

**ATTACHMENT E**  
**PREPAREDNESS AND PREVENTION**

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## ATTACHMENT E

### PREPAREDNESS AND PREVENTION

#### 1 E-1 Preparedness and Prevention Requirements

2 Preparedness and Prevention Requirements are as described in the following sections.

#### 3 E-1a Equipment Requirements

4 The WIPP facility is well equipped with internal and external communications systems,  
5 emergency equipment, and water for fire control. As shown in the following sections, the  
6 Permittees fully commit to meeting the requirements of 20.4.1.500 NMAC (incorporating 40 CFR  
7 §264.32 and §264.34).

#### 8 E-1a(1) Internal Communications

9 20.4.1.500 NMAC (incorporating 40 CFR §264.32(a)), requires a facility to have an internal  
10 communications or alarm system capable of providing immediate emergency instructions (voice  
11 or signal) to facility personnel. In addition, 20.4.1.500 NMAC (incorporating 40 CFR §264.34(a)),  
12 requires that employees have immediate access to an internal alarm or emergency  
13 communication device when handling transuranic (**TRU**) mixed waste. The following  
14 discussions show that the WIPP facility is well equipped for internal communications and that  
15 the Permittees fully commit to complying with the regulations.

16 The intraplant communication systems, designed to provide immediate emergency instructions  
17 to facility personnel, include two-way communication by the public address (**PA**) system and its  
18 intercom phones and paging channels, an intraplant telephone system, mine phones, pagers  
19 and plectrons, portable two-way radios, and local and facility wide alarm systems. The  
20 procedures for notifying facility personnel in an emergency are contained in the Contingency  
21 Plan, Permit Attachment F of this Permit.

22 The intercom system (with an integral PA system) consists of handset stations and loudspeaker  
23 assemblies, with multiple amplifiers. The system has multiple channels in the main buildings.  
24 Initial communication between parties within the plant can be established by using the paging  
25 channel. Each designated location has a single set of electrically isolated speakers and a  
26 handset. In order to cover most areas in the plant, loudspeakers are properly oriented, and  
27 volume levels are adjusted. If one station fails, the remaining stations are isolated from the out-  
28 of-service unit to prevent a failure in the remaining system.

29 Private branch automatic exchange two-way communication is provided between any two  
30 telephones located above or below ground. Direct dialing to outside telephones and direct  
31 dialing to WIPP facility telephones are provided by this system. Failure of a single telephone  
32 station does not affect the balance of the telephone system. If the telephone system should fail,  
33 the PA system, the plectrons, and the portable two-way radios provide backup surface  
34 communications.

1 The Site Notification System (**SNS**) consists of pagers in the possession of office wardens and  
2 plectrons located in various buildings. The SNS pagers and plectrons are tone-activated radio  
3 receivers that are activated by the two-way radio system. To generate a tone on the pagers and  
4 plectrons or to send a verbal message, the radio operator enters a security code into the two-  
5 way radio system and begins broadcasting. The SNS pagers are portable and battery-operated.  
6 The plectrons are portable and can be plugged into a standard electrical circuit or powered from  
7 internal batteries that are continuously recharged when connected to the electrical circuit.

8 A plant radio station in the Guard and Security Building, one located in the Emergency  
9 Operations Center in the Safety and Emergency Services Building, and one in the Central  
10 Monitoring Room (**CMR**), allow two-way radio communication with on-site personnel and with  
11 mobile/portable WIPP facility radios operating on and off the WIPP site. The two-way radio also  
12 allows one-way emergency notification on the portable SNS pagers and plectrons. The two-way  
13 radio system located in the CMR is supplied with power from the uninterruptible power supply if  
14 the off-site power supply fails.

15 There are various alarm systems used at the WIPP facility. The PA system has two alarm tones  
16 in use, a yelp and a gong. Its signals are produced in the master PA console by a tone  
17 generator and are transmitted sitewide over the paging channel of the system, overriding its  
18 normal use. The signals are intermittent and of high intensity. The evacuation tone is a yelp  
19 tone and is used for, and limited to, situations requiring immediate, rapid, and complete (or  
20 selective area) evacuation. The evacuation tone is initiated manually on the surface. In the  
21 underground, the evacuation tone may be initiated manually or automatically by underground  
22 fire detection and alarm systems. This tone is also a yelp tone. It is accompanied with strobe  
23 lights for high noise areas. These alarm signals take priority over other signals on the paging  
24 channel but do not affect the intercom channels. Evacuation alarms using the PA system, local  
25 and plantwide, also can be initiated manually from the CMR in the Support Building. The audible  
26 alarm signals are supplemented by warning lights in high ambient-noise areas underground,  
27 such as active mining areas. These alarms are supplied with power from the uninterruptible  
28 power supply if the off-site power supply fails. The PA system may also produce a gong tone  
29 followed by a message. Local fire alarms are bell tones.

30 Whenever TRU mixed wastes are handled, two persons, at a minimum, are involved in the  
31 operation. The WHB contains readily accessible telephones and PA stations throughout. The  
32 mine phones are the main means of communication underground, although the PA system is  
33 also available.

34 Underground communication and alarm systems will be arranged to meet the requirements of  
35 30 CFR Part 57. Telephones or other two-way communication equipment with instructions for  
36 their use will be provided for communications from underground to the surface. These  
37 communications are typically moved to ensure communications are maintained close to the  
38 work areas. Alarm systems capable of promptly warning every person underground, will be  
39 provided and maintained in operating condition. If persons are assigned to work areas beyond  
40 the warning capabilities of the system, provisions will be made to alert them in a proper manner  
41 to provide for their safe evacuation. Typically, these provisions include a flashing light capable  
42 of being seen easily. As part of the preoperational inspection, prior to initiating waste handling  
43 operations underground, waste handling personnel verify that underground communications are  
44 ready and are working. If they are not working, repairs are initiated.

1 Table F-6 in Permit Attachment F describes the capabilities and locations of the various internal  
2 communication systems.

3 E-1a(2) External Communications

4 20.4.1.500 NMAC (incorporating 40 CFR §264.32(b)), requires that a communications device be  
5 available for contacting outside agencies for emergency assistance. In addition, 20.4.1.500  
6 NMAC (incorporating 40 CFR §264.34(b)), requires that if just one employee is on the premises,  
7 the employee must have immediate access to a device capable of summoning outside help.  
8 TRU mixed waste handling operations are not conducted at the WIPP facility when only one  
9 person is present on the premises. TRU mixed waste handling operations are conducted by two  
10 or more persons. The security officers and staff from Facility Operations are also present at the  
11 WIPP facility during TRU mixed waste handling operations. When no TRU mixed waste  
12 handling operations are being conducted at the WIPP facility, at a minimum, the security officers  
13 and staff from Facility Operations are present. As discussed below, the WIPP facility has the  
14 required external communication devices and will operate in a manner that fully complies with  
15 these regulations.

16 The external communication systems, designed to provide two-way communication with outside  
17 agencies or for summoning emergency assistance from off site, include the commercial  
18 telephone system and two-way radios.

19 Direct dialing through any telephone located above or below ground allows contact with outside  
20 agencies. Failure of a single telephone station does not affect the balance of the telephone  
21 system. Sixty percent of the direct-dial incoming and outgoing lines are routed via a microwave  
22 system located on the edge of the parking lot. The remaining 40 percent of the direct-dial lines  
23 are routed to Carlsbad by means of a buried cable. In the unlikely event that both routing modes  
24 are inoperable, direct dial telephone capability still exists via cellular telephone or Satellite  
25 Communications (**SATCOM**) linkage in the Emergency Operations Center.

26 Plant radio stations in the Guard and Security Building and in the Emergency Operations Center  
27 in the Safety and Emergency Services Building allow two-way radio communication with the  
28 CMR, the Eddy County and Lea County Sheriff's Departments, the New Mexico State Police,  
29 and the Otis Fire Response Teams. Communication is available with the Lea County Sheriff's  
30 Department, the Hobbs Fire Department, the Carlsbad Medical Center, and the Columbia  
31 Regional Hospital via the Eddy County dispatcher. Another base station is in the CMR, however  
32 it is not normally used to communicate with offsite agencies. Radios are not inspected, instead,  
33 they are operated daily and repaired if they fail.

34 Table F-6 in Permit Attachment F describes the capabilities and locations of the various external  
35 communication systems.

36 E-1a(3) Emergency Equipment

37 Contingency Plan ( Permit Attachment F) describes the capabilities and locations of the fire-  
38 suppression equipment and systems. Table F-7 lists the types of fire-suppression systems by  
39 structure. Figure F-5 displays the underground locations of emergency equipment. Figure F-6  
40 shows the fire-water distribution system on the surface. Figure F-7 shows the underground fuel

1 area fire protection system. The information contained in these tables and figures in Permit  
2 Attachment F demonstrates that the WIPP facility has the portable fire extinguishers, fire-control  
3 equipment (including special extinguishing equipment that use foam, inert gas, or dry  
4 chemicals), spill-control equipment, and decontamination equipment needed for compliance  
5 with the requirements of 20.4.1.500 NMAC (incorporating 40 CFR §264.32(c)).

#### 6 E-1a(4) Water for Fire Control

7 20.4.1.500 NMAC (incorporating 40 CFR §264.32(d)), requires that the WIPP facility be  
8 equipped with water at an adequate volume and pressure to supply water-hose streams, foam-  
9 producing equipment, automatic sprinklers, or water-spray systems. The following discussion on  
10 fire control systems at the WIPP facility demonstrates the Permittees commitment to comply  
11 with this requirement.

12 The primary function of the WIPP facility water system is to supply water for domestic use and  
13 fire protection. Water is furnished by the Double Eagle Water Company, owned by the City of  
14 Carlsbad. Wells located 30 miles (mi) (48.3 kilometers [km]) north of the WIPP facility are the  
15 source of the water. Water is supplied by gravity flow through a 24 inch (in.) (61 centimeter [cm])  
16 diameter pipeline to a junction point about 13 mi (20.9 km) north of the site at U.S. Highway  
17 62/180. This line is sized to provide 6,000 gallons (gal) (22,712 liters [L]) per minute for use by  
18 others, in addition to the peak flow rate required by the WIPP facility. Controls at the junction  
19 point give the WIPP facility priority over flows to all other users. A 10 in. (25 cm) diameter  
20 pipeline supplies water by gravity flow from the tie-in point to the WIPP facility.

21 At the WIPP facility, the water enters a pair of 180,000-gal (681,372-L) aboveground storage  
22 tanks located adjacent to the Pumphouse. These tanks are 32 ft (9.75 m) in diameter and are  
23 constructed of welded steel. The water level in each tank is monitored in the CMR. One tank  
24 stores water for use by the facility's fire-water system. The other tank stores water for use by the  
25 facility's domestic water system, and to reserve approximately 100,000 gal (378,540 L) of water  
26 for use by the fire-water system. Separate sets of pumps for the domestic water and fire-water  
27 systems are provided in the Pumphouse. During a fire, the fire-water pump is automatically  
28 started, and available domestic water is used first. Upon depletion of the domestic-water  
29 inventory, the domestic-water pumps are automatically shut off, and the dedicated fire-water  
30 reserve is available for fire-suppression use only. The primary fire-water pump is a 100-percent-  
31 capacity electric pump. A 100-percent-capacity diesel fire-water pump provides backup in case  
32 of a power failure or when maintenance is required on the electric pump. Each fire-water pump  
33 is rated at 1,500 gal (5,678 L) per minute at 125 pounds (lb) (56.7 kilograms [kg]) per square in.

34 The following buildings are connected to and protected by the wet-pipe sprinkler system: the  
35 Pumphouse, the Guard and Security Building, the Support Building, the WHB, the Exhaust Filter  
36 Building, the TRUPACT Maintenance Facility, the Engineering Building, the Safety and  
37 Emergency Services Building, the Training Building, and several other warehouse and  
38 maintenance buildings. The Pumphouse, the Support Building, the WHB, and several other  
39 warehouse and maintenance buildings also have fire hose connections. There is no firefighting  
40 water-supply system underground. Instead, the underground is equipped with fire extinguishers  
41 of various types and in various locations (including vehicles) and a fire truck with a 125 lb (56.7  
42 kg) chemical extinguisher. The underground fuel station is equipped with an automatic, 1,000-lb



1 (453.5 kg) chemical extinguishing systems. Only dry chemical materials or water are used to  
2 fight fires involving TRU mixed waste.

3 E-1b Aisle Space Requirement

4 20.4.1.500 NMAC (incorporating 40 CFR §264.35), requires that a facility maintain sufficient  
5 aisle space to allow the unobstructed movement of personnel, fire protection equipment, spill  
6 control equipment, and decontamination equipment to areas of the facility during an emergency  
7 (other than a permanent disposal stack). Aisle space for each regulated unit is specified below.

8 Waste Handling Building Container Storage Unit (WHB Unit) and Parking Area Container  
9 Storage Unit (Parking Area Unit)

10 During TRU mixed waste handling operations, sufficient room is maintained for unobstructed  
11 movement of personnel, fire-protection equipment, spill control equipment, or decontamination  
12 equipment to areas in the WHB Unit.

13 Waste containers will remain inside the Contact-Handled (**CH**) or Remote-Handled (**RH**)  
14 Packages in the Parking Area Unit until TRU mixed waste handlers are prepared to handle  
15 them. As shown in Figure M1-1 in Permit Attachment M1, there is ready access to all areas  
16 within the WHB Unit where hazardous wastes are handled. Waste containers are unloaded from  
17 the Contact-Handled Package in to the WHB Unit (see Figure M1-12 in Permit Attachment M1).  
18 The WHB Unit can handle the unloading of four ~~Contact-Handled CH~~ Packages at one time.  
19 **Single RH TRU mixed waste canisters are unloaded from the RH-TRU 72-B casks in the**  
20 **Transfer Cell of the WHB Unit where they are transferred to facility casks (see Figures M1-23**  
21 **and M1-24 in Permit Attachment M1). RH TRU mixed waste drums in CNS 10-160B casks,**  
22 **which may contain up to 10 drums configured in two 5-drum baskets (see Figure M1-25 in**  
23 **Permit Attachment M1), are unloaded from the cask staged in the Cask Unloading Room into**  
24 **the Hot Cell.**

25 At all times, written procedures ensure that loaded ~~Contact-Handled CH or RH~~ Packages,  
26 facility pallets, **containment pallets**, and waste containers **in the WHB Unit and Parking Area**  
27 **Unit** are managed ~~in the WHB Unit~~ in a manner to prevent obstructing the movement of  
28 personnel, fire-protection equipment, spill-control equipment, and decontamination equipment.

29 **For CH TRU mixed waste, an** ~~An~~ aisle space of **at least 44 in. (1.1 m)** between loaded facility or  
30 **containment pallets** will be maintained in all **CH** waste storage areas of the WHB Unit, and a  
31 minimum of 4 ft **(1.2 m)** of aisle space will be maintained between ~~Contact-Handled CH~~  
32 Packages in the outdoor Parking Area Unit. **For RH TRU mixed waste, a minimum of 44 in. (1.1**  
33 **m) between loaded casks in the RH Bay will be maintained. A maximum of two loaded casks**  
34 **may be stored in the RH Bay at one time. Implementation of written procedures ensures that**  
35 **loaded casks, transfer cars, and canisters are managed in the RH Bay in a manner to allow the**  
36 **movement of personnel, fire-protection equipment, spill-control equipment, and decontamination**  
37 **equipment. Within the Hot Cell, waste containers are not stored in multiple rows; similarly, within**  
38 **the Transfer Cell, the canister is located in a rack on the Transfer Cell Shuttle Car. Thus, aisle**  
39 **space does not apply to these areas. Aisle space requirements also do not apply to empty**  
40 **casks in racks. When CH or RH Packages contain waste in the Parking Area Container Storage**

1 **Unit, the Permittees shall maintain a minimum spacing of 4 ft (1.2 m) between trailers loaded**  
2 **with CH or RH Packages or between CH or RH Packages not on trailers.**

### 3 Underground Hazardous Waste Disposal Units (HWDUs)

4 The mined areas underground are all maintained to provide free access to the repository and to  
5 the face of the waste disposal areas in the active panels. As specified in 30 CFR 57, adequate  
6 access is provided for movement of personnel, fire equipment, or spill-controlled equipment to  
7 any area of operations during an emergency or response action, as provided in the facility  
8 Contingency Plan (Permit Attachment F). These items are subject to inspection by Federal mine  
9 inspectors at least quarterly. Waste emplacement occurs sequentially on a room-by-room basis  
10 until each room in a HWDU panel has been filled with waste. Derived waste will be emplaced in  
11 the disposal rooms along with the TRU mixed waste. Once panel closure has been effected, the  
12 waste is considered disposed of, and access is no longer provided beyond the panel closure  
13 barrier to closed HWDUs.

14 Proper airflow distribution to all areas of the underground is achieved through a multi-step  
15 process. Tests and balances of the underground ventilation system are conducted on a periodic  
16 basis with the frequency depending on changes that are occurring in the configuration of the  
17 underground. These tests and balances physically measure airflow, pressure, and system  
18 resistance. Computer modeling is performed to determine the configuration necessary to  
19 achieve any desired underground airflow distribution. Administrative procedures are used as the  
20 means of assuring control of the configuration of the ventilation control devices such as  
21 bulkheads, doors, fans, and air regulators needed to achieve the desired configuration.  
22 Underground Facility Operations makes daily checks of air quality in all parts of the repository  
23 where personnel will be working. Air quantity checks are made on an as-needed basis as  
24 changing conditions warrant such checks.

### 25 E-2 Preventive Procedures, Structures, and Equipment

26 The WIPP facility has been designed and will be operated to fully meet each of the  
27 requirements of 20.4.1.900 NMAC (incorporating 40 CFR §270.14(b)(8)), to prevent hazards  
28 associated with unloading operations, prevent runoff from hazardous waste handling areas,  
29 prevent contamination of water supplies, mitigate the effects of equipment and power failures,  
30 prevent undue exposure of personnel to hazardous waste, and prevent releases to the  
31 atmosphere. The individual regulatory requirements are discussed below.

#### 32 E-2a Unloading Operations

33 The WIPP facility's equipment, structures, and procedures are specially designed for the safe  
34 handling of TRU mixed waste. Permit Attachments M1 and M2 detail how ~~contact-handled (CH)~~  
35 **CH and RH** TRU mixed waste is handled, including unloading and transport operations. The  
36 following is a summary of the activities, structures, and equipment that were developed to  
37 prevent hazards in unloading of TRU mixed waste, as required by 20.4.1.900 NMAC  
38 (incorporating 40 CFR §270.14(b)(8)(i)).

1 CH TRU Mixed Waste

2 The TRUPACT-II shipping container has a gross loaded weight of 19,265 lbs (8,737 kgs). The  
3 HalfPACT shipping container has a gross loaded weight of 18,100 lbs (8,210 kgs). The gross  
4 loaded weight is defined as the weight of the payload and the weight of the Contact Handled  
5 Package itself. The Contact Handled Packages have forklift pockets at the bottom of the  
6 container specifically for lifting the container with a forklift (see Figure M1-8 in Permit  
7 Attachment M1). The 13 ton (11.8 metric tons) electric forklift unloads the TRUPACT-II from the  
8 trailer and transfers it to an unloading dock in the WHB Unit (see Figure M1-9 in Permit  
9 Attachment M1). The unloading dock is designed to accommodate the Contact Handled  
10 Package and functions as a work platform, providing TRU mixed waste handling and health  
11 physics personnel with easy access to the container during unloading operations.

12 An overhead 6-ton (5.4-metric ton) crane and adjustable center-of-gravity lift fixture transfer  
13 TRU mixed waste containers from the Contact Handled Package to the facility a pallet on the  
14 WHB Unit floor. The facility pallet is a fabricated steel structure designed to securely hold waste  
15 containers. Each facility pallet has a rated load capacity of 25,000 lb (11,340 kg). The upper  
16 surface of the facility pallet has two recesses sized to accept the waste containers, ensuring  
17 that the containers are held in place. Up to four SWBs, four 7-packs of 55-gallon drums, four 4-  
18 packs consisting of 85-gallon drums, four 3-packs of 100-gallon drums, or two TDOPs may be  
19 placed on a facility pallet. Each stack of waste containers is strapped down to holding bars in  
20 the top reinforcement plate of the facility pallet to avoid spillage during movement. Two  
21 rectangular tube openings in the bed allow the facility pallet to be securely lifted by forklift. In  
22 order to assure a facility pallet is not overloaded, operationally it will hold the contents of two  
23 Contact Handled Packages, as specified in Permit Attachment M1.

24 The WIPP facility has the capability to handle each of the CH TRU containers singly using  
25 forklifts and single container attachments. In such cases, the container would be loaded on the  
26 waste shaft conveyance and moved underground as a single unit.

27 All unloading equipment is inspected in accordance with the schedule shown in Tables D-1 and  
28 D-1a. Cranes that are used in the unloading and handling of TRU mixed waste have been  
29 designed and constructed so that they will retain their loads in the event of a loss of power.  
30 Cranes in the WHB Unit are also designed to withstand a design basis earthquake without  
31 moving off of their rails and without dropping their load. Lowering loads is a priority activity after  
32 a disruptive event.

33 The following is a summary of the activities, structures, and equipment that were developed to  
34 prevent hazards in transporting TRU mixed waste.

35 Palletized CH TRU mixed waste is either transferred by a 13-ton (11.8-metric ton) forklift or the  
36 facility transfer vehicle, which is designed with an adjustable bed height that is used to transfer  
37 the facility pallets to the special pallet-support stands in the waste hoist cage.

38 The waste hoist system in the waste shaft and all waste shaft furnishings are designed to resist  
39 the dynamic forces of the hoisting system, which are greater than the seismic forces on the  
40 underground facilities. In addition the waste hoist headframe is designed to withstand the  
41 design-basis earthquake (DBE). Maximum operating speed of the hoist is 500 ft (152.4 m) per

1 minute. During loading and unloading operations, the waste hoist is steadied by fixed guides.  
2 The waste hoist is equipped with a control system that will detect malfunctions or abnormal  
3 operations of the hoist system, such as overtravel, overspeed, power loss, or circuitry failure.  
4 The control response is to annunciate the condition and shut the hoist down. Operator response  
5 is required to recover from the automatic shutdown. Waste hoist operation is continuously  
6 monitored by the CMS. A battery powered FM transmitter/receiver allow communication  
7 between the hoist conveyance and the hoist house.

8 The waste hoist shaft system has two pairs of brake calipers acting on independent brake  
9 paths. The hoist motor is normally used for braking action of the hoist. The brakes are used to  
10 hold the hoist in position during normal operations and to stop the hoist under emergency  
11 conditions. Each pair of brake calipers is capable of holding the hoist in position during normal  
12 operating conditions and stopping the hoist under emergency conditions. In the event of power  
13 failure, the brakes will set automatically.

14 The hoist is protected by a fixed automatic fire suppression system. Portable fire extinguishers  
15 are also provided on the hoist floor and in equipment areas.

16 Once underground, the facility pallet is removed from the hoist cage by the underground waste  
17 transporter (see Figure M2-7 in Permit Attachment M2), a commercially available articulated  
18 diesel vehicle. The trailer is designed specifically for transporting palletized TRU mixed waste  
19 and is sized to accommodate the facility pallet. All motorized waste handling equipment is  
20 equipped with on-board fire-suppression systems.

21 The underground waste transporter is equipped with a fire suppression system, rupture-  
22 resistant diesel fuel tanks, and reinforced fuel lines to minimize the potential for a fire involving  
23 the fuel system. Waste containers will be placed into underground HWDUs using a forklift and  
24 attachments.

25 All CH TRU mixed waste transport equipment is inspected at a frequency indicated in Table  
26 D-1.

### 27 RH TRU Mixed Waste

28 Cranes and forklifts that are used to unload and handle RH TRU mixed waste have been  
29 designed and constructed to retain their loads in the event of a loss of power. RH TRU mixed  
30 waste received in an RH-TRU 72-B cask is unloaded from the trailer in the RH Bay, using the  
31 RH Bay Overhead Bridge Crane, and is placed on the cask transfer car. The cask transfer car  
32 moves the RH-TRU 72-B cask into the Cask Unloading Room, where a bridge crane lifts the  
33 cask from the cask transfer car and lowers it into the Transfer Cell and onto the Transfer Cell  
34 shuttle car. The Transfer Cell shuttle car moves the RH-TRU 72-B cask into position for  
35 transferring the canister to the facility cask.

36 RH TRU mixed waste received in a CNS 10-160B cask is unloaded from the trailer in the RH  
37 Bay using the RH Bay overhead bridge crane and is placed on the cask transfer car. The cask  
38 transfer car moves the CNS 10-160B cask into the Facility Cask Unloading Room. The Hot Cell  
39 crane lifts the two drum carriage units from the CNS 10-160B cask in the Facility Cask  
40 Unloading Room into the Hot Cell, where the drums are transferred into RH TRU mixed waste

1 facility canisters using the Overhead Powered Manipulator or Hot Cell Crane. The facility  
2 canisters are then lowered into a shielded insert on the Transfer Cell Shuttle Car in the Transfer  
3 Cell. The Transfer Cell Shuttle Car moves the shielded insert into position for transferring the  
4 facility canister to the facility cask.

5 A remotely-operated fixed hoist grapple lifts the canister from the RH-TRU 72-B cask or from  
6 the shielded insert on the Transfer Cell shuttle car and transfers the canister into the facility  
7 cask located on the facility cask transfer car in the Facility Cask Loading Room. The facility cask  
8 is rotated to a horizontal position on the Facility Cask Transfer Car and the Facility Cask  
9 Transfer Car moves onto the waste hoist and is lowered underground.

10 Once underground, the RH TRU mixed waste handling forklift lifts the facility cask from the  
11 Facility Cask Transfer Car and carries the facility cask to the Horizontal Emplacement and  
12 Retrieval Equipment (**HERE**). After placing the facility cask on the HERE, the canister is  
13 emplaced in the wall of the disposal room.

14 Pertinent RH TRU mixed waste transport equipment is inspected at a frequency indicated in  
15 Table D-1a.

16 Figures of RH TRU mixed waste emplacement equipment are included in Attachments M1 and  
17 M2.

#### 18 E-2b Runoff

19 The following description of procedures, structures, or equipment used at the WIPP facility to  
20 prevent runoff from TRU mixed waste handling areas to other areas of the facility or  
21 environment or to prevent flooding is required by 20.4.1.900 NMAC (incorporating 40 CFR  
22 §270.14(b)(8)(ii)).

23 The WHB Unit is a physical barrier that will prevent TRU mixed waste spills from reaching the  
24 environment before a cleanup could be initiated and completed. A detailed description of the  
25 WHB containment capability for the CH Bay and RH Complex is contained in Permit Attachment  
26 M1. Secondary containment is also provided by the shipping containers while waste are within  
27 them. These are sealed vessels with no open vents and therefore cannot leak.

28 TRU mixed waste received for emplacement at the WIPP facility must be certified under this  
29 Permit's Treatment, Storage, and Disposal Facility Waste Acceptance Criteria (**TSDF-WAC**) as  
30 nonliquid waste; in some cases, the Permit allows up to one percent residual liquids. The TSDF-  
31 WAC are procedural controls that must be met at the generator or storage site and the data  
32 must be verified by the WIPP facility staff prior to acceptance for the Disposal Phase and  
33 shipment to the WIPP facility. Permit Module II and Permit Attachment B contain information  
34 regarding TSDF-WAC requirements for shipping and discusses receipt and verification of the  
35 TRU mixed waste at the WIPP facility. Derived waste must also meet all TSDF-WAC  
36 requirements prior to disposal. Calculations in Permit Attachment M1 demonstrate that one  
37 percent residual liquid in TRU mixed waste containers is easily contained by the WHB Unit floor.

38 The WIPP facility does not lie within a 100-year floodplain. There are no major surface-water  
39 bodies within 5 mi (8 km) of the site, and the nearest river, the Pecos River, is approximately 12

1 mi (19 km) away. The general ground elevation in the vicinity of the surface facilities  
2 (approximately 3,400 ft [1,036 m] above mean sea level) is about 500 ft (152 m) above the  
3 riverbed and 400 ft (122 m) above the 100-year floodplain. Protection from flooding or ponding  
4 caused by probable maximum precipitation (**PMP**) events is provided by the diversion of water  
5 away from the WIPP facility by a system of peripheral interceptor berms and dikes. Additionally,  
6 grade elevations of roads and surface facilities are designed so that storm water will not collect  
7 on the site under the most severe conditions.

8 Repository shafts are elevated at least 6 in. (15.2 cm) to prevent surface water from entering the  
9 shafts. The floor levels of all surface facilities are above the levels calculated for local flooding  
10 due to PMP events. Therefore, flooding of WIPP facility roads and surface structures is not  
11 expected from the flooding of surface waters as a result of PMP events or because of site-runoff  
12 design.

13 Flood-control structures are inspected as part of a general facility inspection at least annually.  
14 During this inspection, the structures are checked to assure there has been no wind or rain  
15 erosion or animal-caused damage that would cause the structures to fail. Further, the areas  
16 around the structures are inspected to ensure they are free of vegetation, debris, or other items  
17 that would impede the diversion of water. Experience with these structures has shown that  
18 annual structural inspections are adequate for the climate and soil conditions at the WIPP  
19 facility; however, inspections are also conducted after severe natural events, such as severe  
20 storms and a design basis earthquake.

21 Whenever TRU mixed waste is outside the WHB Unit, it will be contained in ~~Contact Handled~~  
22 **CH or RH** Packages. TRU mixed waste containers are only unloaded from the shipping  
23 containers inside the WHB Unit and shipping containers are never opened outside this facility;  
24 therefore, TRU mixed waste is not expected to reach the outside environment or other parts of  
25 the facility from the TRU mixed waste handling facilities in nonflood circumstances. Flooding of  
26 the TRU mixed waste handling facilities is prevented by drainage ditches and berms such that  
27 there is no mechanism that might transport TRU mixed waste to the outside environment and  
28 between parts of the WIPP facility. Neither is there a mechanism to allow TRU mixed waste to  
29 find its way to an area of the WIPP site where it would be carried off site by flood or precipitation  
30 waters.

### 31 E-2c Water Supplies

32 At the WIPP facility, water supplied by a local water company enters a pair of 180,000-gal  
33 (681,372-L) aboveground storage tanks located adjacent to the Pumphouse. The 360,000-gal  
34 (1,362,744-L) combined capacity of the tanks is used as the potable water source and for fire  
35 control. These tanks are 32 ft (9.8 m) in diameter and are constructed of welded steel. The  
36 water level in each tank is inspected daily. Potable water is piped to the site and stored in tanks  
37 until distributed by pipe to the fire hydrants and buildings. Managing the potable water supply in  
38 this manner prevents the contamination of the supply by TRU mixed waste.

### 39 E-2d Equipment and Power Failure

40 The following description of procedures, structures, or equipment used at the facility to mitigate  
41 effects of equipment failure and power outages is required by 20.4.1.900 NMAC (incorporating



1 40 CFR §270.14(b)(8)(iv)). The specific systems and facilities related to the protection of human  
2 health and the environment during waste handling and management operations are discussed  
3 in the in Permit Attachment M1.

4 Utility power is fed to the WIPP site by two separate feeds in a ring bus configuration. This  
5 provides the capability to supply uninterruptible, redundant power to the site upon the loss of  
6 one feed. A redundant Southwestern Public Service (**SPS**) power feed has been installed. In the  
7 event that normal utility power is lost, on-site diesel generators will provide alternating current  
8 (**AC**) power to important WIPP facility electrical loads. Uninterruptible power supply (**UPS**) units  
9 are also on line providing power to important monitoring systems.

10 If utility power fails, the exhaust filter system goes into the fail position, and the system high-  
11 efficiency particulate-air filter dampers are placed into filtration position. When power is restored  
12 by the diesel generators, a decision is made whether to remain in filtration mode and energize a  
13 filtration fan or to realign the dampers into the minimum exhaust mode. Without any indication of  
14 a radiological release, the decision is usually the latter. TRU mixed waste handling and related  
15 operations cease upon loss of utility power and are not resumed until normal utility power is  
16 returned. All waste handling equipment will "fail safe," meaning that it will retain its load during a  
17 power outage.

18 In case of a loss of utility power, backup power to predetermined loads can be supplied by  
19 either of the two on-site diesel generators. Each of these units provide 480 volts (**V**) of power  
20 with a high degree of reliability and are sized to feed the selected loads. Each of the diesel  
21 generators can carry all preselected monitoring loads plus operation of the Air Intake Shaft hoist  
22 for personnel evacuation and other selected backup loads. The diesel generators can be  
23 brought on line within 30 minutes.

24 Upon loss of normal power, the diesel generators are manually started from the local control  
25 panel or from the CMR. The starter system is a 24-V battery system with a 300-ampere-hour  
26 capacity. Although it is standard practice to start the diesel generators from the local control  
27 panel, each unit can be remotely started from the CMR when the generator start switch is  
28 placed in the "remote" position. The diesel generators and associated breakers can be  
29 monitored in the CMR, thus providing the ability to feed selected facility loads from the backup  
30 power source, in sequence, without exceeding generator capacity. The on-site fuel storage  
31 capacity is sufficient for the operation of one generator at an expected load of 62 percent for  
32 three days. Additional fuel supplies are readily available within a few hours by tank truck,  
33 allowing on-line refueling and continued operation.

34 There is a Central UPS, located in the Support Building, that supplies power to selected loads  
35 located in the Support Building and WHB Unit. The Central UPS provides back-up power to  
36 equipment associated with radiation monitoring, communications, and central monitoring  
37 systems. In addition, individual UPSs are provided for the selected equipment associated with  
38 these same systems, but are located remotely from the Support Building and the WHB Unit. The  
39 CMR is also connected to the Central UPS.

40 In case of loss of AC power input to the UPSs, the dedicated batteries were designed to supply  
41 power to a fully loaded UPS for 30 minutes. It is expected that the AC power input to the UPS

1 will be restored within 30 minutes, either from the off-site electric utility or from the site back-up  
2 power generator system.

3 Human health and the environment are protected during a loss of off-site power by a  
4 combination of factors:

5 C The underground filtration system fails in the "filter" mode so that no releases of  
6 contaminated particulates will occur

7 C The UPS maintains all monitoring systems and alarms in waste handling areas  
8 so that fires or pressure loss will be detected and an appropriate response  
9 initiated

10 C Generators are brought on line within 30 minutes, at which time hoisting can be  
11 initiated so that personnel do not have to stay underground for extended lengths  
12 of time.

13 C Decisions to evacuate underground personnel will be made in accordance with  
14 the requirements of the Mine Safety and Health Administration (**MSHA**)

15 C The waste hoist brakes set automatically so that loads do not fall

16 C Cranes retain their loads so that spills do not occur from dropped containers

17 C Communication systems are maintained

18 C The emergency operations center is powered if it is needed.

19 The CMS is a computerized system that collects, records, and displays data for all critical facility  
20 systems. The system is designed to provide a centralized, integrated location for collecting,  
21 monitoring, and storing facility parameters and is informed from signals provided by the seismic,  
22 meteorological, radiological effluent, and fire detection and alarm systems. Additionally, the  
23 CMS monitors heating, ventilation, air conditioning and electrical system status. Certain control  
24 functions of the underground ventilation fans, major facility electrical systems, and the backup  
25 diesel generators can be performed by the CMS from the CMR. The CMS can be set to alarm  
26 upon failure of the equipment monitored.

27 The CMS components of the WHB Unit and the Support Building are powered from the central  
28 UPS. The UPS features automatic switching without a loss of power from primary power to  
29 alternate power to battery backup power. The components located throughout the facility are  
30 powered by various electrical switchboards, with UPS battery backup.

31 The major components of the system are interconnected by means of a redundant network. The  
32 network is the communications medium for the CMS and consists of network cables routed  
33 throughout the facility. The network is designed such that no single point failure will cause  
34 failure of the entire network. Parameters or status are monitored by Local Processing Units  
35 strategically located throughout the surface and underground facility.



1 In addition, a number of automatic checks are performed on the internal processes associated  
2 with system components and network communications. If any fault is detected, the system has  
3 the capability to remove a component from the network and alert the CMR Operator (**CMRO**) of  
4 the fault. The status of the network is continuously monitored by the CMRO 24 hours per day,  
5 seven days per week. If a fault occurs, the CMRO initiates an AR within the Work Control  
6 system to correct the problem.

7 The RH Complex is included in the WHB. The Central UPS supplies power to the WHB which  
8 includes the RH Complex. The RH Bay, Hot Cell and Transfer Cell equipment are serviced by  
9 dual 1,300 KW diesel powered generators located between the exhaust shaft and the WHB.  
10 The generators provide backup power to both CH and RH waste handling operations. The RH  
11 waste handling equipment is designed to stop as a result of loss of power in a fail-safe  
12 condition. Power from the back-up generators may be utilized to place RH TRU mixed waste  
13 containers in process into a safe configuration. During a total power outage condition selected  
14 RH loads can be powered by the Central UPS. Within a short time selected RH loads at 480  
15 volts and below can be powered by the Backup Diesel Generators. The backup central UPS for  
16 the WHB would also supply backup power to the RH Complex.

#### 17 E-2e Personnel Protection

18 The following description of procedures, structures, or equipment used at the facility to prevent  
19 undue exposure of personnel to hazardous waste is required by 20.4.1.900 NMAC  
20 (incorporating 40 CFR §270.14(b)(8)(v)).

21 Procedures used at the WIPP facility to prevent undue exposure of personnel to hazardous  
22 waste and the sections in this permit application where these procedures are discussed in detail  
23 are listed below.

- 24 ● The TSDF-WAC are criteria designed to prevent the shipment or acceptance of  
25 TRU mixed waste exhibiting the characteristics of ignitability, corrosivity, or  
26 reactivity.
- 27 ● Written procedures to prevent the addition of materials to the TRU mixed waste  
28 that could exhibit incompatibility or the characteristics of reactivity and/or  
29 ignitability are discussed in Section E-3 of this Permit Attachment.
- 30 ● The shipping containers, forklifts, unloading dock, crane, facility pallets,  
31 **containment pallets**, facility transfer vehicle, waste hoist cage, and underground  
32 waste transporter were designed or selected for use in order to minimize the  
33 need for **CH** TRU mixed waste handling personnel to come into contact with **CH**  
34 TRU mixed waste. Each of these items are discussed in detail in Permit  
35 Attachments M1 and M2; Section E-2a of this Permit Attachment discusses  
36 prevention of hazards to personnel during unloading operations.
- 37 ● **The shipping containers, forklifts, cranes, cask shuttle, transfer cars,**  
38 **manipulators, Hot Cell, waste hoist cage, and HERE were designed or selected**  
39 **for use in order to minimize the need for RH TRU mixed waste handling**  
40 **personnel to come into contact with RH TRU mixed waste. These items are**

1 discussed in Permit Attachments M1 and M2. Section E-2a of this Permit  
2 Attachment discusses in detail prevention of hazards to personnel during  
3 unloading operations.

- 4 ● TRU mixed waste handling operations are conducted so that the need for TRU  
5 mixed waste handling personnel to touch the TRU mixed waste containers during  
6 unloading, overpacking (if necessary), and emplacement operations is  
7 minimized. Appropriate personal protective equipment (**PPE**) will be used  
8 depending on locations and operations (e.g., steel-toed shoes, hard hat, safety  
9 glasses inside a crane operating envelope; steel-toed shoes, hard hat, mine  
10 lamp, self rescuer, and safety glasses in the Underground).
- 11 ● Tagout/Lockout and work authorization procedures, discussed in Section D-1,  
12 prohibit WIPP facility personnel from utilizing TRU mixed waste handling  
13 equipment that is temporarily out of service and prevent inappropriate use of  
14 TRU mixed waste handling equipment that is not operational for all uses.
- 15 ● A system for monitoring and inspecting monitoring equipment, safety and  
16 emergency systems, security devices, and operating and structural equipment is  
17 in place to prevent, detect, or respond to environmental or human health hazards  
18 caused by hazardous waste. The inspection/monitoring requirements are  
19 described in Permit Attachment D.
- 20 ● Adequate aisle space is maintained for emergency response purposes, as  
21 discussed in Section E-1b of this Permit Attachment.
- 22 ● Procedures to protect personnel from hazardous and/or TRU mixed waste during  
23 nonroutine events are detailed in Permit Attachment F.

24 The following discusses the structures and equipment that prevent undue exposures of  
25 personnel at the WIPP facility to hazardous constituents:

- 26 ● The WIPP facility was sited and designed to be protective of human health and  
27 ensure safe operations during the Disposal Phase.
- 28 ● TRU mixed waste containers are required to meet shipping/structural  
29 requirements.
- 30 ● The shipping container, forklifts, unloading dock, crane, facility pallets,  
31 **containment pallets**, facility transfer vehicle, waste hoist cage, and underground  
32 waste transporter were designed or selected for use in order to minimize the  
33 need for TRU mixed waste handling personnel to come into contact with TRU  
34 mixed waste. Each of these items is discussed in detail in Permit Attachments  
35 M1 and M2; Section E-2a of this Permit Attachment discusses prevention of  
36 hazards to personnel during unloading operations.

- 1 ● The hood ventilation system, used during the initial opening of Contact Handled  
2 Packages, is used to vent any potential release of radioactive contaminants into  
3 the ventilation system of the WHB Unit (Permit Attachment M1).
  
- 4 ● Differential air pressure between the RH TRU mixed waste handling locations in  
5 the RH Complex protects workers and prevents potential spread of  
6 contamination during handling of RH TRU mixed waste. Airflow between key  
7 rooms in the WHB are controlled by maintaining differential pressures between  
8 the rooms. The CH Receiving Bay is maintained with a negative pressure relative  
9 to outside atmosphere. The RH Receiving Bay is maintained with a requirement  
10 to be positive pressure relative to the CH Receiving Bay. The RH Hot Cell is  
11 maintained with a negative differential pressure relative to the RH Receiving Bay.  
12 The Hot Cell ventilation is exhausted through high-efficiency particulate air filters  
13 prior to venting through the WHB exhaust.
  
- 14 ● The WIPP facility has internal and external communications and alarm systems  
15 to notify personnel of emergency situations and provide instructions for response,  
16 evacuation, etc. as discussed in this Permit Attachment and Permit Attachment  
17 F.
  
- 18 ● The WIPP facility is well equipped with spill-response equipment, transport  
19 vehicles, emergency medical equipment and rescue vehicles, fire detection, fire-  
20 suppression and firefighting equipment (including water for fire control), PPE,  
21 emergency lighting and backup power, and showers and eye-wash fountains.  
22 These are discussed in Sections E-1a, E-2C and E-2d of this Permit Attachment  
23 and are listed in Permit Attachment F.
  
- 24 ● The surface and underground ventilation systems, discussed in Permit  
25 Attachment M2, are designed to provide personnel with a suitable environment  
26 during routine operations.

#### 27 E-2f Releases to Atmosphere

28 The following description of procedures, structures, or equipment used at the facility to prevent  
29 releases to the atmosphere is required by 20.4.1.900 NMAC (incorporating 40 CFR  
30 §270.14(b)(8)(vi)).

31 All TRU mixed waste will be contained. TRU mixed waste container vents employ particulate  
32 filters that prevent particulate releases to the atmosphere. The nature of the waste itself also  
33 mitigates potential releases to the atmosphere. Lead and other heavy metals, which could  
34 exhibit the characteristic of toxicity, may be present in some TRU mixed waste forms. The metal  
35 in the TRU mixed waste, most of which is lead in monolithic form, is present in bricks and  
36 shielding rather than in particulate form. The primary sources of other metals are sheets, rods,  
37 plating, equipment parts, or solidified sludges.

38 A release of hazardous waste or hazardous constituents to the air that may have adverse  
39 effects on human health or the environment is unlikely. Although VOCs could be present in the  
40 TRU mixed waste emplaced within the unit and could potentially be a source of release to the

1 air, the confirmatory volatile organic compound monitoring plan described in Permit Attachment  
2 N will be used to confirm that there is no adverse effects on human health and the environment.

3 E-2g Flammable Gas Concentration Control

4 Gas concentrations in the mine and around the underground HWDUs are controlled by  
5 mechanically induced ventilation. There are two primary ventilation fans and three filtration fans.  
6 If only one primary ventilation fan is ventilating the mine, it typically will be set to draw 260,000  
7 ft<sup>3</sup> (7,358 m<sup>3</sup>) per minute of air through the mine, which is sufficient to adequately ventilate all  
8 active areas in the mine. If both primary fans are operating, they will typically be set to draw  
9 425,000 ft<sup>3</sup> (12,028 m<sup>3</sup>) per minute of air through the mine. The filtration fans are interlocked so  
10 that only one filtration fan can operate at any time in the filtration mode. One filtration fan is  
11 normally set to draw 60,000 ft<sup>3</sup> (1,698 m<sup>3</sup>) per minute of air through the mine. The air is routed  
12 through the underground facility with bulkhead doors and dampers to achieve the most efficient  
13 use of the air in ventilating for possible gases and maintaining required differential pressures in  
14 the underground facility.

15 The WIPP Mine Ventilation Plan are updated a least once a year or more often to accommodate  
16 changing underground conditions. Dead end drifts are fairly common in underground mines.  
17 Ventilation to accessible dead end drifts is provided by auxiliary fans and ducts to the extent  
18 necessary. Minimum requirements for air quantity, quality, and air flow velocity depend on the  
19 level of activity in a given area and are governed by Federal (30 CFR §57, Subpart G) and State  
20 regulations. Compliance with those regulations is monitored by facility personnel and through  
21 frequent inspections by regulatory authorities.

22 The WIPP Industrial Hygienist is responsible for monitoring and/or testing the air in the  
23 underground. The tests are on an as needed basis, in areas where chemicals are stored, and in  
24 areas where people are working that may contain hazardous concentrations of airborne fumes,  
25 mists, or vapors. All surveys are recorded; records contain location, time, job description, or  
26 occurrences associated with the contaminants, and the identification of instruments used.

27 Underground Facility Operations checks the underground air quality on a daily basis in all open  
28 drifts utilizing instrumentation which indicates Oxygen, Carbon Monoxide, and Flammable Gas  
29 concentration. The results of the monitoring are entered in the Shift Log Daily. If conditions are  
30 found that exceed established criteria, additional notification is made to the CMR. Appropriate  
31 actions are taken to determine the type of gases and impact on mine activities. The readings  
32 taken during specific tests for unusual conditions are recorded in the Daily Shift Log. All the  
33 monitoring performed by Underground Facility Operations is in accordance with MSHA (30 CFR  
34 §57).

35 Portable air monitoring equipment is used to assure access to all areas where air quality may be  
36 of concern. Two types of measuring systems are used at the WIPP: Draeger Pump Systems  
37 and Portable Air Monitoring Instruments. Prior to use, all instruments must have certification of  
38 current calibration and check gases must also be certified as accurate within one percent of the  
39 label concentration. Instruments are used within the guidelines established by the  
40 manufacturers and are accompanied with suitable temperature, barometric and relative humidity  
41 measurements (as required). Functional testing of instruments must be done before each use  
42 and the results must fall within the ranges specified in air monitoring procedures. Gases that are

1 to be tested include oxygen, methane, carbon monoxide, hydrogen sulfide, sulphur dioxide,  
2 nitrogen dioxide, and chlorine. Alarm levels are set for each gas. Typical settings are as follows:  
3 O<sub>2</sub>: 19.5% LOW; 23.0% HIGH; CH<sub>4</sub>: 0.25%; CO: 25 ppm; H<sub>2</sub>S: 10 ppm; SO<sub>2</sub>: 2 ppm; NO<sub>2</sub>: 1  
4 ppm; Cl<sub>2</sub>: 0.5 ppm. When alarm levels are reached, Industrial Safety is contacted to evaluate the  
5 conditions and to determine the appropriate actions. Equipment operation is by trained  
6 personnel only, or under the supervision of trained personnel. Air Quality sampling is performed  
7 as often as needed to assure safe working conditions. If conditions are worsening, or action has  
8 been taken to mitigate high levels of contamination, the frequency of measurement is increased.  
9 Underground air quality is checked at the beginning of the day when personnel are  
10 underground.

### 11 E-3 Prevention of Reaction of Ignitable, Reactive, and Incompatible Waste

12 20.4.1.900 NMAC (incorporating 40 CFR §270.14(b)(9)), requires a description of precautions  
13 taken to prevent accidental ignition or reaction of ignitable, reactive, or incompatible TRU mixed  
14 waste as required to demonstrate compliance with 20.4.1.900 NMAC (incorporating 40 CFR  
15 §270.15(c)), and 20.4.1.500 NMAC (incorporating 40 CFR §264.17). Because the TRU mixed  
16 waste (including the container) received at the facility during the Disposal Phase and any  
17 derived TRU mixed waste have been demonstrated to be compatible and do not exhibit the  
18 characteristics of ignitability, reactivity, or corrosivity, the WIPP facility is in full compliance with  
19 these regulations.