ gal x 0.1337 ft³/gal ÷ 0.0033 ft = ~~201~~ ft² (18.67 m²)

25 Hot Cell

26 2.35 gal x 0.1337 ft³/gal ÷ 0.0033 ft = 95 ft² (8.8 m²)

27 Transfer Cell

28 2.35 gal x 0.1337 ft³/gal ÷ 0.0033 ft = 95 ft² (8.8 m²)

29 The WHB Unit has 33,175 ft² (3,082 m²) of floor space, the ~~NE~~ CH Bay Storage Area in the
30 northeast corner of the WHB Unit (Figure M1-7) has ~~2,924~~ 20,574 ft² (~~272~~ 1,911 m²) of floor
31 space, and the Shielded Storage Area has 292.5 ft² (27.2 m²) of floor space. The CH Bay
32 Storage Area and Shielded Storage Area requires 1,750 ft² (162.7 m²) for containment, Thus,
33 the floor area of the ~~NE~~ CH Bay Storage Area and the Shielded Storage Area of the WHB Unit
34 provide sufficient secondary containment to contain a release of ten percent of one percent of

1 the volume of all of the containers, or one percent of the capacity of the largest container,
2 whichever is greater.

3 The Hot Cell and Transfer Cell are the only portions of the RH Complex managing RH TRU
4 mixed waste outside of casks or canisters. The Hot Cell has 1,841 ft² (171 m²) of floor space
5 and the Transfer Cell has 1,003 ft² (93 m²) of floor space. The Hot Cell and Transfer Cell require
6 only 95 ft² for containment, therefore there is sufficient floor space to contain a release of ten
7 percent of one percent of containers in these storage areas.

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

10 Derived Waste Storage Area

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

15 Parking Area Unit

16 Containers of TRU mixed waste to be stored in the Parking Area Unit will be in Contact-Handled
17 or Remote-Handled Packages. There will be no additional requirements for engineered
18 secondary containment systems.

19 M1-1g Special Requirements for Ignitable, Reactive, and Incompatible Waste

20 Special requirements for ignitable, reactive, and incompatible waste are addressed in
21 20.4.1.500 NMAC (incorporating 40 CFR §§264.176 and 264.177). Permit Module II precludes
22 ignitable, reactive, or incompatible waste at the WIPP. No additional measures are required.

23 M1-1h Closure

24 Clean closure is planned in accordance with 20.4.1.500 NMAC (incorporating 40 CFR
25 §264.178) for all permitted container storage areas. The applicable areas and the plans for
26 clean closure are detailed in Permit Attachment I.

27 M1-1i Control of Run On

28 The WHB Unit is located indoors which prevents run-on from a precipitation event. In addition,
29 the CH TRU containers are stored on facility pallets, containment pallets, or standard drum
30 pallets, which elevate the CH TRU mixed waste containers at least 6 in. (15 cm) off the floor, or
31 in Contact-Handled or Remote-Handled Packages, so that any firewater released in the building
32 will not pool around containers. Within the RH Bay, Cask Unloading Room, Transfer Cell, and
33 Facility Cask Loading Room, waste containers are stored in casks or shielded inserts and
34 protected from any potential run on. Any firewater released in the building will not pool around
35 the waste containers as they are stored in casks, or shielded inserts. Within the Hot Cell, there
36 is no source of water during operations. However, control of run-on is provided by the Lower Hot

1 Cell, which lies below a sloped floor surrounded by a grating and canister sleeves in the Hot
2 Cell above.

3 In the Parking-Lot Area Unit, the containers of TRU mixed waste are always in Contact-Handled
4 or Remote-Handled Packages which protect them from precipitation and run on. Therefore, the
5 WIPP container storage units will comply with the requirements of 20.4.1.500 NMAC
6 (incorporating 40 CFR §264.175(b)(4)).

References

1

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

4 DOE, 1997b. Waste Isolation Pilot Plant Safety Analysis Report (DOE/WIPP-95-2065, Rev. 1),
5 U.S. Department of Energy, Carlsbad Area Office, Carlsbad, NM, April 1997.

TABLES

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**TABLE M1-1
 BASIC DESIGN REQUIREMENTS, PRINCIPAL
 CODES, AND STANDARDS**

	STRUCTURE/SUPPORTS			LIQUID AND PROCESS AIR HANDLING PROCESSING AND STORAGE EQUIPMENT							AIR HDLG DUCTING & FANS	HVAC FILTERS		MECHANICAL HANDLING EQUIPMENT			INSTRUMENTATION AND ELECTRICAL			QUALITY ASSURANCE PROGRAM	
	DBE DBT ACI-318 AISC	ANSI A58.1	SITE-SPECIFIC REQUIREMENTS	VESSEL ASME VIII NFPA ^e	PIPING & VALVES		PUMPS API-610 NFPA ^e	STORAGE TANKS API-650 OR API-620	HEAT EXCHGRS ASME VIII TEMA	ALL OTHER EQUIPMENT MFRs STD	ARI SMACNA AMCA	PRE-FILTERS ASHRAE 52.68	HEPA FILTERS MIL F 51068C ANSI N 509 ANSI N 510	CRANE AND RELATED EQUIPMENT CMAA	CMAA AISC AWS	ALL OTHER EQUIP-MEANT MFRs STD	A-NE	ANSI SODS OR NAT'L ELECT-TRIAL CODE	IA/ MFRs STD	ANSI/ASME NQA-1 AND SUPPLE-MENTS	COM. AND INDUSTRY PRACTICES
DESIGN CLASS I	X		a	X f			X	X	X		X c	X c,d	X c	X	X		X	X		X	
DESIGN CLASS II	a,b	X	a	X	X		X	X	X		X c	X c	X c	X	X			X	X	X	
DESIGN CLASS IIIA	a	X	a	a	X		a			X	X c	X c	a	a	X		X	X	X		
DESIGN CLASS III		X	g		a	X			X	X	X	X			X		X	X		X	

X = Minimum Requirements

^a Requirements to be determined on a case-by-case basis.

^b Required for structure and supports needed for confinement and control of radioactivity.

^c Except structures and supports that are designed to withstand a design-basis earthquake (DBE)/design-basis tornado (DBT) when specified in column 1 of this table.

^d Underwriter's Laboratory (UL) Class I Listed.

^e For fire-protection systems.

^f American Society for Mechanical Engineers (ASME) III for other Class I vessels.

^g Design of underground structures, mining equipment, and facilities are basically governed by the MSHA and experience in local mines.

ACI = American Concrete Institute
 AISC = American Institute of Steel Construction
 AMCA = Air Moving and Conditioning Association
 ANSI = American National Standards Institute
 API = American Petroleum Institute
 ARI = Air Conditioning and Refrigeration Institute
 ASHRAE = American Society of Heating, Refrigeration, and Air Conditioning Engineers, Inc.

AWS = American Welding Society
 CMAA = Crane Manufacturers Association
 DBE = Design-basis earthquake
 DBT = Design-basis tornado
 HEPA = High-efficiency particulate air
 HVAC = Heating, Ventilation, and Air-Conditioning
 A = Institute of Electronics and Electronic Engineers
 IA = Instrument Society of America
 MFR = Manufacturer
 MIL = Military (specification)
 MSHA = Mine Safety and Health Administration
 NFPA = National Fire Protection Association
 NQA = Nuclear Quality Assurance (Standard)

SMACNA = Sheet Metal and Air Conditioning Contractors National Association, Inc.
 STD = Standard
 TEMA = Tubular Exchanger Manufacturers Association
 UP = Uniform Plumbing Code

**TABLE M1-2
 WASTE HANDLING EQUIPMENT CAPACITIES**

CAPACITIES FOR EQUIPMENT	
CH Bay overhead bridge crane	12,000 lbs.
CH Bay forklifts	26,000 lbs.
Facility Pallet	25,000 lbs.
Adjustable center-of-gravity lift fixture	10,000 lbs.
Facility Transfer Vehicle	26,000 lbs.
MAXIMUM GROSS WEIGHTS OF CONTAINERS	
Seven-pack of 55-gallon drums	7,000 lbs.
Four-pack of 85-gallon drums	4,500 lbs.
Three-pack of 100-gallon drums	3,000 lbs.
Ten-drum overpack	6,700 lbs.
Standard waste box	4,000 lbs.
MAXIMUM NET EMPTY WEIGHTS OF EQUIPMENT	
TRUPACT-II	13,140 lbs.
HalfPACT	10,500 lbs.
Adjustable center of gravity lift fixture	2,500 lbs.
Facility pallet	4,120 lbs.

**TABLE M1-3
 RH TRU MIXED WASTE HANDLING EQUIPMENT CAPACITIES**

CAPACITIES FOR EQUIPMENT	
RH Bay Bridge Crane	140 tons main hoist 25 tons auxiliary hoist
RH-TRU 72-B Cask Transfer Car	20 tons
CNS 10-160B Cask Transfer Car	35 tons
Transfer Cell Shuttle Car	29 tons
Hot Cell Crane	15 tons
Overhead Powered Manipulator	2.5 tons
Facility Cask Rotation Fixture	No specific load rating
Cask Unloading Room Crane	25 tons
6.25 Ton Grapple Hoist	6.25 tons
Facility Cask Transfer Car	40 tons
MAXIMUM GROSS WEIGHTS OF RH TRU CONTAINERS	
RH TRU Mixed Waste Canister	8,000 lbs
55-Gallon Drum	1,000 lbs
RH TRU Facility Canister	10,000 lbs
MAXIMUM NET EMPTY WEIGHTS OF EQUIPMENT	
Shielded RH-TRU 72-B Cask	37,000 lbs
Shielded CNS 10-160B Cask	57,500 lbs
Facility Cask	67,700 lbs

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FIGURES

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Figure M1-1
Waste Handling Building - Container Storage Unit

Figure M1-1a
Waste Handling Building Plan (Ground Floor)

Figure M1-2
Parking Area - Container Storage Unit

Figure M1-3
Standard 55-Gallon Drum (Typical)

Figure M1-4
Standard Waste Box

Figure M1-5
Ten-Drum Overpack

Figure M1-6
85-Gallon Drum

Figure M1-7
Waste Handling Building - Facility Pallet Temporary Storage Area

Figure M1-8a
TRUPACT-II Shipping Container for CH Transuranic Mixed Waste (Schematic)

Figure M1-8b
Typical HalfPACT Shipping Container for CH Transuranic Mixed Waste (Schematic)

Figure M1-9
Configuration of Contact-Handled Transuranic Mixed Waste Unloading Docks in the Waste
Handling Building

Figure M1-10
Facility Pallet for Seven-Pack of Drums

Figure M1-10a
Typical Containment Pallet

Figure M1-11
Facility Transfer Vehicle (Example) with Seven-Packs and Facility Pallet

Figure M1-12
TRUPACT-II Containers on Trailer

Figure M1-13
WIPP Facility Surface and Underground CH Transuranic Mixed Waste Process Flow Diagram

Figure M1-14
Waste Handling Building Plan (Ground Floor)

Figure M1-14a
RH Bay Ground Floor

Figure M1-15
100-Gallon Drum

Figure M1-16
RH-TRU Facility Canister Assembly

Figure M1-17a
RH Bay, Cask Unloading Room, Hot Cell, Facility Cask Loading Room

Figure M1-17b
RH Hot Cell Storage Area

Figure M1-17c
RH Canister Transfer Cell Storage Area

Figure M1-17d
RH Facility Cask Loading Room Storage Area

Figure M1-18
RH-TRU 72-B Shipping Cask on Trailer

Figure M1-19
CNS 10-160B Shipping Cask on Trailer

Figure M1-20
RH-TRU 72-B Shipping Cask for RH Transuranic Waste (Schematic)

Figure M1-21
CNS 10-160B Shipping Cask for RH Transuranic Waste (Schematic)

Figure M1-22
Example of RH Cask Transfer Car (Side View)

Figure M1-23
RH Transuranic Waste Facility Cask

Figure M1-24
RH Facility Cask Transfer Car (Side View)

Figure M1-25
CNS 10-160B Drum Carriage

Figure M1-26
Surface and Underground RH Transuranic Mixed Waste Process Flow Diagram for
RH-TRU 72-B Shipping Cask

Figure M1-27
Surface and Underground RH Transuranic Mixed Waste Process Flow Diagram for
CNS 10-160B Shipping Cask

Figure M1-28
Schematic of the RH Transuranic Mixed Waste Process for RH-TRU 72-B Shipping Cask

Figure M1-29
Schematic of the RH Transuranic Mixed Waste Process for CNS 10-160B Shipping Cask