

#### **EA-2064: ABOVE GROUND STORAGE CAPABILITY PROJECT AT THE WASTE ISOLATION PILOT PLANT**

DOE is preparing an Environmental Assessment that will assess the potential environmental consequences of a proposed action which is to construct and operate an Above Ground Storage Capability (AGSC) area at the Waste Isolation Pilot Plant (WIPP). The purpose of the AGSC project is to improve transuranic (TRU) waste shipping throughout the DOE complex and the WIPP disposal process efficiency by adding the capability to temporarily store TRU mixed waste above ground in concrete overpack containers at the WIPP site. As a result of the AGSC project, the DOE plans to provide a 65,280 cubic foot contact-handled (CH) TRU mixed waste concrete container storage unit on the surface of the WIPP facility. This additional surface storage capacity is for TRU waste in containers that are shipped to WIPP in TRUPACT-II and HalfPACT shipping packages and are managed as CH TRU waste. The proposed storage time for the concrete overpack containers on the surface at WIPP is up to 365 days. Up to 408 concrete overpacks containers of CH TRU mixed waste are proposed to be stored on the concrete pad.

**U.S. Department of Energy  
Waste Isolation Pilot Plant  
NOTICE OF AVAILABILITY TO PREPARE ENVIRONMENTAL ASSESSMENT**



The U.S. Department of Energy (DOE) has prepared a National Environmental Policy Act (NEPA) Draft Environmental Assessment (DEA) to consider the potential environmental consequences of the proposed action which is to construct and operate an Above Ground Storage Capability (AGSC) area at the Waste Isolation Pilot Plant (WIPP). The purpose of the AGSC project is to improve transuranic (TRU) waste shipping throughout the DOE complex and the WIPP disposal process efficiency by adding the capability to temporarily store TRU mixed waste above ground in concrete overpack containers at the WIPP site. .

As a result of the proposed AGSC project, the DOE plans to provide a 65,280 cubic foot contact-handled (CH) TRU mixed waste concrete container storage unit on the surface at the WIPP site. This additional surface storage capacity is for CH TRU waste in containers that are shipped to WIPP in TRUPACT-II and HalfPACT shipping packages.

The proposed storage time for the TRU waste in the concrete overpack containers on the surface at WIPP is up to 365 days. Up to 408 concrete overpacks containers of CH TRU waste are proposed to be stored on the concrete pad.

The DEA will be made available to the public at the following website: <https://energy.gov/nepa/listings/latest-documents-and-notices> . The 30-day public comment period will commence on 12/15/2017 and conclude on 01/15/2018. For comments to be considered in the NEPA document development process, they must be received by close of business on 01/15/2018. Written comments may be provided to the address presented below or they may be submitted electronically to the following e-mail link [WIPP.EA@WIPP.ws](mailto:WIPP.EA@WIPP.ws)

DOE Point-of-contact for written comments:

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Or e-mail comments to [WIPP.EA@WIPP.ws](mailto:WIPP.EA@WIPP.ws) (not case sensitive)

**DOE/EA-2064**

**DRAFT A**

**ENVIRONMENTAL ASSESSMENT FOR THE  
ABOVE GROUND STORAGE CAPABILITY  
AT THE WASTE ISOLATION PILOT PLANT**



**U.S. DEPARTMENT OF ENERGY  
CARLSBAD FIELD OFFICE  
CARLSBAD, NEW MEXICO**

**DECEMBER 2017**

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## 1 Acronyms and Abbreviations

2	AEC	Atomic Energy Commission
3	AGSC	Above Ground Storage Capacity
4	BGS	below ground surface
5	BLM	Bureau of Land Management
6	CB	Cabin Baby
7	CFR	Code of Federal Regulations
8	CH	contact-handled
9	cm	centimeter
10	DEA	Draft Environmental Assessment
11	DOE	U.S. Department of Energy
12	DSA	Documented Safety Analysis
13	EA	Environmental Assessment
14	EO	Executive Order
15	EPA	U.S. Environmental Protection Agency
16	ERDA	Energy Research and Development Administration
17	FEIS	Final Environment Impact Statement
18	ft	foot
19	ft <sup>2</sup>	square foot
20	ft <sup>3</sup>	cubic foot
21	FY	fiscal year
22	GHG	greenhouse gas
23	HalfPACT	Half-package Transporter
24	HEPA	high efficiency air particulate
25	in.	inch
26	km	kilometer
27	L	liter
28	lbs/hr	pounds per hour
29	lbs/yr	pounds per year
30	LCF	latent cancer fatality
31	LMP	Land Management Plan
32	LWA	Land Withdrawal Act (Public Law 102-579)
33	m	meter
34	m <sup>2</sup>	square meter
35	m <sup>3</sup>	cubic meter
36	m/s	meter per second
37	mg/L	milligram per liter
38	MOI	maximally-exposed offsite individual
39	mrem	millirem

Environmental Assessment for the Above Ground Storage Capability at the Waste Isolation Pilot Plant

1	NAAQS	National Ambient Air Quality Standards
2	NEPA	National Environmental Policy Act of 1969
3	NHPA	National Historic Preservation Act
4	NMED	New Mexico Environment Department
5	NOA	Notice of Availability
6	NPH	natural phenomena hazards
7	NRC	Nuclear Regulatory Commission
8	Overpack Unit	Concrete Overpack Container Storage Unit
9	PAU	Parking Area Unit
10	Permit	Hazardous Waste Facility Permit
11	PPA	Property Protection Area
12	psi	pounds per square inch
13	PVS	Permanent Ventilation System
14	rem	roentgen equivalent man
15	RH	remote-handled
16	SHPO	State Historic Preservation Officer
17	SSW	shallow subsurface water
18	SVS	Supplemental Ventilation System
19		
20	TDS	total dissolved solids
21	TRU	transuranic
22	TRUDOCK	TRUPACT-II Unloading Dock
23	TRUPACT-II	Transuranic Package Transporter Model II
24	U/G	underground
25	VHS	vent hood system
26	WHB	Waste Handling Building
27	WIPP	Waste Isolation Pilot Plant
28	WLWA	WIPP land withdrawal area



1 **1. PURPOSE OF AND NEED FOR THE PROPOSED ACTION**

2 **1.1 Introduction**

3 The Waste Isolation Pilot Plant (WIPP) is the nation's only approved repository for the disposal  
4 of defense related/defense generated transuranic (TRU) and mixed hazardous TRU waste  
5 (henceforth called TRU waste). The mission of the WIPP Project is to realize the safe disposal  
6 of TRU waste from TRU waste generator sites in the Department of Energy waste complex.  
7

8 The WIPP Project was authorized by Title II, Section 213(a) of Public Law 96-164 (U. S.  
9 Congress 1979). Congress designated the WIPP facility "for the express purpose of providing a  
10 research and development facility to demonstrate the safe disposal of radioactive wastes  
11 resulting from the defense activities and programs of the United States exempted from  
12 regulation by the Nuclear Regulatory Commission (NRC)." The WIPP facility is operated by the  
13 U. S. Department of Energy (DOE). Transuranic waste that is disposed in the WIPP facility is  
14 defined by Section 2(18) the WIPP Land Withdrawal Act of 1992 (LWA) (U. S. Congress, 1992)  
15 as: "waste containing more than 100 nanocuries of alpha-emitting transuranic isotopes per gram  
16 of waste, with half-lives greater than 20 years, except for:  
17

- 18 (A) high-level radioactive waste;
- 19 (B) waste that the Secretary has determined, with the concurrence of the Administrator,  
20 does not need the degree of isolation required by the disposal regulations; or
- 21 (C) waste that the NRC has approved for disposal on a case-by-case basis in  
22 accordance with part 61 of title 10, Code of Federal Regulations (CFR).  
23

24 The half-lives of many TRU wastes isotopes are considerably longer than 20 years. For  
25 instance, the half-life of one isotope of plutonium is 24,000 years.

26 TRU waste is further classified as contact-handled (CH) and remote-handled (RH). CH-TRU  
27 waste has radioactivity levels that are low enough to permit workers to directly handle the  
28 containers in which the waste is kept. This level of radioactivity is specified as a dose rate of no  
29 more than 200 millirems per hour (mrem/hr) at the outside surface of the container. RH-TRU  
30 waste has a surface dose rate greater than 200 mrem/hr, so workers use remote manipulators  
31 to handle containers of RH-TRU waste. Transuranic mixed waste is CH-TRU or RH-TRU waste  
32 that also contains hazardous components, such as lead or organic solvents regulated in  
33 accordance with the Resource Conservation and Recovery Act. Transuranic waste also may be  
34 commingled with polychlorinated biphenyls which are regulated by the Toxic Substances  
35 Control Act. The waste that is authorized for emplacement is containerized dry TRU waste that  
36 must meet DOE/WIPP-02-3122, Rev.8.0, *WIPP Waste Acceptance Criteria*, in order to qualify  
37 for shipment to the WIPP facility. Containers of waste remain closed throughout the  
38 management and disposal processes at the WIPP facility.

39 The WIPP facility is a deep geologic repository mined within a 2,000-foot-thick bedded-salt  
40 formation. The WIPP repository sits in the middle of a 41-square-kilometer (16-square-mile)  
41 area under the jurisdiction of DOE pursuant to the LWA. The underground (UG) portion of the  
42 disposal facility, where waste is emplaced for disposal, is 2,150 feet beneath the ground  
43 surface.

44 The principal surface structure at the WIPP facility is the Waste Handling Building (WHB) where  
45 shipments of TRU waste are unloaded from their transporters and are inspected for compliance  
46 with shipping documentation. The WHB is designed and operated to prevent radiological

1 releases to the environment during waste handling operations. The area south of the WHB is a  
2 large parking area used to store TRU waste waiting to be unloaded in the WHB. This area is  
3 referred to as the Parking Area Unit (PAU). Other surface facilities include the hoist houses and  
4 headframes to provide underground access; support buildings and temporary structures to  
5 provide office space, training facilities and operations monitoring equipment; guard and security  
6 facilities including a guardhouse and perimeter fencing; safety facilities including emergency  
7 response equipment and personnel; water storage tanks and pump house; sewage lagoons;  
8 mined salt storage piles; maintenance buildings; ventilation buildings and ductwork; warehouse;  
9 and water control structures including berms, retention ponds and evaporation ponds. In  
10 addition, there are several parking areas for vehicles and laydown yards for construction  
11 equipment. The project area is south of the WHB in an area that includes a portion of that was  
12 previously disturbed during facility construction. (See Figure 2-2 for project location.)  
13 The surface structures occupy the central portion of a 290-acre "Exclusive Use Area" which has  
14 been designated by the DOE as an area exclusively for the use of the DOE and its contractors  
15 in support of the WIPP Project. This area is considered the point of closest approach for  
16 members of the public for the purposes of analyzing consequences from accidents.

17  
18 The WIPP facility design is based upon the receipt and emplacement of 500,000 cubic feet (ft<sup>3</sup>)  
19 (14,158 cubic meters [m<sup>3</sup>]) of contact-handled (CH) TRU mixed waste per year (Design Criteria,  
20 Waste Isolation Pilot Plant (WIPP), Revised Mission Concept – IIA (RMC-IIA) WIPP-DOE-71-  
21 Rev.3). In practice, the operation of the WIPP facility has been able to sustain about one-half  
22 this rate based on 17 TRU waste shipments per week, with 42 shipping weeks per year, and  
23 TRU waste being emplaced upon receipt with limited above ground storage capability. During  
24 the years 2000-2014, the WIPP facility received 11,763 shipments of CH TRU mixed-waste (or  
25 an average of 840 shipments per year). The WIPP facility is currently receiving five shipments  
26 per week due to reduced ventilation in the underground and, therefore, not capable of receiving  
27 and downloading as many shipments as the generator sites wish to make to satisfy agreements  
28 in their host states. Storage time limitations are set by the WIPP Hazardous Waste Facility  
29 Permit (Permit). The Permit limits the volume and time for storage of TRU mixed-waste in the  
30 parking area storage unit and Waste Handling Building (WHB), 59-days and 60-days,  
31 respectively.

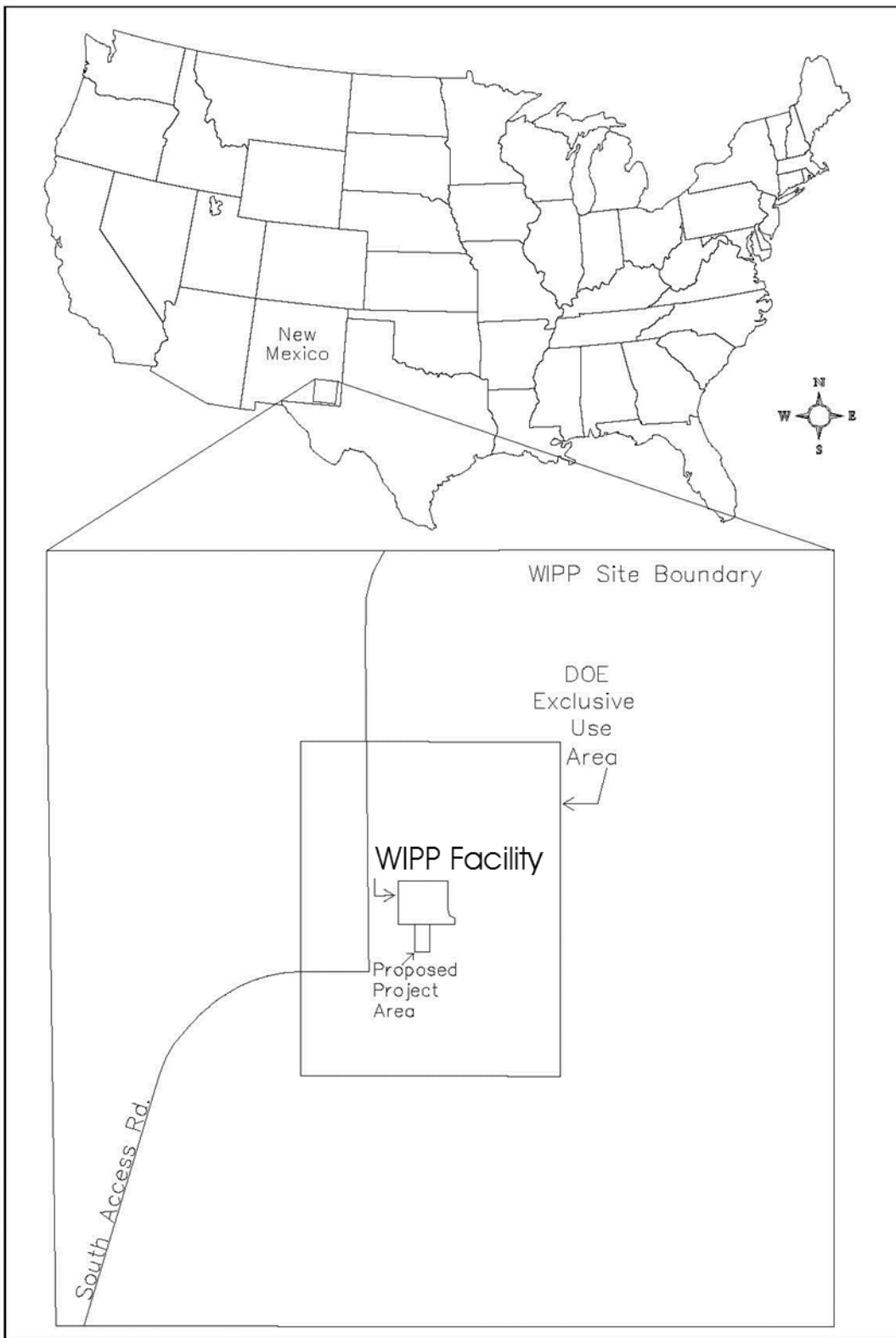
32 The 10 weeks out of the year when shipments are not received encompass planned and  
33 unplanned maintenance outages (6-8 weeks' duration) and estimated 2-4 weeks for interrupted  
34 shipments due to inclement weather conditions along the TRU waste transportation corridors.  
35 Because of planned and unplanned maintenance outages and inclement weather delays, an  
36 above ground storage capability would facilitate waste receipt during outages and downloading  
37 waste into the WIPP underground should there be weather delays impacting the transportation  
38 corridor.

39 Currently, DOE is storing TRU waste at a non-DOE site. State compliance agreements and  
40 regulatory deadlines for the shipment of waste are in place, with deadlines in the near term  
41 (fiscal year [FY] 2017 to 2018) and beyond.

## 42 **1.2 Project Location**

43 The project is located 26 miles east of Carlsbad, New Mexico in an approximately 35 to 40-acre  
44 (14 to 16 hectares) tract adjacent to and immediately south of the WIPP WHB that would be  
45 added to the Property Protection Area). The proposed project area is shown in Figure 1-1.

46



1

2 **FIGURE 1-1. PROJECT LOCATION**

1 **1.3 Purpose of and Need for the Proposed Action**

2 The purpose of the proposed action, which is described in detail in Chapter 2 of this  
3 Environmental Assessment (EA), is to enhance (i.e., provide additional above ground storage  
4 capability) the DOE's ability to store TRU waste above ground for up to one year. This  
5 enhanced storage ability will provide operational flexibility that is needed to reduce mission  
6 impacts from fluctuation in ship schedules and waste emplacement activities. These  
7 fluctuations typically result from planned and unplanned maintenance outages and weather  
8 events affecting the WIPP transportation corridors. The DOE has determined that the  
9 operational flexibility is needed to improve efficiency in the overall mission of TRU waste clean-  
10 up throughout the DOE complex. Because facility maintenance and transportation-related  
11 outages occur, the DOE has identified a mission-related need to develop expanded storage  
12 capability for TRU waste at the WIPP facility. The additional above ground storage capability  
13 would provide the DOE complex an additional means to safely and efficiently manage TRU  
14 waste transportation and storage functions, and to fulfill the mandate Congress has given the  
15 DOE – to safely dispose of defense-related TRU waste. In addition, the DOE has entered into  
16 several generator/storage site state compliance agreements which contain milestones for facility  
17 cleanup, including the shipment of waste to the WIPP facility. Some of these milestones are in  
18 the near term (fiscal year [FY] 2017 to 2018) and beyond. The proposed storage capacity will  
19 facilitate shipments from these sites even if the WIPP facility is undergoing an extended  
20 maintenance outage.

21  
22 The Permit (NM4890139088-TSDF) describes the receipt and disposal of TRU waste shipments  
23 with no storage at the surface beyond the short-term administrative limits for the WIPP WHB  
24 and the PAU. A modification to the Permit is underway to authorize additional storage as  
25 proposed. DOE is currently paying for additional TRU waste storage at a non-DOE site.

26 Further support for proposing additional storage came from the New Mexico Environment  
27 Department (NMED). In settling the December 2014, Administrative Compliance Orders against  
28 the DOE with regard to alleged noncompliances stemming from the February 14, 2014  
29 radiological incident at the WIPP facility, the NMED and DOE signed the “General Principles of  
30 Agreement” (NMED, 2015) which provided the framework for settlement discussions. In  
31 paragraph 8, the NMED recognized the utility of additional on-site storage and agreed to “...  
32 consider in a timely manner a permit modification request to allow for an above-ground storage  
33 facility for temporary on-site storage of transuranic waste at WIPP.” The DOE has pursued this  
34 permit modification (DOE, 2016).

35 Currently, the WIPP facility maximum storage capacity is 6,854 ft<sup>3</sup> (194 m<sup>3</sup>) of TRU waste  
36 storage in the WHB, including surge storage. The WIPP PAU maximum storage capacity is  
37 8,863 ft<sup>3</sup> (251 m<sup>3</sup>) including surge storage. The additional above ground storage capacity would  
38 be in addition to the existing storage capacities of the WHB and PAU. Concrete overpack  
39 containers would be used to manage TRU waste stored in this above ground storage unit at the  
40 WIPP facility. The increased storage capability would allow the DOE to conduct waste disposal  
41 operations at the WIPP facility somewhat independently of the variations that occur in shipping  
42 operations. If one of the operations has a disruption, the other operation would be unaffected,  
43 at least until any inventory in storage is disposed of. For example, if shipping is stopped due to  
44 weather delays or other emergencies, the WIPP facility staff can continue to process the waste  
45 from the AGSC facility while awaiting shipment restart. Likewise, if a maintenance outage  
46 prevents the disposal of TRU waste at the WIPP facility, shipments can continue until the AGSC  
47 facility is full. A full above ground storage facility could receive and store the equivalent of 408  
48 Ten-drum Overpacks with a capacity of 160 ft<sup>3</sup> (4.5 m<sup>3</sup>) each.

1 The proposed action is needed to ensure the DOE plan and mission to provide effective  
2 management through the anticipated lifetime of the WIPP Project mission continues to be met.  
3 The proposed action would provide efficiencies in operational and support capabilities for  
4 shipment of CH TRU mixed waste and RH TRU mixed waste in shielded containers from  
5 generator sites for more shipping weeks per year, while allowing DOE to manage and maintain  
6 the WIPP facility in an effective and safe manner.

#### 7 **1.4 NEPA Process and Public Involvement**

8 The National Environmental Policy Act (NEPA) requires federal agencies to consider the  
9 potential environmental impacts of their proposed actions such as constructing and operating  
10 the proposed project to improve the TRU waste shipping process efficiency throughout the DOE  
11 complex and reasonable alternatives before making decisions. DOE has prepared this draft  
12 environmental assessment (DEA) to determine whether the potential environmental impacts of  
13 the proposed project would be significant to human health and the environment in accordance  
14 with DOE's NEPA implementing procedures, 10 CFR Part 1021, and the regulations  
15 promulgated by the Council on Environmental Quality for implementing NEPA, 40 CFR Parts  
16 1500-1508. This DEA will be released for a 30-day public review and comment period. After  
17 this public review/comment period, DOE will review the comments received and prepare a Final  
18 Environmental Assessment, and determine whether to issue a Finding of No Significant Impact  
19 or prepare an Environmental Impact Statement.  
20

21 The resource-specific environmental impact analysis presented in this DEA was performed in  
22 compliance with relevant environmental laws applicable to the resource areas analyzed. Key  
23 documents previously prepared for the WIPP Project (i.e., the DOE/EIS-0026-S2 and SA-10)  
24 were reviewed regarding their applicability to the subject DEA. This review was conducted with  
25 respect to resource-specific existing conditions (i.e., the affected environment). This is because  
26 the previously prepared NEPA documents cover/address the geographic area of the proposed  
27 project. The impact analysis in this DEA has been prepared specifically for this project in order  
28 to provide sufficient information to support a decision regarding the environmental impacts of  
29 the proposed project. Consultations with other agencies (e.g., State Historic Preservation  
30 Officer [SHPO], U.S. Fish and Wildlife Service) were not required or undertaken in connection  
31 with this DEA.  
32

33 As noted above, the DEA will be released for a 30-day public review and comment period as  
34 public involvement is a key component of the NEPA process. Regarding the public  
35 involvement/participation process, the public was made aware of the preparation of this DEA via  
36 the publication of a Notice of Availability (NOA) on **mm/dd/year** in the following news  
37 publications: This DEA was made available to the public at the following DOE website: **@@@**  
38 The publication of the NOA initiated the 30-day public review and comment period commencing  
39 on **mm/dd/year** and ending on **mm/dd/year**. For comments to be considered in the preparation  
40 of the Final Environmental Assessment, they must be received by close of business on  
41 **mm/dd/year** (end date of comment period). Written comments may be provided by mail to the  
42 contact presented below or they may be submitted to the following email link:

43 | [WIPP.EA@wipp.ws](mailto:WIPP.EA@wipp.ws)

44

45

1 Or write:

2 CBFO Document Manager, Point-of-contact:

3 Anthony Stone, Carlsbad Field Office

4 P.O. Box 3090

5 Carlsbad, New Mexico, 88221-3090

6

7 The DOE will review the comments provided by the public and modify the DEA as appropriate  
8 based on the comments. Appendix A of this DEA presents the NOA. Appendix A of the Final  
9 EA will provide the public comments received as well as responses to the comments.

10

1 **2. PROPOSED ACTION AND ALTERNATIVES**

2 **2.1 Proposed Action**

3 The proposed action is to add an above ground hazardous waste container storage unit at the  
4 WIPP facility for storage of 65,280 ft<sup>3</sup> (1,836m<sup>3</sup>) of TRU mixed waste for up to one year. This  
5 CH TRU mixed waste storage capacity also includes RH TRU mixed waste in shielded  
6 containers that are managed and stored as CH TRU mixed waste.

7 The AGSC project would add capacity for the WIPP facility to store TRU mixed waste on the  
8 surface prior to disposal in the U/G. Storage would be accomplished using concrete overpack  
9 containers (see Figure 2.1) placed in an outdoor TRU mixed waste storage area, referred to as  
10 the Overpack Unit. As illustrated in Figure 2-1, the concrete overpack container may hold any  
11 TRU waste container sized to be shipped in a Transuranic Package Transporter Model II  
12 (TRUPACT-II) or a Half-Package Transporter (HalfPACT) shipping package. This Overpack  
13 Unit would provide the ability to safely store additional CH TRU mixed waste on the surface of  
14 the WIPP facility during times when the facility is undergoing a planned or unplanned  
15 maintenance activity, or during any event that delays waste emplacement or delays shipments  
16 to the WIPP facility (e.g., inclement weather). For example, if inclement weather (such as  
17 snowfall in northern New Mexico) delays shipments, the DOE would have the ability to process  
18 waste that has been stored in the Overpack Unit. The DOE could schedule the removal and  
19 disposal of waste stored in the Overpack Unit during periods when shipments are slower, during  
20 a separate shift, or on weekends. The one-year storage limit would provide sufficient time and  
21 flexibility to schedule disposal of waste that is stored in the Overpack Unit.

22 The proposed storage capability would represent a significant improvement in operational  
23 flexibility and efficiency of waste processing. The current Permit requires shipments of waste  
24 from the generator sites to be stopped when any event results in an interruption to normal waste  
25 handling operations that exceeds three days. Storing waste in the Overpack Unit would  
26 eliminate the need for this stoppage and allow generator sites to continue shipments. Upon  
27 completion of the AGSC project, the Permittees would have the capability and space to store up  
28 to 136 shipments (the equivalent of eight weeks of shipments at a rate of 17 shipments per  
29 week).

30 Tracking of the waste while at the WIPP facility is required by the Permit and includes  
31 documenting where the waste containers are within the facility, whether they are in the PAU,  
32 WHB, Overpack Unit, or emplaced U/G in a Hazardous Waste Disposal Unit.

33

34 **2.2 Alternatives Considered**

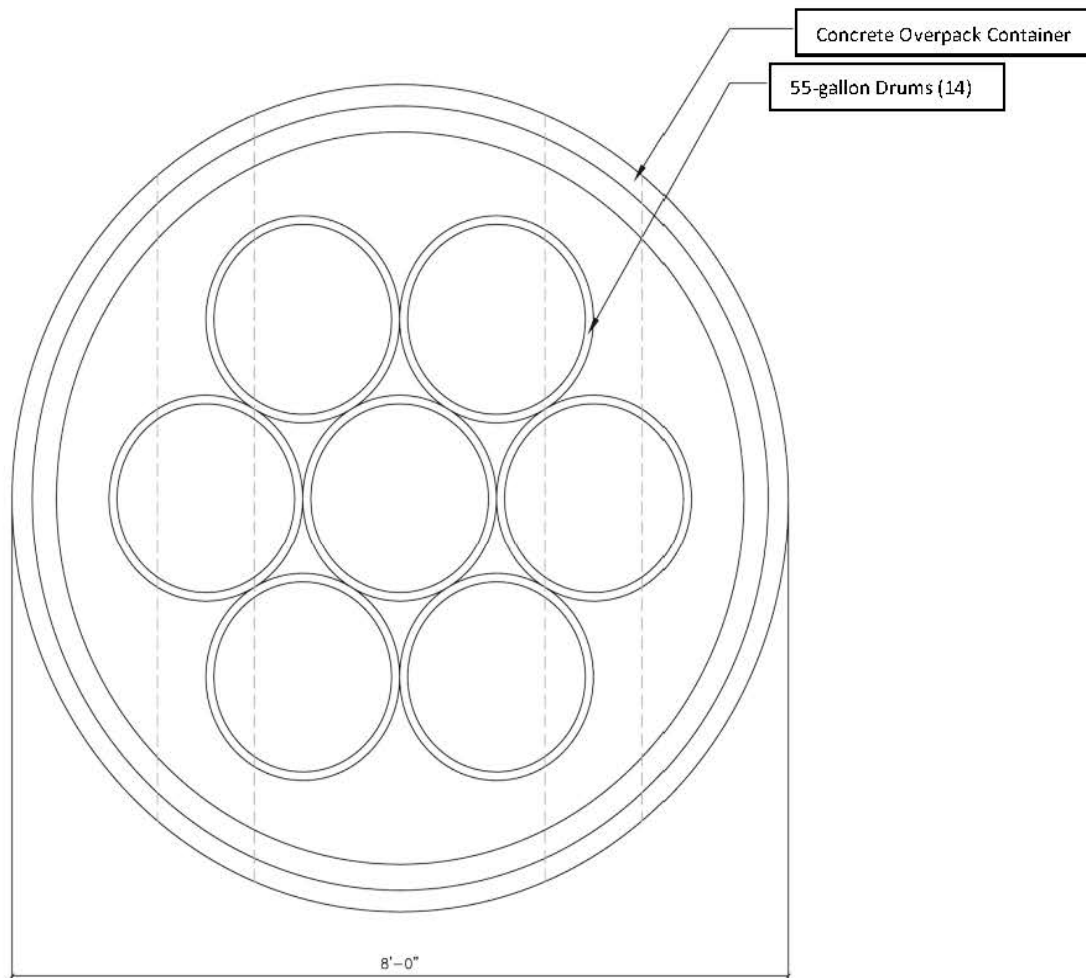
35 **2.2.1 Alternative 1**

36 **Project-specific Construction Components**

37 The components of Alternative 1 include the construction and operation of an Overpack Unit as  
38 described in the proposed action. The constructed facility would include a concrete pad on  
39 which up to 408 concrete overpack containers would be placed. Standard construction methods  
40 would be used to construct the facility such as grading and paving of the project area, pouring of  
41 a concrete slab, fire water plumbing, fencing, lighting, and geotextile-lined water run-off pond.

- 1 The concrete pad would have the following dimensions:
- 2 • Length: 712 ft (217 m)
- 3 • Width: 135.5 ft (41.3 m)
- 4 • Area: 96,500 square feet (ft<sup>2</sup>) (8,965 square meters [m<sup>2</sup>])
- 5 • Pad thickness: 14 inches (in.) (35.6 centimeters [cm])





1

2 **FIGURE 2-1. CONCRETE OVERPACK CONTAINER (TOP VIEW)**

1 Outside of the fence, a 20-ft (6.1-m) gravel road would be constructed as a wildfire break and to  
2 provide a line of sight for security inspections. To prevent run-on of water, the rebar-reinforced  
3 concrete pad would have a berm that is engineered to prevent run-on of overland flowing water  
4 and contain and collect any liquid spills from waste handling operations. The berm would be  
5 approximately 8 in. (20.3 cm) high by 12 in. (30.5 cm) wide. A 7-ft (2.1-m) fence topped with  
6 about 1-ft (0.3 m) of barbed wire would be placed along the periphery of the facility. The  
7 minimum of 48 in. (121.9 cm) of aisle space would be established between the concrete  
8 overpack containers to enable inspection and provide emergency equipment access.

9 The Property Protection Area (PPA) fence would be extended to surround the facility and a 20-  
10 foot (ft) (6-meter [m]) outer perimeter would be cleared for security road visibility and as a  
11 firebreak. As a result, the PPA would increase from approximately 35 to 40-acres (14 to 16-  
12 hectares).

13 Empty concrete overpack units would be stored on the AGSC pad or other appropriate location,  
14 clearly marked, "EMPTY." When needed, the empty concrete overpack units will be  
15 transported back into the WHB for loading and returned to the AGSC facility for storage.  
16 Movements of the waste will be logged and tracked; and containers inspected in accordance the  
17 Permit.

18 Storm water runoff from the concrete pad would be conveyed via gravity to a drainage pipe  
19 (treated to avoid corrosion) that would be connected to a new dedicated storm water retention  
20 pond (i.e., an evaporation pond). The pond would be sized for a 100-year flood plus  
21 100 percent for over-flow capacity. The pond would be constructed to allow for a large surface  
22 area. Evaporation is a proven method in the arid Southwest to address accumulation of storm  
23 water. There would be no intent to remove the water for disposal, unless the liners require  
24 replacement or the facility is decommissioned. The pond would be appropriately designed and,  
25 at a minimum, would be double-lined with an interstitial layer between the liners. A civil  
26 engineer or equivalent expert would specify the liner type and proper-engineered material  
27 (representing the layer between the liners) and incorporate additional precautions to ensure the  
28 containment of the storm water runoff from the concrete pad area. The NMED – Ground Water  
29 Quality Bureau currently regulates the lined evaporation ponds at the WIPP facility. It is  
30 expected that this pond would need to be included in the current Discharge Permit 831 that is  
31 issued to the DOE by the NMED – Ground Water Quality Bureau.

32 The concrete pad area would be inspected regularly by WIPP facility staff to ensure that there  
33 are no leaks or spills from the concrete overpack containers. In the unlikely event of a leak or  
34 spill, it would be cleaned up and properly disposed of in accordance with standard operating  
35 procedures that will be prepared to implement DOE/WIPP radiation protection policies in effect  
36 at the time.

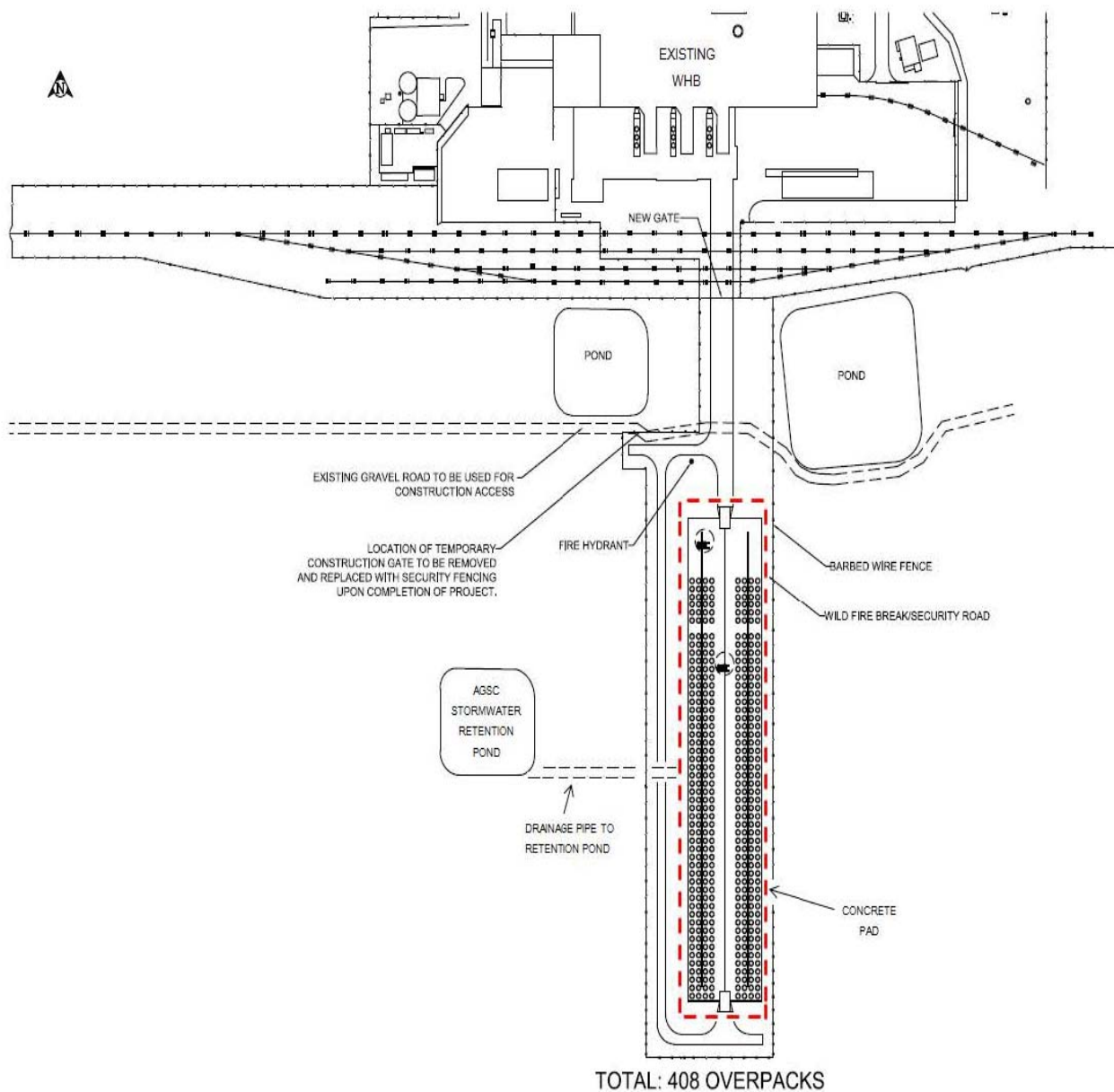
37 Figure 2-2 illustrates the components of Alternative 1 to be constructed, as well as existing  
38 facilities that are used as part of the TRU mixed waste storage process.

### 39 **Project-Specific Operations**

40 The proposed TRU mixed waste storage operations process would begin with the WIPP  
41 Operations personnel transporting an empty concrete overpack container into the WHB using a  
42 forklift and positioning it in front of the TRUPACT-II Unloading Dock (TRUDOCK). Next, the  
43 personnel would remove the empty concrete overpack lid and set it aside on the designated  
44 stand. TRU mixed waste containers would be removed from the CH packaging on the

1 TRUDOCK. The TRUDOCKs are equipped with a Vent Hood System (VHS). Functionally, the  
2 VHS will draw the TRU waste container headspace gases that may have accumulated in the  
3 transportation package, convey them through a HEPA filter, and ultimately duct them through  
4 the WHB exhaust ventilation system. As the waste is removed from the CH packaging, the  
5 payload containers would be inspected. Containers that are not of good integrity are  
6 dispositioned in accordance with existing standard operating procedures (i.e., WP 05-WH1011,  
7 *CH Waste Processing*). Once the waste is lowered into the empty concrete overpack container,  
8 the annual inspection and storage period would begin. The lid would then be placed back on  
9 the concrete overpack container. This would provide secondary containment for the TRU mixed  
10 waste. Using a forklift, TRU mixed waste handling personnel would then transport the loaded  
11 concrete overpack container holding the TRU mixed waste outside of the airlocks. An all-terrain  
12 forklift would then transport the loaded concrete overpack container into the Overpack Unit for  
13 storage for up to one year.  
14

1



2

3 **FIGURE 2-2. OVERPACK UNIT – ALTERNATIVE 1**

1 When it is time to emplace the TRU mixed waste into the WIPP U/G, personnel would retrieve  
2 the loaded concrete overpack containing the TRU mixed waste from the Overpack Unit and  
3 move it using a forklift outside the WHB. The concrete overpack would then be carried into the  
4 WHB using an electric forklift and placed in the TRUDOCK. The concrete overpack lid would be  
5 removed and radiological surveys performed as required. The TRU mixed waste would be  
6 removed from the concrete overpack, inspected for spills or leaks, and, if found to be in good  
7 condition, placed on a facility pallet and readied for emplacement in the WIPP U/G. The empty  
8 concrete overpack would then be made ready to receive other TRU mixed waste for storage or  
9 to be moved out of the WHB and staged for future use.

10 In summary, key features and attributes of the concrete overpack containers and the Overpack  
11 Unit include:

- 12 • The concrete overpack would serve dual functions: (1) as a fire barrier for external fire  
13 events, and (2) to prevent the buildup of flammable gasses above applicable limits.
- 14 • The Overpack Unit concrete pad for TRU mixed waste loaded concrete overpack  
15 containers would have a berm that allows for the control of spills.
- 16 • The Overpack Unit would have a fire water supply line with hydrant.
- 17 • Ample space would be required between stored concrete overpack containers to allow  
18 access for personnel performing inspections and emergency personnel as needed.
- 19 • In accordance with the Fire Hazard Analysis, a 20-ft (6.1-m) minimum cleared area  
20 would be maintained around the storage area to protect it from wildfires.
- 21 • Concrete overpack containers would be manufactured with pockets for forklift tines,  
22 eliminating the need for pallets on the concrete pad.

### 23 **2.2.2 Alternative 2**

24 Alternative 2 consists of the same construction components as described under Alternative 1,  
25 but includes construction of a TRUDOCK facility for unloading operations (see Figure 2-3),  
26 structure covering the entire Overpack Unit (Figure 2-4) such as a Sprung® structure, and  
27 mobile loading and unloading equipment (Figure 2-5). A Sprung® structure is an enclosure that  
28 is designed with durability to withstand heavy snow loads to hurricane force winds, but has the  
29 advantage of being constructed over a shorter duration and at a lower cost compared to a  
30 conventional metal building. Regarding the proposed TRU mixed waste storage operations  
31 process, the TRUPACT-IIs or HalfPACTs would arrive at the Overpack Unit with a payload  
32 designated by the operating staff for storage and the contents of the TRUPACT-IIs or  
33 HalfPACTs would be placed in the Sprung® structure using mobile loading and unloading  
34 equipment. Figure 2-5 illustrates the mobile loader in operation.  
35

36 As with Alternative 1, whenever a disposal time for the containers within the concrete overpack  
37 is determined, the concrete overpack containers would be moved from the AGSC facility and  
38 transported to the WHB via forklift. In the WHB, the concrete overpack containers would be  
39 unloaded and the containers placed upon a facility pallet. Movement of the payload containers  
40 in the TRUPACT-IIs or HalfPACTs and the concrete overpack containers would be tracked.  
41 Tracking of the waste includes knowing where the waste containers are within the facility,  
42 whether they are in the PAU, WHB, Overpack Unit, or emplaced U/G in a Hazardous Waste  
43 Disposal Unit.

1 The capacity for Alternative 2 is 408 concrete overpack containers, the same capacity as  
2 Alternative 1. The mobile loader includes a gantry crane that would be used for the vertical  
3 unloading of the TRUPACT-IIs or HalfPACTs. The payload containers would undergo  
4 radiological contamination checks. The outer and inner containment vessels would be opened  
5 to allow for the venting of the TRUPACT-IIs or HalfPACTs inside the Sprung® structure.

6 The vented air from the TRUPACT-IIs or HalfPACTs would travel through the vent hood system  
7 (VHS) uptake and pass through a high efficiency air particulate (HEPA) filter system to capture  
8 any radioactive particulate. With the VHS, a confined and controlled set of prevailing air  
9 currents would be induced by the system blower. The VHS would function as a local exhaust  
10 system to effectively control radiologically contaminated airborne dust particles (and volatile  
11 organic compounds) at essentially atmospheric pressure conditions.

12 Functionally, the VHS would draw the TRU mixed waste container headspace gases, convey  
13 them through a HEPA filter, and ultimately duct them through the AGSC exhaust ventilation  
14 system. Volatile organic compounds would pass through the HEPA filter and would be  
15 conveyed to the ventilation exhaust duct system. The system principally consists of a functional  
16 aggregation of (1) a vent hood assembly, (2) HEPA filter assemblies to capture any airborne  
17 radioactive particles, (3) a blower to provide forced airflow, (4) ductwork, (5) flexible hose, and  
18 (6) monitoring station.

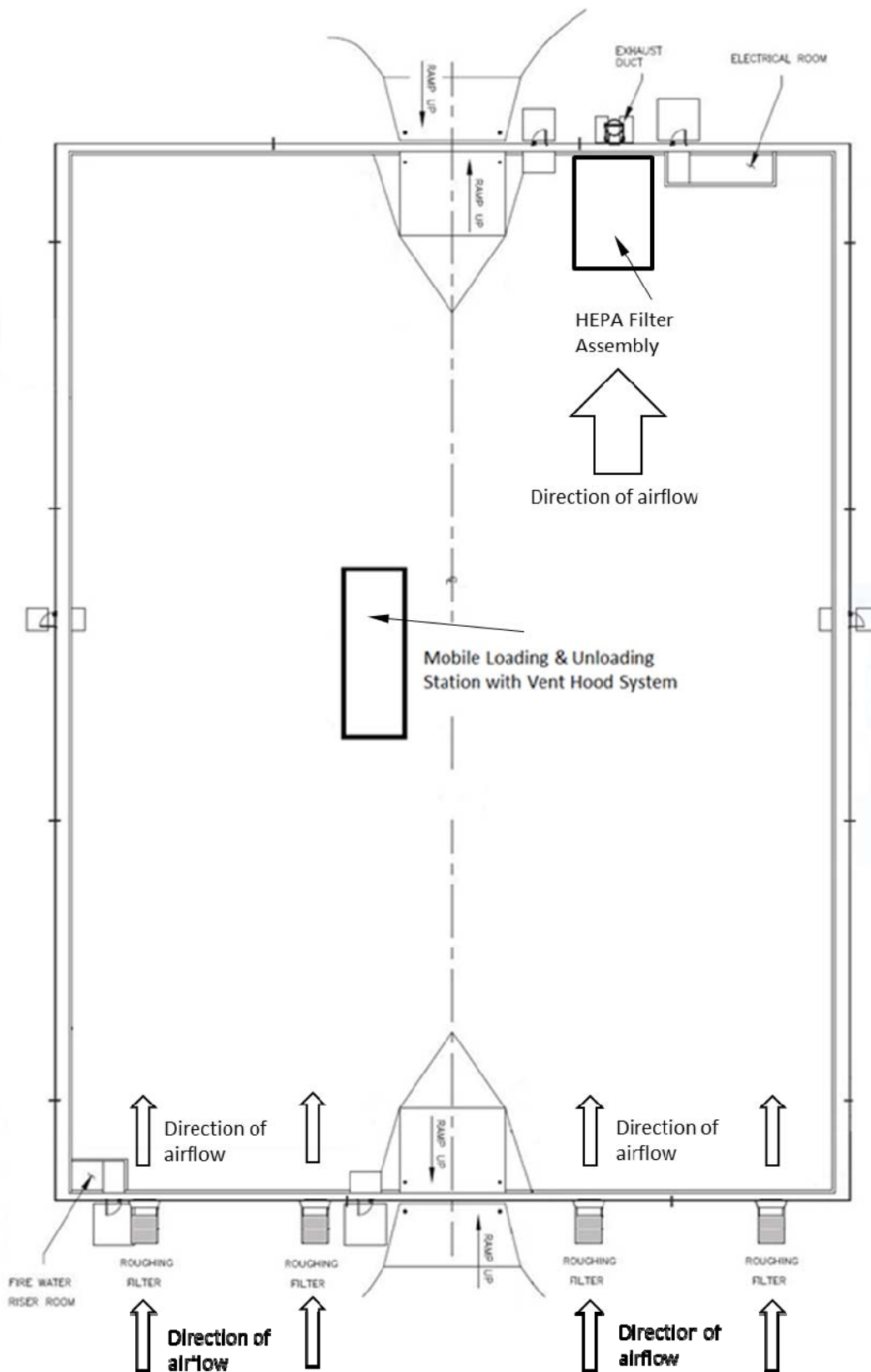
19 If the containers inside the TRUPACT-II or HalfPACTs are determined to be clean, they would  
20 be placed into a concrete overpack. The concrete overpack would then be moved to the  
21 Overpack Unit and the location recorded.

22 As with Alternative 1, when it is time to emplace the TRU mixed waste into the WIPP U/G,  
23 personnel would retrieve the loaded concrete overpack containing the TRU mixed waste from  
24 the Overpack Unit and move it using a forklift outside the WHB. The concrete overpack would  
25 then be carried into the WHB using an electric forklift and placed in the TRUDOCK. The  
26 concrete overpack lid would be removed and radiological surveys performed as required. The  
27 TRU mixed waste would be removed from the concrete overpack, inspected for spills or leaks,  
28 and, if found to be in good condition, placed on a facility pallet and readied for emplacement in  
29 the WIPP U/G. The empty concrete overpack would then be made ready to receive other TRU  
30 mixed waste for storage or to be moved out of the WHB and staged for future use.

### 31 **2.3 No Action Alternative**

32 Under the No Action Alternative, DOE would not proceed with the AGSC Project (i.e., the  
33 proposed action would not be implemented). The No Action Alternative would require no  
34 additional action for the DOE regarding increased storage at the WIPP facility. Storage would  
35 be limited to the space available in the WHB and in the PAU. In the event of delays of  
36 shipments from storage/generator sites, there would be no backlog of TRU waste available for  
37 disposal once the inventories in the WHB and PAU were processed. Further, maintenance  
38 outages at the WIPP facility will lead to a cessation of shipments once the on-site storage  
39 capacities of the WHB and PAU are reached.

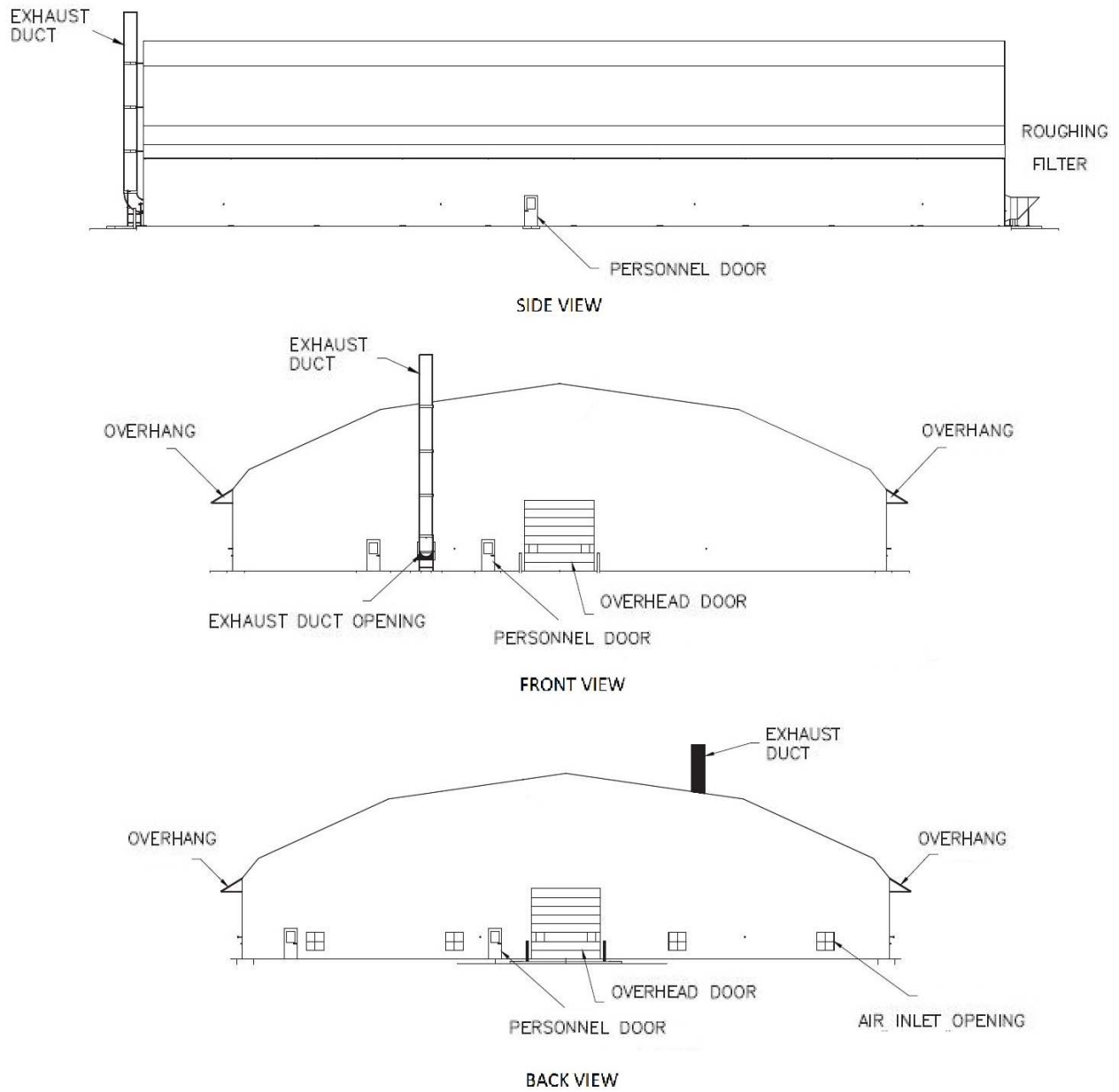
40 The No Action Alternative represents the affected environment or existing conditions for each of  
41 the environmental resource areas discussed in Chapter 3 of this EA. Under this alternative, the  
42 impacts of the proposed action would not take place, and ongoing activities that are described in  
43 the affected environment would continue.



1

2 **FIGURE 2-3. OVERPACK UNIT – ALTERNATIVE 2**

1



2

3 **FIGURE 2-4. GROUND LEVEL VIEW OF OVERPACK UNIT – ALTERNATIVE 2 CONCEPT STRUCTURE**





1  
2

3 **FIGURE 2-5. MOBILE LOADING AND UNLOADING EQUIPMENT**

1 **3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES**

2 **3.1 Introduction**

3 This chapter describes the affected environment or existing environmental conditions in and  
4 around the AGSC project area, as well as the environmental consequences for resources  
5 potentially affected by implementation of Alternatives 1 and 2 as described in Chapter 2.  
6 Information presented in this chapter represents existing conditions against which the  
7 alternatives are evaluated to identify potential impacts (refer to the environmental consequences  
8 sections in this chapter). In compliance with NEPA regulations (40 CFR § 1502.15), the  
9 description of the affected environment focuses only on those resources potentially subject to  
10 impacts. In addition, the level of analysis is commensurate with the anticipated level of impact  
11 (or the sliding scale approach). Accordingly, the discussion of the affected environment (and  
12 associated environmental consequences) focuses on geology and soils, hydrology/water  
13 quality, air quality, cultural resources, hazardous materials and hazardous wastes, nuclear  
14 safety, waste and facility operations, and visual resources. Conversely, the following resource  
15 areas were evaluated, but not carried forward for detailed analysis in this DEA because the  
16 proposed action and supporting action alternatives would have only negligible impacts on these  
17 resources.

18 **Transportation.** Implementation of the proposed action would have no effect on TRU waste  
19 transportation because the number of shipments to the WIPP facility from the generator sites  
20 does not increase. The total number (lifetime) shipments and the annual shipments to or from  
21 the WIPP facility as previously analyzed in the *Supplemental Environmental Impact Statement II*  
22 (DOE/EIS-0026-S-2) and the December 2016 *Supplement Analysis* (DOE/EIS-0026-SA-10) are  
23 bounding numbers and are assumed to remain the same. There will be a temporary increase in  
24 transportation associated with the shipment of materials and equipment needed to construct the  
25 AGSC facility; however, these shipments will be infrequent. The construction staff, estimated to  
26 be about 50, will add to daily automobile traffic.

27 **Land Use.** Implementation of the proposed action would have no impact on land use because  
28 it does not introduce a new land use and the proposed activities are compatible with WIPP land  
29 uses as specified in Section 3(3) of the LWA.

30 **Noise.** Proposed action construction activities would require the use of heavy equipment for  
31 site preparation and development that would result in temporarily increased noise levels within  
32 the immediate area; however, noise levels would be typical of standard construction activities  
33 and would cease upon completion of proposed construction. Proper hearing protection would  
34 be worn per the DOE occupational safety and health program. Operation of various  
35 components and facilities of the project would generate instantaneous noise levels between 60  
36 and 70 decibels; however, due to the attenuation of noise with distance from the noise source,  
37 noise levels from both construction and operation of the proposed action would be reduced to  
38 ambient levels before reaching the nearest sensitive noise receptor. Since publication of the  
39 2016 SA, no known new noise receptors have been identified in the WIPP ROI (DOE/EIS-0026-  
40 SA-10). Chapter 9, Section 9.3.1 of the Final Environment Impact Statement (FEIS) (DOE/EIS-  
41 026) contains a thorough noise evaluation for construction activities similar to those in the  
42 proposal. The nearest noise receptor remains the Mills Ranch, three miles to the south.

43 **Socioeconomics and Environmental Justice.** Proposed construction activities would result in  
44 a minor short-term benefit to the region's economy. Attempts are made to hire and buy services  
45 and equipment locally. Even if an out-of-town construction contractor is used, construction

1 employees would be accommodated in the local area for the duration of construction.  
2 Implementation of the proposed action would not appreciably change the economic character or  
3 stability of the surrounding area.

4 *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income*  
5 *Populations*, Executive Order (EO) 12898, requires that “each Federal Agency shall make  
6 achieving environmental justice part of its mission by identifying and addressing, as appropriate,  
7 disproportionately high and adverse human health effects of its programs, policies, and activities  
8 on minority populations and low-income populations.” Due to the remote location of the WIPP  
9 facility and the large land withdrawal area, there are no minority or low-income populations  
10 adjacent to the project area that would be impacted by the proposed action. Therefore, impacts  
11 related to EO 12898 would not occur.

12 A large number of minority and low-income individuals are located in Eddy and Lea counties,  
13 New Mexico. In this area, 53 percent of the population is classified as minority, while 15.5  
14 percent is classified as low-income. Although the number of minority exceeds 50 percent of the  
15 total population in the area, the number is not meaningfully greater than the state average  
16 based on 2010 Census data. The number of low-income individuals does not exceed 50  
17 percent of the total population in the area, (DOE/EIS-0026-SA-10); therefore, no  
18 disproportionate impacts to low-income and minority populations are anticipated.

19 **Biological Resources.** In 1996, DOE conducted a Threatened and Endangered Species  
20 Survey on the WIPP Land Withdrawal Area (WLWA) and associated lands to investigate the  
21 potential for impact to rare, threatened, endangered, or sensitive plant or animal species as a  
22 result of the potential actions presented in SEIS-II. The 1996 survey included an assessment of  
23 suitable habitats for these species. No threatened, endangered, or state-listed species were  
24 found on the WLWA during the survey. The data reported in the survey, which support the  
25 conclusions of other studies, suggest that dense and permanent populations of these species  
26 are not presently established on WIPP lands.

27 Two species, previously listed as threatened or endangered, live in the shinnery oak sand  
28 dunes areas near the WIPP site. These two species are the dunes sagebrush lizard  
29 (*Sceloporus arenicolus*) and the lesser prairie chicken (*Tympanuchus pallidicinctus*). On June  
30 19, 2012, the proposal to list the dunes sagebrush lizard was withdrawn under:

- 31 • the New Mexico Game and Fish Endangered Species Act
- 32 • the U.S. Fish and Wildlife Endangered Species Act (candidate species)

33 The U.S. Fish and Wildlife Service withdrew the proposed rule to list the dunes sagebrush lizard  
34 as endangered under the Endangered Species Act of 1973 based on the conclusion that the  
35 threats to the species as identified in the proposed rule no longer are as significant as believed  
36 (*Endangered and Threatened Wildlife and Plants; Withdrawal of the Proposed Rule to List*  
37 *Dunes Sagebrush Lizard*, 77 FR 36871).

38 On July 20, 2016, the U.S. Fish and Wildlife Service published a final rule formally vacating the  
39 previous listing of the lesser prairie chicken as threatened under the Endangered Species Act.  
40 The listing of the lesser prairie chicken was vacated in order to comply with a court order  
41 regarding a challenge to the listing. (*Endangered and Threatened Wildlife and Plants; Lesser*  
42 *Prairie Chicken Removed from the List of Endangered and Threatened Wildlife*, 81 FR 47047).

1 According to the most recent Annual Site Environmental Report (DOE/WIPP-15-8866, *Waste*  
2 *Isolation Pilot Plant Annual Site Environmental Report for 2014*, September 2015), there have  
3 been no substantive changes in the biological resources at the WIPP site since SEIS-II. During  
4 2014, no species of plants or animals that are protected by the *Endangered Species Act* were  
5 identified within the WLWA (*Supplement Analysis for the Waste Isolation Pilot Plant Site-Wide*  
6 *Operations*, DOE/EIS-0026-SA-10).

### 7 **3.1.1 Intentional Destructive Acts**

8 Following the terrorist attacks of September 11, 2001, DOE has implemented measures to  
9 address the risk and consequences of potential terrorist attacks on its facilities. DOE  
10 subsequently issued guidance on the analysis of accidents and intentional destructive acts in its  
11 NEPA documents (DOE 2002; Borgstrom 2006). In SA-10 (DOE/EIS-0026-SA-10), DOE  
12 considered security scenarios involving intentional destructive acts to assess potential  
13 environmental impacts. The analysis addresses both the storage and disposal of TRU waste at  
14 the WIPP facility.

15  
16 The potential impacts of intentional destructive acts (i.e., acts of sabotage or terrorism) would be  
17 minimal and no greater than the impacts of a transportation or facility accident as analyzed in  
18 SEIS-II because the initiating forces and resulting quantities of radioactive or hazardous  
19 materials potentially released by an intentional destructive act would be similar to those for the  
20 severe accident scenarios as discussed in SEIS-II (DOE/EIS-0026-S-2); intentional destructive  
21 and accident scenarios both involve the same containers with the same radionuclide loadings.  
22

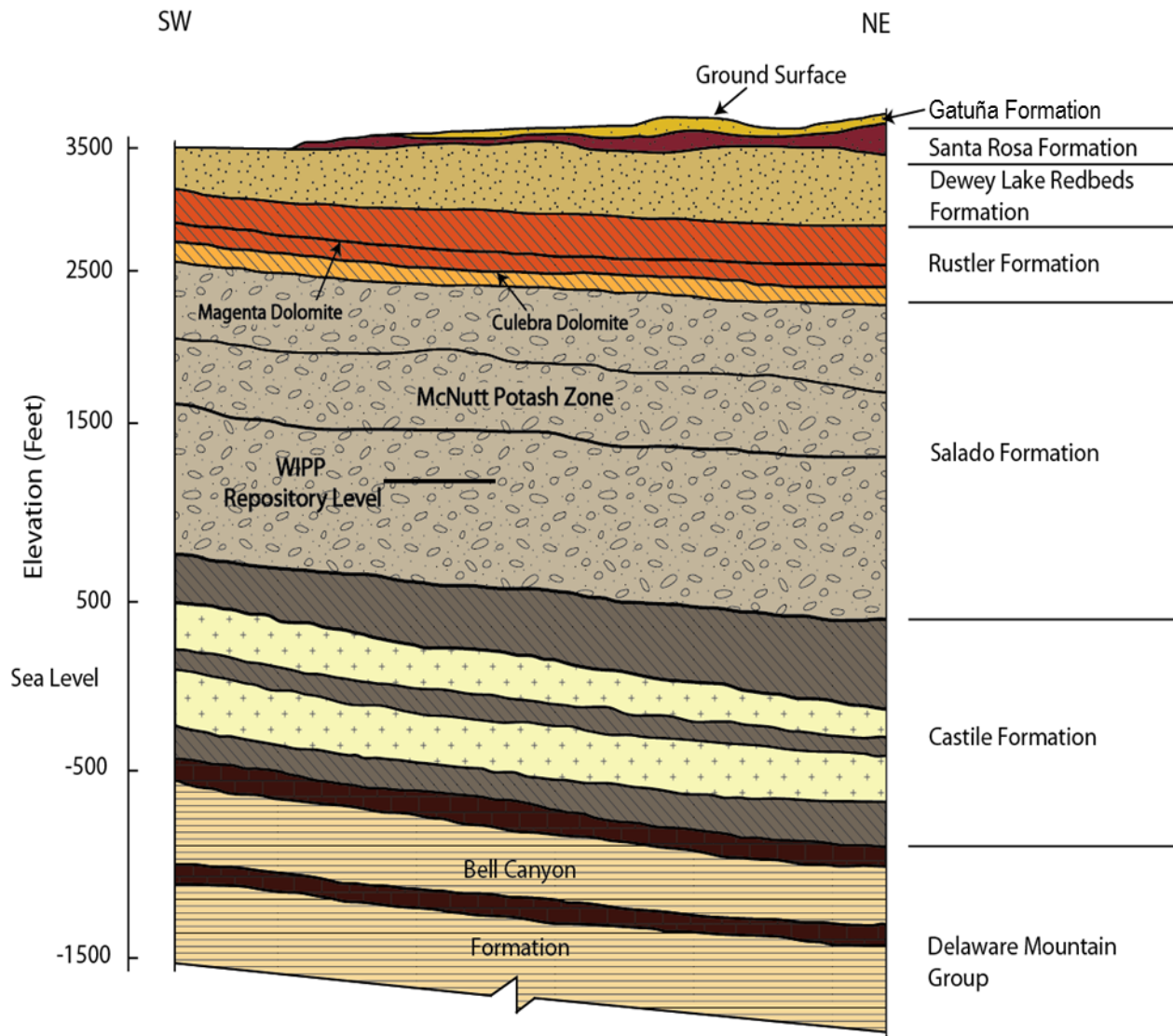
## 23 **3.2 Geology and Soils**

### 24 **3.2.1 Existing Environment**

#### 25 **3.2.1.1 Geology**

26 The WIPP site that includes the proposed project area is located 26 miles east of Carlsbad in  
27 the Chihuahuan Desert of southeastern New Mexico. Since the mid-1970s continuing through  
28 the opening of the WIPP facility in 1999, and into the operational period, an extensive program  
29 of site characterization and validation was conducted. The results of these site investigation  
30 studies have been summarized in numerous publications, including the WIPP *Geological*  
31 *Characterization Report* (SAND78-1596); the *WIPP Design Validation Final Report* (DOE/WIPP-  
32 86-010); and *Summary of Site-Characterization Studies Conducted from 1983 through 1987 at*  
33 *the Waste Isolation Pilot Plant (WIPP) Site Southeastern New Mexico* (SAND88-0157).

34 Water-bearing zones that have been identified and studied at and near the WIPP site are the  
35 middle Dewey Lake Redbeds Formation (Dewey Lake) and the overlying Triassic Dockum  
36 group (including the Santa Rosa Formation [Santa Rosa]); Culebra and Magenta Dolomite  
37 Members of the Rustler Formation (Culebra, Magenta, Rustler); the Rustler-Salado Formation  
38 (Salado) contact; and the Bell Canyon Formation (Bell Canyon). In addition, the nature and  
39 extent of anthropogenic shallow subsurface water (SSW) has been characterized within the  
40 Santa Rosa and Dewey Lake. These units and other formations in the WIPP stratigraphy that  
41 underlie the proposed project area (see Figure 3-1) are discussed below.



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**FIGURE 3-1. AGSC PROJECT AREA STRATIGRAPHY**

1 **Bell Canyon Formation**

2 The Bell Canyon consists of channel sandstones and siltstones with interbedded limestone and  
3 shale. The Bell Canyon is overlain by the Castile Formation (Castile).

4 The Castile is a thick layer of nearly impermeable anhydrites and halites that isolate the Salado  
5 Formation (Salado) from the deeper water-bearing rocks. The Bell Canyon is considered for the  
6 purposes of regional groundwater flow to form a single hydrostratigraphic unit about 1,000 ft  
7 (305 m) thick (Figure 3-1). Tests at five boreholes (Atomic Energy Commission [AEC]-7,  
8 AEC-8, Energy Research and Development Administration [ERDA]-10, DOE-2, and Cabin Baby  
9 [CB]-1) (Mercer, 1983; WTSD TME 020; SAND86-1364), indicate a range of hydraulic  
10 conductivities from  $5 \times 10^{-02}$  ft/day to  $1 \times 10^{-06}$  ft/day ( $1.7 \times 10^{-07}$  to  $3.5 \times 10^{-12}$  meters per  
11 second [m/s]). The pressure measured in the Bell Canyon at DOE-2 and CB-1 boreholes at the  
12 time of the Compliance Certification Application ranged from 1,827 to 1,929 pounds per square  
13 inch (psi) (12.6 to 13.3 megapascals).

14 Fluid flow in the Bell Canyon is markedly influenced by the presence of the extremely low-  
15 permeability Castile and Salado above it, which effectively isolates the Bell Canyon from  
16 interaction with overlying units. The exception are areas where the Castile is absent because of  
17 erosion or non-deposition, such as in the Guadalupe Mountains, or where the Capitan Reef is  
18 the overlying unit. Because of the isolating nature of the Castile and Salado, fluid flow  
19 directions in the Bell Canyon are sensitive only to gradients established over very long  
20 distances. At the WIPP site, the brines in the Bell Canyon flow northeasterly under an  
21 estimated hydraulic gradient of 25 to 40 ft/mi (4.7 to 7.6 m/km [kilometer]) and discharge into the  
22 Capitan aquifer. Velocities are on the order of tenths of feet per year (centimeters per year),  
23 and groundwater yields from wells in the Bell Canyon are 0.6 to 1.5 gallons (2.3 to 5.8 liters [L])  
24 per minute. The fact that flow directions in the Bell Canyon under the WIPP site are inferred to  
25 be almost opposite to the flow directions in units above the Salado is not of concern. This is  
26 because flow in the units above the Salado is controlled by local variations in water table  
27 elevation, whereas flow in the Bell Canyon is controlled by regional gradients. The presence of  
28 the Castile and Salado makes the flow in the Bell Canyon sensitive to gradients established  
29 over long distances, whereas flow in the units above the Salado is sensitive to gradients  
30 established by more local variations in water table elevation.

31 **Castile Formation**

32 The Castile is composed of a sequence of three thick anhydrite beds separated by two thick  
33 halite beds. The Castile acts as an aquitard that separates the Salado, where the repository is  
34 located, from the underlying water-bearing sandstones of the Bell Canyon.

35 No regional groundwater flow system is present in the Castile. The only substantial water  
36 present in the formation occurs in isolated brine reservoirs in fractured anhydrite. These brine  
37 reservoirs are unconnected with surrounding aquifers or the surface, and have little potential to  
38 dissolve the host rocks or move through them.

39 **Salado Formation**

40 The massive halite beds within the Salado host the WIPP repository. The Salado represents a  
41 regional aquiclude due to the hydraulic properties of the bedded halite of which it is mostly  
42 comprised. In the halites, the presence of circulating groundwater is restricted because halites

1 do not readily maintain primary porosity, solution channels, or open fractures owing to creep  
 2 closure. The results of hydraulic conductivity testing, both within the repository and from the  
 3 surface, are generally consistent with a hydraulic conductivity of the undisturbed halite rock of  
 4 less than  $2.5 \times 10^{-13}$  ft/s ( $7.5 \times 10^{-14}$  m/s), with the purer halites (less argillaceous) having even  
 5 lower hydraulic conductivity. Anhydrite interbeds typically have hydraulic conductivities ranging  
 6 from  $2.5 \times 10^{-13}$  to  $2.5 \times 10^{-11}$  ft/s ( $7.5 \times 10^{-14}$  to  $7.5 \times 10^{-12}$  m/s) ("Hydrology and Hydraulic  
 7 Properties of a Bedded Evaporite Formation," [Beauheim and Roberts, 2002]). The only  
 8 significant variation to these extremely low hydraulic conductivities occurs in the disturbed rock  
 9 zone of the U/G workings (Stormont et al., 1991). However, it is expected that the salt will heal  
 10 due to creep closure in a relatively short period of time (100 years) to regain low hydraulic  
 11 conductivity characteristics.

12 **Rustler-Salado Contact**

13 The contact between the Rustler and Salado was studied and discovered to contain minor  
 14 amounts of non-potable water. In Nash Draw, the contact exists as a dissolution residue  
 15 capable of transmitting water. Eastward from Nash Draw toward the WIPP site, the amount of  
 16 dissolution decreases and the transmissivity of this interval decreases. Tests within the  
 17 boundary of the WIPP site showed very low transmissivities, ranging from  $3 \times 10^{-5}$  to  
 18  $3 \times 10^{-3}$  ft<sup>2</sup>/day ( $2.8 \times 10^{-6}$  to  $2.8 \times 10^{-4}$  m<sup>2</sup>/day) (*Geohydrology of the Proposed Waste Isolation*  
 19 *Pilot Plant*, Mercer, 1983).

20 Mercer (1983) provides data from 16 wells sampled in the WIPP site vicinity from the Rustler-  
 21 Salado and 4 wells that sampled the dissolution residue in the uppermost Salado. The largest  
 22 concentrations of total dissolved solids (TDS) in the WIPP water-bearing formations are  
 23 contained in the Rustler-Salado contact. TDS values ranged from 67,300 milligrams per liter  
 24 (mg/L) in well P-15 (now plugged and abandoned) to 411,000 mg/L in well H-05c (not open to  
 25 formation). Sulfates and chlorides of calcium, magnesium, sodium, and potassium make up the  
 26 primary dissolved mineral constituents of this brine.

27 **Rustler Formation**

28 The Rustler is made up of five distinct members. These are, from top to bottom (also newest to  
 29 oldest), the Forty-niner, Magenta, Tamarisk, Culebra, and Los Medaños. The Culebra and  
 30 Magenta (discussed below) are significant water-bearing zones with confining layers above and  
 31 below.

32 **Culebra**

33 The Culebra is the most transmissive hydrologic unit within the WLWA boundary and is some  
 34 1,000 ft (300 m) above the repository level. It is considered the most significant potential  
 35 hydrologic pathway for a release to the accessible environment. Tests show that the Culebra is  
 36 a fractured, heterogeneous dolomite system with varying local anisotropic characteristics  
 37 (Mercer and Orr, 1977; Mercer, 1983; SAND86-2311; SAND87-0039; SAND98-0049).  
 38 Calculated transmissivities for the Culebra within the WIPP site boundary have a wide range  
 39 with values from  $9.0 \times 10^{-2}$  ft<sup>2</sup>/day to approximately 69 ft<sup>2</sup>/day ( $8.3 \times 10^{-3}$  m<sup>2</sup>/day to  
 40 approximately 6.4 m<sup>2</sup>/day) (hydraulic conductivities range from  $1.19 \times 10^{-3}$  m/day to  
 41  $9.14 \times 10^{-1}$  m/day). However, the majority of the values are less than  $9.3 \times 10^{-2}$  m<sup>2</sup>/day  
 42 (Hydraulic Conductivity of  $1.3 \times 10^{-2}$  m/day) (1 ft<sup>2</sup>/day) (SAND87-0039). Transmissivities  
 43 generally decrease from west to east across the WIPP site. The regional flow direction of  
 44 groundwater in the Culebra is generally to the south.

1 Water quality in the Culebra varies greatly. The TDS values range from 3,300 mg/L at well  
2 H-09bR to about 353,000 mg/L at well SNL-06. These two wells are fairly remote from the  
3 WIPP site but, even at closer proximity, a marked variation in the water quality is observed. At  
4 well H-02a (now plugged), located 0.5 mile (0.8 km) west of the center of the WIPP site, Culebra  
5 water has a TDS of 13,500 mg/L, while at well H-15, which lies one mile east of the center of the  
6 WIPP site, it has a TDS of 231,000 mg/L. The chemical constituents consist predominantly of  
7 sulfates and chlorides of calcium, magnesium, potassium, and sodium.

## 8 **Magenta**

9 The Magenta is separated from the Culebra by anhydrite, gypsum, and mudstones of the  
10 Tamarisk. The Magenta has been tested in 18 cased and open boreholes at and around the  
11 WIPP site. Transmissivities within the WIPP site range from  $2.1 \times 10^{-3}$  to  $3.8 \times 10^{-1}$  ft<sup>2</sup>/day  
12 ( $2.0 \times 10^{-4}$  to  $3.5 \times 10^{-2}$  m<sup>2</sup>/day) (SAND89-0869; SAND98-0049).

13 The water quality data for the Magenta indicate the water is saline to brine, with TDS values  
14 ranging from 5,460 to 270,000 mg/L. The predominant dissolved species are sodium, calcium,  
15 magnesium, chloride, and sulfate.

## 16 **Dewey Lake Redbeds Formation**

17 The Dewey Lake at the WIPP site is approximately 500 ft (152 m) thick and consists of  
18 alternating thin beds of siltstone and fine-grained sandstone. The upper Dewey Lake consists  
19 of a thick, generally unsaturated section. The middle Dewey Lake is the interval immediately  
20 above a cementation change, from carbonate (above) to sulfate (below), where saturated  
21 conditions and a natural water table have been identified in limited areas. The average  
22 saturated thickness is 16.6 ft (5.1 m). The lower Dewey Lake is below the sulfate cementation  
23 change, with much lower permeability.

24 The WIPP Groundwater Level Monitoring Program well WQSP-6A, approximately 1 mi (1.6 km)  
25 southwest of the center of the WIPP site, intersects water in the middle portion of the Dewey  
26 Lake. The Dewey Lake in general does not yield a sufficient domestic water supply; both in  
27 quality and volume. However, about 1.75 mi (2.8 km) south of WQSP-6A domestic and stock  
28 supply wells produce water from the middle Dewey Lake at Mills [formerly James] Ranch  
29 (*Geohydrology of Project Gnome Site* [Cooper and Glanzman, 1971]).

## 30 **Santa Rosa Formation**

31 The Triassic Santa Rosa consists of sandstones, siltstones, and conglomerates. It is absent  
32 over the western portion of the WIPP site. It dips and thickens from the center of the site to the  
33 east, increasing from 2 ft (0.6 m) thick at the air intake shaft to 255 ft (78 m) in potash holes 1 mi  
34 (1.6 km) east of the WIPP site boundary.

35 Water in the Santa Rosa has been found in the center part of the WIPP site only since the mid-  
36 1990s. In as much as no water was found in this zone during the mapping of the shafts in the  
37 1980s, this water is deemed to be caused by man (see Section 3.3.1.3, Shallow Subsurface  
38 Water).

## 39 **Gatuña Formation**

40 Overlying the Santa Rosa, the Gatuña Formation (Gatuña) is a sandstone that typically



1 increases in thickness towards the west of the WIPP site. The Gatuña unconformably overlies  
2 the Santa Rosa at the WIPP site, ranging in thickness from approximately 20 to 30 ft (6 to 9 m).  
3 The Gatuña consists of silt, sand, and clay, with deposits formed in localized depressions during  
4 the Pleistocene period. The Gatuña is water bearing in some areas, with saturation occurring in  
5 discontinuous perched zones. However, because of its erratic distribution, the Gatuña has no  
6 known continuous saturation zone. Drilling at the WIPP site, including 30 exploration borings  
7 drilled between 1978 and 1979, did not identify saturated zones in the Gatuña (Daniel B.  
8 Stephens & Associates, 2003).

### 9 **3.2.1.2 Seismicity**

10 The FEIS (DOE/EIS-026) defines the WIPP site as an area of low seismicity. Section 7.3.1 of  
11 the FEIS contains a detailed description of historical seismicity. The strongest earthquake on  
12 record within 80 mi (290 km) of the site was the Valentine, Texas, earthquake of August 16,  
13 1931 (Doser 1987), with an estimated magnitude of 6.4. Seismic activity within 186 mi (300 km)  
14 of the WIPP site is currently monitored by seismographs installed and operated by the New  
15 Mexico Institute of Mining and Technology. Based on four quarterly reports for 2016 and  
16 reports from other seismic networks in the region, the largest was a 3.6 magnitude event  
17 located 83 mi (140 km) south of the WIPP site. The closest seismic event recorded had a  
18 magnitude of -1.7 and was located about 17 mi (27 km) north-northeast of the WIPP site. The  
19 events had no observable effect on WIPP facility structures (New Mexico Institute of Mining and  
20 Technology, 2016).

### 21 **3.2.1.3 Soils**

22 The Mescalero caliche, Berino soil, and surficial sands overlie the Gatuña. The Mescalero is an  
23 informal soil stratigraphic unit defined in *Geologic Processes and Cenozoic History Related to*  
24 *Salt Dissolution in Southeast New Mexico* (Bachman, 1974). It is widespread in southeastern  
25 New Mexico, and is a continuous stratigraphic unit at the WIPP site. The Mescalero near the  
26 WIPP site is about 5 ft (1.5 m) thick and about 5 to 10 ft (1.5 to 3 m) below ground surface  
27 (BGS). Overlying the Mescalero is the Berino soil overlain by surficial sands. The Berino soil is  
28 not a geologic unit, it is pedogenic. The surface sand across much of the WIPP site is aeolian,  
29 generally fine to medium grained and well sorted. Sand dunes in the vicinity of the WIPP area  
30 are generally stabilized by vegetation (*Basic Data Report for Drillhole C-2737*,  
31 DOE/WIPP-01-3210). Table 7-13 of the FEIS (DOE/EIS-026) provides details regarding the  
32 engineering suitability of Berino soil at the WIPP site.

33 A recent geotechnical investigation was performed at WIPP for a proposed filter building due  
34 east of the proposed above ground storage facility location. Several geotechnical tests were  
35 performed and the general conclusion was there are no soil constraints (e.g., expansive soils)  
36 that would preclude the development of the new filter building. The report did recommend the  
37 removal of surficial dune sand and soils to the Mescalero Caliche to support foundations  
38 (Golder Associates, 2016). The same assumptions would be applied to the above ground  
39 storage facility location.

## 40 **3.2.2 Environmental Consequences**

### 41 **3.2.2.1 Alternative 1**

42 Geological behavior, as well as key factors for performance of the repository, has been studied  
43 at the WIPP site and the proposed project area for over 30 years. Based on the results of site

1 investigation summarized in numerous publications, including the WIPP *Geological*  
2 *Characterization Report* (SAND78-1596); the *WIPP Design Validation Final Report* (DOE/WIPP-  
3 86-010); and *Summary of Site-Characterization Studies Conducted from 1983 through 1987 at*  
4 *the Waste Isolation Pilot Plant (WIPP) Site Southeastern New Mexico* (SAND88-0157), no  
5 substantive changes have occurred in the understanding of the site and regional geology over  
6 this time period. The geological system, including seismicity, has been stable throughout this  
7 timeframe. There are not any active faults (less than 150 years) in the area of the WIPP site for  
8 hundreds of kilometers (United States Geologic Society Interactive Fault Map).

9 Alternative 1 is a surface-based facility that does not require the modification of the geology.  
10 Soils will be removed where necessary to make room for properly engineered base material for  
11 the concrete pad and associated drainage and pond features. Removal of topsoil will not be  
12 significant and top soil will be stored for eventual reclamation activities as is the practice at the  
13 WIPP facility. Therefore, impacts to geology and soils from implementation of Alternative 1  
14 would be negligible.

### 15 **3.2.2.2 Alternative 2**

16 The analysis presented above under Alternative 1 is applicable to Alternative 2; because the  
17 differences in construction and operation methodologies (e.g., ground disturbing activities)  
18 would not lead to any greater impact to geology and soils; therefore, impacts to geology and  
19 soils from implementation of Alternative 2 would be negligible.

### 20 **3.2.2.3 No Action Alternative**

21 Under the No Action Alternative, the proposed action would not be implemented. Consequently,  
22 the existing conditions (as described in Section 3.2.1, Existing Environment) would remain  
23 unchanged. Therefore, no impacts to geology and soils would occur under the No Action  
24 Alternative.

## 25 **3.3 Hydrology/Water Quality**

### 26 **3.3.1 Existing Environment**

#### 27 **3.3.1.1 Surface Water**

28 No surface water occurs in the area of the WIPP site and proposed project area, but surface  
29 water bodies lie within a 25-mile (40-km) radius of the center of the site, such as the Pecos  
30 River, Laguna Grande de la Sal, and livestock ponds (termed “tanks”), which are fed from  
31 surface runoff, and are sampled as part of the *Waste Isolation Pilot Plant Environmental*  
32 *Monitoring Plan* (DOE/WIPP-96-2194).

33 The nearest substantial surface water body, Laguna Grande de la Sal, is 8 miles (13 km) west-  
34 southwest of the center of the WIPP site in Nash Draw where shallow brine ponds occur. The  
35 Pecos River is located about 12 miles (20 km) west of the WIPP site. The livestock tanks are  
36 not hydrologically connected to the formations overlying the WIPP repository.

37 In the vicinity of the WIPP site, there are limited occurrences of potable water, and several  
38 water-bearing zones that produce poor-quality water. In the immediate vicinity of the WIPP site,  
39 groundwater is commonly of such poor quality that it is not usable for most purposes  
40 (*Groundwater Protection Program Plan*, DOE/WIPP-06-3339).

1 **3.3.1.2 Groundwater**

2 Several water-bearing zones have been identified and extensively studied at and near the WIPP  
3 site. Limited amounts of potable water are found in the middle Dewey Lake and the overlying  
4 Santa Rosa and Gatuña in the southern part of the WIPP LWA. Two water-bearing units, the  
5 Culebra and the Magenta, occur in the Rustler and produce brackish to saline water at and near  
6 the WIPP site. Another very low transmissivity, saline water-bearing zone occurs at the Rustler  
7 and Salado contact. More detail regarding groundwater at the WIPP site can be found in  
8 Section 3.2.1.1.

9 A Groundwater Detection Monitoring Program is required by the WIPP Hazardous Waste  
10 Facility Permit. In 2015, groundwater samples were collected and analyzed from six detection  
11 monitoring wells in the Culebra on the WIPP site. Concentrations of the indicator parameters,  
12 including those of the major cations, were all below the concentrations from the baseline studies  
13 with some exceptions for total suspended solids. Volatile organic compounds, semi-volatile  
14 organic compounds, and metals were less than background values stated in the WIPP Permit.  
15 The concentrations of the uranium isotopes measured in 2015 did not vary substantially from  
16 the concentrations measured in the same wells in 2014 (*Waste Isolation Pilot Plant Annual Site  
17 Environmental Report for 2015*, DOE/WIPP-16-3572). Two water-bearing zones exist beneath  
18 the WIPP site above the repository horizon. The Culebra is the most transmissive and occurs  
19 675 ft (206 m) BGS in the area. The Magenta is less transmissive and occurs 571 ft (174 m)  
20 BGS (*Basic Data Report for Drillhole C-2737*, DOE/WIPP-01-3210).

21 **3.3.1.3 Shallow Subsurface Water**

22 Beginning in 1995, water was observed leaking into the Exhaust Shaft between 50 and 80 ft  
23 (15 and 24 m) BGS. Studies indicate that the water leaking into the shaft is from an unconfined,  
24 perched water table at the base of the Santa Rosa. This water is believed to come from  
25 anthropogenic causes, specifically from infiltration of rainfall that collected in surface  
26 impoundments on the WIPP site, such as the north salt storage catchment basin and the storm  
27 water runoff catchment basins to the south of the site (Daniel B. Stephens and Associates,  
28 2003).

29 The SSW occurs beneath the WIPP site at depths less than 100 ft (30 m) BGS at the contact  
30 between the Santa Rosa and the Dewey Lake. This SSW yields generally less than 1 gallon  
31 per minute (4 liters per minute) in monitoring wells and piezometers and contains high TDS and  
32 chloride. The SSW occurs not only under the WIPP site surface facilities but also to the south  
33 as indicated by an encounter in borehole C-2737 about 0.5 mi (880 m) south of the Waste Shaft  
34 (*Basic Data Report for Drillhole C-2811*, DOE/WIPP-02-3223). A study of results of three  
35 piezometers drilled around the Site and Preliminary Design Validation salt pile (*Basic Data  
36 Report for Piezometers PZ-13, PZ-14, and PZ-15*, DOE/WIPP-08-3375) indicated SSW to be  
37 present to the east of the surface facilities.

38 The saturated zone is both vertically and laterally distinct from the water in the middle of the  
39 Dewey Lake at WQSP-6A, located about one mile to the southwest. Sample results at  
40 WQSP-6A have not indicated the existence of a hydraulic connection between the SSW located  
41 in the Santa Rosa and natural groundwater that occurs in the middle part of the Dewey Lake at  
42 the southern portion of the WIPP site and further south.

43

1    **3.3.2    Environmental Consequences**

2    **3.3.2.1    Alternative 1**

3    Hydrology/water quality has been studied at the WIPP site for over 30 years. Surface water  
4    bodies are not impacted by activities at the WIPP site. Water-bearing formations (Culebra,  
5    Magenta) are deep and separated from the surface by several hundred feet of low-permeability  
6    geologic formations (aquitards), limiting or preventing infiltration. Recharge to the Culebra is  
7    north and northwest of Nash Draw. Discharge from the Culebra is south of Laguna de la Sal  
8    near Malaga Bend. Recharge for the Magenta is north of the WIPP site near Bear Grass Draw  
9    and in Clayton Basin (*Geohydrology of the Proposed Waste Isolation Pilot Plant Site*, Mercer,  
10   1983). More importantly, vertical infiltration into these water-bearing zones does not exist at the  
11   WIPP site.

12   The rate of evapotranspiration exceeds normal precipitation by about a factor of four. This  
13   means that precipitation does not infiltrate deeply into the soil except in areas where there are  
14   sand dunes. Infiltration generally does not go beyond the Mescalero Caliche. Precipitation that  
15   falls on the concrete pad will be collected and channeled to a lined evaporation pond to prevent  
16   infiltration and to provide an opportunity to sample the water to assure there has been no  
17   release or spill of radioactive waste. Based on the containment of runoff that falls on the  
18   concrete pad, the lack of surface water and depth of water-bearing formations, separated by  
19   low-permeability formations resulting in the lack of vertical infiltration, and distant recharge and  
20   discharge locations, implementation of Alternative 1 would have a negligible impact to  
21   hydrology/water quality.

22   **3.3.2.2    Alternative 2**

23   The analysis presented above under Alternative 1 is applicable to Alternative 2 because the  
24   differences in construction and operation methodologies (e.g., ground disturbing activities)  
25   would not lead to any greater impact to hydrology and water quality. Therefore, based on the  
26   lack of surface water and the depth of water-bearing formations, separated by low-permeability  
27   formations resulting in the lack of vertical infiltration, and distant recharge and discharge  
28   locations, impacts to hydrology and water quality from implementation of Alternative 2 would be  
29   negligible.

30   **3.3.2.3    No Action Alternative**

31   Under the No Action Alternative, the proposed action would not be implemented. Consequently,  
32   the current conditions would remain unchanged. Therefore, no impacts to hydrology/water  
33   quality would occur under the No Action Alternative.

34   **3.4    Air Quality**

35   **3.4.1    Existing Environment**

36   The SEIS-II documented that the U.S. Environmental Protection Agency (EPA) has classified  
37   Eddy County, New Mexico, where the WIPP facility is located, as an attainment area for all six  
38   of the criteria pollutants under the National Ambient Air Quality Standards (NAAQS). The WIPP  
39   facility is also in a Class II Prevention of Significant Deterioration area as defined in Section  
40   160-169 of the Clean Air Act (CAA), and any new sources of emissions would have to adhere to  
41   the standards for such an area. The CAA allows for three air quality classes related to ambient

1 air quality: Class I allows very little deterioration of air quality; Class II allows moderate  
2 deterioration; and Class III allow more deterioration; but in all cases, the pollution concentrations  
3 shall not violate any of the NAAQS. The Class I Prevention of Significant Deterioration areas  
4 nearest to the WIPP facility are Carlsbad Caverns National Park, which is 38 miles (61 km)  
5 southwest of the WIPP site, and Guadalupe Mountains National Park, which is 62 miles (100  
6 km) southwest of the WIPP site (SEIS-II, pg. 4-6).

7 As discussed in the SEIS-II, the regional climate is semiarid, with low precipitation and humidity  
8 and a high rate of evaporation. Precipitation is unevenly distributed throughout the year, with  
9 most occurring during summer thunderstorms. Winds are mostly from the southeast, and  
10 moderate. In late winter and spring, there are strong west winds and dust storms.  
11 Thunderstorms are frequent from June through September, and are often accompanied by hail.  
12 Rains are brief but occasionally intense, and can result in flash flooding in arroyos and along  
13 floodplains. Tornadoes can occur throughout the region.

14 Based on the U.S. Climate Resilience Toolkit, expected climate changes include increased  
15 heat, drought, and insect outbreaks, all linked to climate change and increased wildfires.  
16 Declining water supplies, reduced agricultural yields, health impacts in cities due to heat, and  
17 flooding and erosion are additional concerns. Such changes are not anticipated to impact the  
18 potential environmental impacts of WIPP, as described in *Supplement Analysis for the Waste  
19 Isolation Pilot Plant Site-Wide Operations* (DOE/EIS-0026-SA-10).

### 20 **3.4.2 Environmental Consequences**

21 The area of the proposed action is within the Pecos River airshed and is classified as a Class II  
22 Air Quality Area (CAA Sections 160-169). A Class II area allows moderate amounts of air  
23 quality degradation. The primary causes of air pollution in the project area are from motorized  
24 equipment and dust storms caused by strong winds during the spring. Particulates from nearby  
25 oil and gas production, agricultural burning, recreational and industrial vehicular traffic, and  
26 ambient dust can also affect air quality. Air quality in the area near the proposed action is  
27 generally considered good, and the proposed action is not located in any of the areas  
28 designated by the EPA as “non-attainment areas” for any listed pollutants regulated by the  
29 Clean Air Act (*Environmental Assessment for the Reconstruction of the South Access Road in  
30 Support of the Department of Energy*, DOI-BLM-NM-P020-2010-00114-EA).

#### 31 **3.4.2.1 Alternative 1**

32 The construction and operations emissions that would be generated under Alternative 1 are  
33 described in this section.

34 Estimates of particulate emission from dirt work of excavation and compaction, importing Type 2  
35 aggregate base, fire line excavation and backfill, electrical line excavation and backfill, and  
36 excavation of the storm water pond are shown in Table 3-1.

37

1 **TABLE 3-1. PARTICULATE EMISSIONS FROM CONSTRUCTION ACTIVITIES**

Particle Size (total suspended particulates)	lbs/day	lbs/project	tons/project
(<30 um)	248	11,264	5.6
<=30 um >15 um	194	8,850	4.4
<=15 um >10 um	13	603	0.3
<=10 um > 2.5 um	14	628	0.3
<= 2.5 um	26	1,183	0.6

Note: Emission rates are from AP-42 Table 11.9-1.

2 Emissions from the construction of the project under Alternative 1 would have a negligible  
 3 impact on the total emissions from operations of the WIPP facility. Emissions from the  
 4 construction of the project would not have substantial impact on the ambient air quality. In  
 5 addition, project-related operations emissions would be negligible.

6 The DOE requires that projects quantify a proposed action's projected direct and indirect  
 7 greenhouse gas (GHG) emissions, and use these emissions as a proxy for assessing potential  
 8 climate change effects. The WIPP comprehensive GHG inventory reported emitting 11,101  
 9 metric tons of CO<sup>2</sup> equivalent in FY 2014 and approximately 8,933 metric tons of CO<sup>2</sup>  
 10 equivalents for FY 2015 (*Waste Isolation Pilot Plant Annual Site Environmental Report for 2015*,  
 11 DOE/WIPP-16-3572).

12 In accordance with *Strengthening Federal Environmental, Energy, and Transportation*  
 13 *Management*, EO 13423, and *Federal Leadership in Environmental, Energy, and Economic*  
 14 *Performance*, EO 13514, DOE has made reduction of GHG emissions a priority. DOE's 2015  
 15 *Strategic Sustainability Performance Plan* commits the agency to reduce emissions by 25  
 16 percent from a Fiscal Year 2008 baseline in 2015 and by 50 percent by Fiscal Year 2025. The  
 17 WIPP comprehensive GHG inventory reveals that the largest contributors to the WIPP GHG  
 18 footprint are electricity use, business travel, and employee commute to the WIPP site (*Waste*  
 19 *Isolation Pilot Plant Annual Site Environmental Report for 2015*, DOE/WIPP-15-8866). Fuel  
 20 contributions represent the smallest contributor to CO<sup>2</sup>. See the *Supplement Analysis for the*  
 21 *Waste Isolation Pilot Plant Site-Wide Operations*, DOE/EIS-0026-SA-10; however, a temporary  
 22 increase of CO<sup>2</sup> from construction activities is expected from the construction of the AGSC  
 23 project. Based upon the WIPP facility GHG profile referenced above, this temporary increase  
 24 would be negligible.

25 **3.4.2.2 Alternative 2**

26 The analysis presented above under Alternative 1 would be applicable to Alternative 2 because  
 27 the differences in construction and operation methodologies would not lead to any greater  
 28 impact to air quality. The analysis presented above under Alternative 1 would be applicable to  
 29 Alternative 2 with one exception. The Sprung® structure would require additional electricity use  
 30 for internal structure lighting as well as continuous ventilation system support; therefore, project-  
 31 related operations emissions would increase for Alternative 2 compared to Alternative 1.

32 The analysis presented above under Alternative 1 would be applicable to Alternative 2 because  
 33 the differences in construction and operation methodologies would not lead to any greater  
 34 impact to air quality. However, the Sprung® structure lighting and continuous ventilation system

1 support would require an insignificant increase in electrical power compared to Alternative 1.  
2 The operational emissions associated with this increase in electrical power would be negligible.  
3 Therefore, impacts to air quality from implementation of Alternative 2 would be negligible.

#### 4 **3.4.2.3 No Action Alternative**

5 Under the No Action Alternative, the proposed action would not be implemented. Consequently,  
6 the existing conditions would remain unchanged. Therefore, no impacts to air quality would  
7 occur under the No Action Alternative.

### 8 **3.5 Cultural Resources**

#### 9 **3.5.1 Existing Environment**

10 The WLWA is situated in dune-covered, rolling-plains terrain in the eastern part of the Bureau of  
11 Land Management's (BLM's) Carlsbad Resource Area. Known archaeological sites within the  
12 area are primarily the remains of prehistoric camps and short-term settlements. These localities  
13 are generally marked by hearth features, scattered burned rock, flaked stone projectile points,  
14 cutting and scraping tools, pottery fragments, and ground stone implements. Locations  
15 generally represent short-term, seasonal occupations by small, nomadic groups of hunters and  
16 gatherers who used the plants and animals in the dune lands east of the Pecos River. In a few  
17 cases within the WLWA, sites with evidence of structures have been reported. These sites  
18 probably hosted occupations of perhaps several weeks or months (*Waste Isolation Pilot Plant*  
19 *Land Management Plan*, DOE/WIPP-93-004). The following is a summary of archeological  
20 work performed at the site.

21 In 1976, the Agency for Conservation Archaeology (ACA) from Eastern New Mexico University  
22 conducted an archaeological survey of the core area within the WLWA (Sections 20, 21, 28, and  
23 29) and various other locations around the WIPP facility including rights-of-way and well pads.  
24 Additional rights-of-way and well pads were inventoried in 1978 and 1979 by ACA. The ACA  
25 surveys included various north/south corridors in the areas south of the WIPP site including the  
26 northeast corner of Section 29 which include the project area. None of these corridors indicated  
27 any archaeological sites within or near the corridors, except in areas farther south than the  
28 project area. In 1987, Mariah Associates conducted an intensive study of portions of 45  
29 sections surrounding the WIPP site. Mariah's study included an inventory of 2,460 acres in 15  
30 quarter-section units. Inventoried units were selected to be representative of the area as a  
31 whole. Within each of the sample units, cultural resource sites encountered were recorded,  
32 certain selected sites were tested, and management recommendations were prepared (Mariah  
33 Associates, 1987).

34 Of a total of 10,240 acres (4,144 hectares) in the WLWA, 3,380 acres (1,368 hectares)  
35 (37 percent) have been inventoried for cultural resources. The results indicate one site for  
36 every 65 acres (26 hectares) surveyed, and one isolate in every 42 acres (17 hectares). Based  
37 on this information, and assuming environmental homogeneity and a fairly even distribution of  
38 sites, the remaining 6,410 un-inventoried acres (2,594 hectares) could contain approximately 99  
39 sites and 153 isolates. The combined results of the surveys conducted within the WLWA  
40 compare well with those from Mariah's 1987 inventory of selected units over a much larger area.  
41 Mariah's results show only a slightly higher frequency of cultural resources per acre. In the  
42 2,460 acres (996 hectares) surveyed by Mariah, 40 sites and 75 isolates were recorded, or one  
43 site for every 62 acres (25 hectares) and one isolate in every 33 acres (13 hectares)  
44 (DOE/WIPP-93-004).

1 Based on the results of the Mariah inventory, there is a high likelihood that archaeological sites  
2 exist within the project area. In 1997, the DOE officially entered into a Joint Powers Agreement  
3 with agencies from the State of New Mexico (DOE, 1997) including the SHPO who coordinates  
4 state participation in implementing the National Historic Preservation Act (NHPA).  
5 Commitments by both agencies are established in the agreement with regard to notification time  
6 lines. In addition, the agreement reiterates the DOE obligation to manage cultural resources in  
7 accordance with Sections 106 and 110 of the NHPA, the Archaeological Resource Protection  
8 Act, Native American Graves Protection and Repatriation Act, and applicable DOE orders.  
9 Accordingly, the DOE evaluates construction activities in previously undisturbed areas for  
10 potential impacts to cultural resources as required by the Land Management Plan (DOE/WIPP-  
11 93-004). New surface-disturbing activities are evaluated by a licensed archaeologist and, if  
12 necessary, concurrence is obtained from the SHPO prior to allowing the action to proceed. In  
13 the event that any archaeological sites or isolated manifestations are uncovered during  
14 construction, work would cease to allow the sites to be studied (*Archaeological Clearance*  
15 *Report for Sandia Laboratories* [Schermer, 1978]).

## 16 **3.5.2 Environmental Consequences**

### 17 **3.5.2.1 Alternative 1**

18 Of the 40 sites identified and evaluated on the Mariah inventory, 14 appear to be eligible for the  
19 National Register of Historic Places, 24 are potentially eligible, and 2 are not eligible. None of  
20 the 75 isolates are considered eligible. While the data from the various researchers cited above  
21 are not always consistent with Mariah's explicit data on-site significance, it appears that within  
22 the WLWA, the majority of sites either are or have the potential to be eligible for the National  
23 Register of Historic Places and will require consideration in future land disturbing activities  
24 (DOE/WIPP-93-004).

25 In August 1978, the Agency for Conservation Archaeology from Eastern New Mexico University  
26 conducted an archaeological survey of the area around the WIPP facility. The Agency for  
27 Conservation Archaeology surveyed various north/south corridors in the areas south of the  
28 WIPP site. None of these corridors indicated any archaeological sites within or near the  
29 corridors except in areas farther south than the project area. Therefore, impacts to cultural  
30 resources from implementation of Alternative 1 would be negligible.

### 31 **3.5.2.2 Alternative 2**

32 The analysis presented under Alternative 1 applies to Alternative 2 because the differences in  
33 construction and operation methodologies (e.g., ground disturbing activities) would not lead to  
34 any greater impact to cultural resources. Therefore, impacts to cultural resources from  
35 implementation of Alternative 2 would be negligible.

### 36 **3.5.2.3 No Action Alternative**

37 Under the No Action Alternative, the proposed action would not be implemented. Consequently,  
38 baseline conditions would remain unchanged. Therefore, no impacts to cultural resources  
39 would occur under the No Action Alternative.

## 40 **3.6 Hazardous Materials and Hazardous Wastes**

### 41 **3.6.1 Existing Environment**



1 The WIPP facility/proposed project area has a NMED Discharge Permit for a wastewater lagoon  
2 facility. The daily discharge limit to the lagoon is 23,000 gallons (87,000 L) per day of domestic  
3 wastewater, 2,000 gallons (7,570 L) per day of miscellaneous non-hazardous water, and  
4 8,000 gallons (30,283 L) per day of miscellaneous non-hazardous brine and water. The DOE  
5 currently does not require a National Pollutant Discharge Elimination System permit for the  
6 WIPP. There is no point source discharge to waters in the United States. A National Pollutant  
7 Discharge Elimination System storm water permit would be needed for construction activities on  
8 sites larger than 5 acres (2 hectares).

9 During operations at the WIPP facility, Resource Conservation and Recovery Act hazardous  
10 wastes are generated. These wastes typically included absorbed liquids from spills and routine  
11 usage of maintenance products, including oils, coolants, and solvents. Safe storage of these  
12 materials and their associated hazards are administered in compliance with the Site Generated  
13 Non-Radioactive Hazardous Waste Management Program, the Industrial Safety Program, and  
14 the WIPP Emergency Management Program. A Hazardous Waste/Material Storage Facility is  
15 provided for storage of various types of incoming and outgoing hazardous materials prior to use  
16 or shipment to a Treatment, Storage, and Disposal Facility (*Waste Isolation Pilot Plant*  
17 *Documented Safety Analysis*, DOE/WIPP-07-3372).

18 Consideration of hazardous materials and hazardous waste at the WIPP facility, for the  
19 purposes of NEPA, also considers the generation of radioactive waste. When used as a fire  
20 suppressant, water is the largest potential source of liquid radioactive waste. Another source  
21 would be liquid used for decontamination. In an unlikely fire event, suspect liquids would be  
22 sampled and tested for radioactivity. If the liquid exceeds the uncontrolled release limit imposed  
23 by *Radiation Protection of the Public and the Environment*, DOE Order 458.1, and the  
24 radioactivity is derived from offsite waste containing transuranics, it is collected and made  
25 acceptable for disposal at the WIPP facility. Non-fire water radioactive waste is collected and  
26 handled in accordance with the procedure in *Site-Derived Mixed Waste Handling*, WP  
27 05-WH1036.

28 The solid radioactive waste system provides for the collection and packaging of site-derived  
29 radioactive waste. It is anticipated that site-derived waste would be CH TRU mixed waste.

30 In addition to the processes and procedures identified above, the Nuclear Waste Partnership  
31 LLC has a standing procurement clause for subcontract work regarding environmental  
32 compliance in reference to construction projects. The standing clause states that the  
33 subcontractor and its lower-tier subcontractors and suppliers of any tier, including the  
34 employees and agents, shall comply with all health, safety, and environmental laws, statutes,  
35 ordinances, rules, regulations, permits, and orders regulating or dealing with a hazardous  
36 substance or hazardous waste that becomes applicable during the term of the contract. Also,  
37 the subcontractor shall obtain required permits, licenses, certificates, approvals, and other  
38 authorities required to conduct work and perform the services specified under the contract. The  
39 subcontractor is the responsible party for managing, treating, and disposing of any hazardous  
40 waste that is generated throughout the project.

### 41 **3.6.2 Environmental Consequences**

#### 42 **3.6.2.1 Alternative 1**

43 Construction of an Overpack Unit would lead to new waste generation. These waste forms  
44 would range from the sanitary solid and liquid wastes that would be associated with any facility

1 to the hazardous wastes that would be generated from the construction of the Overpack Unit.  
2 Sanitary wastes are generally disposed of via municipal sewers and treated at municipal waste  
3 treatment facilities. Construction contracts include clauses that require the contractor to  
4 manage and properly disposition any waste generated as the result of construction activities.

5 With regard to operation of an Overpack Unit, the generation of hazardous and radioactive  
6 waste would be minimal and would likely be associated with accidents or off-normal events.  
7 Storage and disposal of such waste under Alternative 1 at the WIPP facility would involve the  
8 same established processes, procedures, and equipment that are currently in use at the WIPP  
9 facility (as discussed above). Therefore, hazardous materials/hazardous wastes impacts from  
10 implementation of Alternative 1 would be negligible.

#### 11 **3.6.2.2 Alternative 2**

12 The analysis presented above under Alternative 1 is applicable to Alternative 2; therefore,  
13 impacts of implementation of Alternative 2 would be negligible.

14 Operation of Alternative 2 will result in an additional waste stream that includes the HEPA  
15 filtration system filters. Based on operating experience in the WHB, these filters are replaced  
16 infrequently and do not represent a significant volume increase. Managing these filters is well  
17 within the current capability of the WIPP facility processes, procedures, equipment and  
18 personnel.

#### 19 **3.6.2.3 No Action Alternative**

20 Under the No Action Alternative, DOE would not build the AGSC (i.e., the proposed action  
21 would not be implemented). The No Action Alternative would require no action for the WIPP  
22 site. Under the No Action Alternative, the management of hazardous waste is the same as the  
23 existing environment. No impacts would result from the No Action Alternative.

24

1 **3.7 Nuclear and Operational Safety**

2 **3.7.1 Existing Environment**

3 The *Waste Isolation Pilot Plant Above Ground Storage Capability (AGSC) Project Preliminary*  
 4 *Documented Safety Analysis* (416-500655-BD-SE-00305) provides an assessment of hazards  
 5 associated with normal, abnormal, and accident conditions involving handling and disposal  
 6 operations with CH TRU mixed waste and RH TRU mixed waste in shielded containers. The  
 7 assessment includes natural phenomena hazards (NPH) and man-made external events,  
 8 including the identification of energy sources or processes that might contribute to the  
 9 generation or uncontrolled release of radioactive and other hazardous materials. In addition,  
 10 events that may be beyond the design basis of the WIPP facility are also assessed.

11 When converting radiological doses to potential latent cancer fatalities (LCFs), the SEIS-II  
 12 (*Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact*  
 13 *Statement*, DOE/EIS-0026-S-2), used a factor of  $5 \times 10^{-4}$  fatality per roentgen equivalent  
 14 man (rem) for the public and a factor of  $4 \times 10^{-4}$  fatality per rem for workers. The value for  
 15 workers was lower due to the absence of children and the elderly, who are considered  
 16 more radiosensitive (*Final Programmatic Environmental Impact Statement for*  
 17 *Accomplishing Expanded Civilian Nuclear Research and Development and Isotope*  
 18 *Production Missions in the United States, Including the Fast Flux Test Facility*,  
 19 DOE/EIS-0310). Since publication of the SEIS-II, DOE guidance (DOE, 2003) recommends  
 20 the use of a conversion factor of  $6 \times 10^{-4}$  fatality per rem for both workers and members of  
 21 the public. The DOE guidance recommends use of factors developed by the document *A*  
 22 *Method for Estimating Radiation Risk from Total Effective Dose Equivalent (TEDE)*  
 23 [Interagency Steering Committee on Radiation Standards, 2002].

24 Table 3-2 depicts worker dose information for normal operations for the years 2013 to 2015.  
 25 The 2013 information represents worker doses for operations before the February 2014  
 26 incidents; the 2015 information represents worker doses associated with post-February  
 27 2014 activities. Data are presented for the average worker, the maximally exposed worker,  
 28 and all workers (collective annual). As the data shows, average worker doses and  
 29 maximally exposed worker doses at the WIPP facility are very small (less than  
 30 1 millirem (mrem)/yr). Collective annual worker doses are also small, at less than  
 31 1 person-rem/yr. Table 3-2 also presents the potential for a LCF using the dose conversion  
 32 factor of  $6 \times 10^{-4}$  fatality per rem.

33 **TABLE 3-2. WORKER DOSES AND IMPACTS**

	2013		2014		2015	
	Dose	LCF	Dose	LCF	Dose	LCF
Average Worker	<1 mrem/yr	$6 \times 10^{-7}$	<1 mrem/yr	$6 \times 10^{-7}$	<1 mrem/yr	$6 \times 10^{-7}$
MEI	<1 mrem/yr	$6 \times 10^{-7}$	<34 mrem/yr	$2 \times 10^{-5}$	<1 mrem/yr	$6 \times 10^{-7}$
All Workers (annual)	0.564 person-rem/yr	$3.4 \times 10^{-4}$	0.034 person-rem/yr	$2 \times 10^{-5}$	0.161 person-rem/yr	$9.7 \times 10^{-5}$

Source: DOE/WIPP-16-3572 with dose data documented the Radiation Exposure Monitoring System database, <https://energy.gov/ehss/policy-guidance-reports/databases/occupational-radiation-exposure>.

1 As with the pre-February 2014 disposal activities at the WIPP facility, potential worker  
2 exposures would achieve as-low-as-reasonably-achievable by four main factors: (1) using  
3 appropriate personal protective equipment; (2) minimizing times of exposure; (3)  
4 maintaining operations that would initially process and dispose of only CH TRU mixed  
5 waste; and (4) configuration of the U/G ventilation so that ventilation flow is always directed  
6 from the involved workers toward areas of potential contamination and then to the HEPA  
7 filtration system. Over time, the TRU waste disposal throughput would gradually increase  
8 to levels similar to those in 2013 and, as a result of the same as-low-as-reasonably-  
9 achievable principles identified above, it is expected that worker doses following resumption  
10 of activities would be less than or similar to 2013 levels (DOE/WIPP-16-3572).

11 DOE has estimated that the annual worker exposures projected after the resumption of  
12 TRU waste emplacement would be less than or similar to the doses measured in 2013  
13 (DOE/WIPP-16-3572). Based on the data in Table 3-2, the annual impacts to all workers  
14 would be less than or equal to  $3.4 \times 10^{-4}$  LCF, which is within the bounds of the analysis  
15 presented in the SEIS-II.

16 The principal hazard analyzed for the WIPP facility/proposed project site is the potential for the  
17 release of radiological material associated with TRU mixed waste resulting from fires,  
18 deflagrations/over-pressurizations, and loss of confinement events due to in-process activities,  
19 external initiation, or NPH initiated events. The hazard and accident analyses are performed  
20 using the methodology outlined in DOE-STD-5506-2007 for compliance with DOE-STD-3009-  
21 2014, and approved by the DOE Carlsbad Field Office for application at the WIPP site.

22 The principal operations at the WIPP facility involve the receipt and disposal of TRU waste and  
23 TRU mixed waste. WIPP CH TRU mixed waste operations considered in the *Waste Isolation*  
24 *Pilot Plant Documented Safety Analysis (DSA)*, DOE/WIPP-07-3372, include the following:

25 • The process for receipt, movement, and emplacement of CH TRU mixed waste  
26 containers with battery-powered and diesel-fueled forklifts, electric-powered Automated Guided  
27 Vehicles, cranes, and the Waste Hoist is depicted in Figure 3-2. (Note: underground operations  
28 are not depicted in Figure 3-2 because they would not be impacted by the Proposed Action and  
29 Alternatives). The following steps are included in this process:

30 – The transportation carrier, after entering the WIPP PPA, parks a trailer with loaded  
31 shipping packages adjacent to the WHB within the PAU hazardous waste storage unit.

32 – A trailer jockey is used to move the loaded trailer, with its accompanying shipping  
33 packages, adjacent to an airlock, in preparation for transit of the loaded shipping packages into  
34 the WHB CH Bay.

35 – A forklift is used to transfer the loaded shipping packages from the trailer through the  
36 airlock to a TRUDOCK unloading station within the WHB.

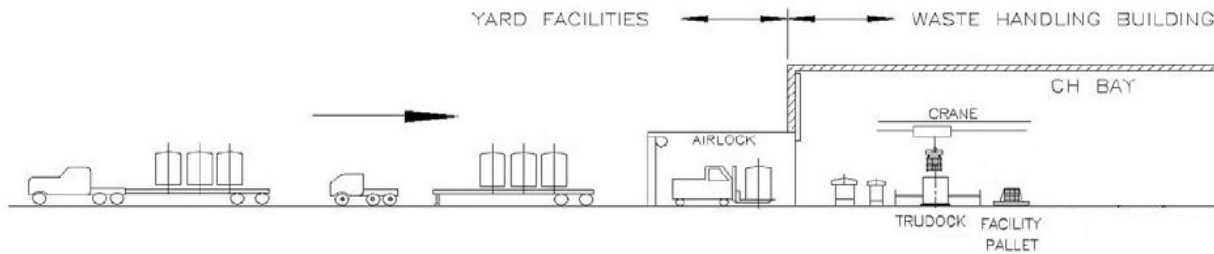
37 – An overhead crane is used to remove the shipping package lids and place them onto  
38 support stands; then the crane operator proceeds to remove the waste containers from the  
39 shipping packages and place them onto facility pallets.

40 The DOE uses the DSA process to describe and analyze the hazards and risks associated with  
41 the WIPP facility waste handling and disposal operations. In the DSA, the DOE identifies the  
42 hazard controls necessary to protect the worker, the public, and the environment. Regarding  
43 the condition of the existing environment, the safety basis demonstrates that the DOE employs  
44 the necessary controls to provide an acceptable level of safety compliant with 10 CFR 830,

1 Subpart B.

2 The existing requirements do not allow for prolonged storage of TRU waste and TRU mixed  
 3 waste above ground at the WIPP facility. The Permit and NEPA documentation require the  
 4 receipt and disposal of TRU waste shipments with no storage at the surface beyond the  
 5 timeframe allowed for storage in the NRC Type B shipping containers certificate of compliance  
 6 (up to 60 days once the inner containment vessel is sealed) and the administrative limits in the  
 7 Permit for the WIPP WHB and the PAU.

8



9

10 **FIGURE 3-2. GENERAL WASTE HANDLING PROCESS FOR CH TRU MIXED WASTE OPERATIONS**

11 **3.7.2 Environmental Consequences**

12 **3.7.2.1 Alternative 1**

13 Because of the change to the facility footprint, the proposed AGSC project has been evaluated  
 14 to meet the requirements for definition as a major DSA modification as described in *Integration*  
 15 *of Safety into the Design Process*, DOE-STD-1189-2016. The facility footprint change of  
 16 interest for Alternative 1 is the addition of an Overpack Unit, which would extend the facility  
 17 footprint to the south of the existing PPA boundary; however, this would not represent an  
 18 increase in the overall WIPP facility TRU waste inventory since the surface storage would be  
 19 temporary and waste that would ever be in the Overpack Unit would already be included in the  
 20 total WIPP TRU waste inventory. It would, however, be an increase in the amount of waste at  
 21 the WIPP facility on the surface at any one time, and the footprint change would reduce the  
 22 minimum distance to the maximally-exposed offsite individual (MOI) from approximately 1.9 mi  
 23 (3.1 km) to about 1.6 mi (2.5 km).

24 Therefore, the hazard that must be analyzed for Alternative 1 is the potential for the release of  
 25 radiological material associated with TRU mixed waste resulting from fires, deflagrations/over-  
 26 pressurizations, and loss of confinement events due to in-process activities, external initiation,  
 27 or NPH initiated events during transport and storage of waste outside of the WHB. The  
 28 analyses of events outside the WHB must also consider the potential impact of reduced  
 29 distance to the MOI.

30 The primary project feature, which addresses facility safety for Alternative 1, is the use of  
 31 concrete overpack containers which provide secondary containment for the waste containers  
 32 and would temporarily reside in the Overpack Unit. The waste containers within each concrete  
 33 overpack would ultimately be disposed of in the WIPP facility U/G in accordance with  
 34 established standard operating procedures. The concrete overpack design minimizes the

1 migration of hazardous waste to the environment in the event of a breach of the primary  
2 containment. The closed concrete overpack containers would be sufficiently permeable to  
3 maintain hydrogen concentrations below the lower flammability limit, and are of robust design  
4 such that waste containers are protected from rain.

5 A closed AGSC concrete overpack provides a thermal barrier to protect stored waste packages  
6 from credible external fires. This also prevents fires inside an overpack from propagating  
7 beyond the AGSC concrete overpack of interest. The concrete overpack containers would be  
8 designed to provide a two-hour barrier for fire events,

9 The likelihood and severity of fires affecting concrete overpack containers would be minimized  
10 through design features and operational restrictions. Concrete overpack containers would be  
11 manufactured with pockets for forklift tines, eliminating the need for pallets on the AGSC  
12 overpack storage pad. Existing WIPP facility fire protection program requirements minimize the  
13 presence of other combustibles on the pad and ensure a minimum 20-ft (6-m) cleared space  
14 around the stored material to protect from wildfires. The WIPP facility fire water supply system  
15 would be extended to the AGSC overpack storage pad and a new fire hydrant adjacent to the  
16 pad would be installed during construction.

17 The operations, which would be enabled by the AGSC project, for Alternative 1 are similar to  
18 those mentioned in Section 3.7.1, Existing Environment, except instead of placing the waste  
19 containers on facility pallets and emplacing them in the U/G, the waste container would be  
20 placed into concrete overpack containers within the WHB and then moved onto the Overpack  
21 Unit south of the existing WHB. These additional operations are listed below and shown in  
22 Figure 3-3:

- 23 • The transport of empty concrete overpack containers into the WHB to the TRUPACT-II  
24 TRUDOCK.
- 25 • Loading/closing of concrete overpack containers with CH TRU mixed waste (including  
26 RH TRU mixed waste in shielded containers) at the TRUDOCK.
- 27 • Movement of the loaded and closed concrete overpack out of the WHB using an all-  
28 terrain forklift of loaded concrete overpack containers to their storage locations in the Overpack  
29 Unit.
- 30 • Storage of the concrete overpack in the Overpack Unit.
- 31 • Transport of the loaded concrete overpack to outside the WHB from the Overpack Unit.
- 32 • Transport of the loaded concrete overpack from outside the WHB to the TRUDOCK.
- 33 • Unloading the contents of the loaded concrete overpack to a facility pallet.
- 34 • Removal of the empty concrete overpack from the WHB to a staging/storage location.

35 Regarding these operations:

- 36 • Operations involving empty/clean concrete overpack containers are Standard Industrial  
37 Hazard events and do not have to be further considered in the DSA.

1 • Operations inside the WHB are similar to operations already analyzed involving Type B  
2 packages and facility pallets and do not have to be considered.

3 • Since, previously, transportation of TRU waste outside the WHB was performed in NRC  
4 certified Type B packages, transportation events outside the WHB involving concrete overpack  
5 containers must be analyzed.

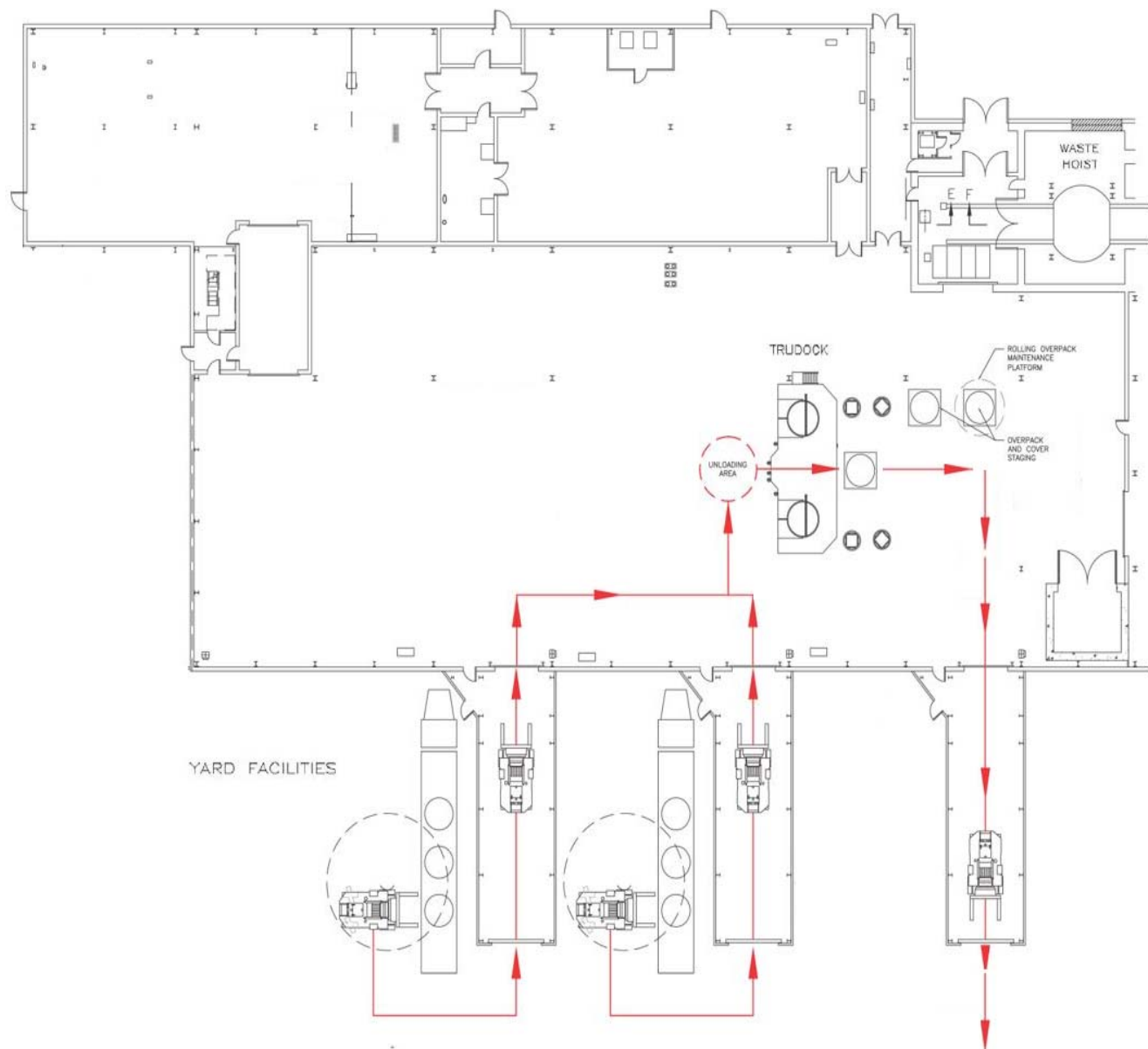
6 • Since, previously, TRU waste storage outside the WHB was performed in NRC certified  
7 Type B packages, events involving CH TRU mixed waste storage outside the WHB in concrete  
8 overpack containers must be analyzed.

9 The following safety class design feature is proposing to reduce the risk to the MOI, co-located  
10 worker, and/or facility worker:

11 • **Concrete Overpack.** The concrete overpack is of robust design with 8-in. (20-cm)  
12 reinforced concrete walls/lid and with a 6-in. (15-cm) concrete base to protect its contents from  
13 mechanical damage and NPH events including tornado hazards, has a large mass and diameter  
14 to resist sliding and overturning in seismic and NPH events, provides a minimum two-hour fire  
15 barrier to protect its contents from exterior fires and prevent internal fires from spreading outside  
16 the overpack, and permits venting of hydrogen through concrete permeation to prevent  
17 flammable concentrations.

18 The following administrative control is modified to reduce the risk to the MOI, co-located worker,  
19 and/or facility worker:

20 • **TRU Waste Outside the WHB.** The TRU waste outside the WHB control is modified to  
21 ensure that TRU waste containers are protected from adverse events (e.g., fires, explosions,  
22 impacts) when located above ground and outside the WHB. This control excludes site-derived  
23 TRU waste. This is accomplished by ensuring that TRU waste (excluding site-derived TRU  
24 waste), above ground and outside of the WHB, is contained in either a closed NRC certified  
25 Type B shipping package or a closed concrete overpack.



1  
2 **FIGURE 3-3. CH TRU MIXED WASTE TRANSPORT ROUTES IN THE WASTE HANDLING BUILDING (TOP VIEW) –**  
3 **ALTERNATIVE 1**



1 The following administrative controls are proposed to reduce the risk to the MOI, co-located  
2 worker, and/or facility worker:

3 • **Payload lift height restriction.** Because the concrete overpack sits on the floor of the  
4 WHB during loading and unloading, the lift height for removing the payload from the TRUPACT  
5 II or HalfPACT is no different than the height required for putting the payload on a facility pallet,  
6 the existing DSA analysis is adequate.

7 • **Concrete overpack tipping potential.** The payload in a concrete overpack is not at a  
8 sufficient height in order to allow it to tip over by itself. If struck by another object, sufficient  
9 momentum could be applied to tip over the concrete overpack. The massive structure of the  
10 concrete overpack prevents it from being overturned with potential lid loss.

11 • **Spotter during loaded concrete overpack movements outside WHB.** Vehicles  
12 transporting loaded concrete overpack containers between the WHB and the overpack storage  
13 pad shall be attended to reduce the likelihood of collision events with potential for combustible  
14 liquid spills resulting in a liquid fuel pool fire involving TRU waste. Spotters observe for an  
15 unobstructed route for the transport vehicle and take action to prevent any other vehicles  
16 operating in the PAU from interacting with the transport of the concrete overpack.

17 The above controls reduce the risk to the MOI, the public, the co-located worker, and the facility  
18 worker to a level of minor or minimal concern from normal, abnormal, and accident conditions  
19 that could occur during WIPP operations, compliant with 10 CFR 830, Subpart B. Also, based  
20 on the conservative analysis results using atmospheric dispersion data from SEIS-II and an  
21 updated dose conversion factor from the 2016 *Supplement Analysis for the Waste Isolation Pilot  
22 Plant Site-Wide Operations* (DOE/EIS-0026-SA-10) for both radiological materials and  
23 hazardous chemicals for Alternative 1, no added or additional health effects would be  
24 anticipated from the operation of an Overpack Unit at the WIPP facility; therefore, impacts to  
25 nuclear safety from implementation of Alternative 1 would be negligible.

26 Under Alternative 1, a new above ground hazardous waste storage unit would be constructed at  
27 the WIPP facility consisting of an Overpack Unit and concrete overpack containers. Although  
28 the WIPP facility infrastructure would be available to support the construction, construction  
29 workers would be needed to complete the project. Construction activities could result in  
30 occupational injuries and illnesses to construction workers. Approximately 50 construction  
31 workers would be employed for 18 months to build the Overpack Unit at the WIPP facility.  
32 Based on the latest available occupational injury and illness statistics under the Specialty Trade  
33 Contractor category from the Bureau of Labor Statistics (year 2015 data from Bureau of Labor  
34 Statistics, 2016), the expected total recordable cases could be 3.7, while approximately one lost  
35 workday case might be expected. Department of Energy and DOE contractor occupational  
36 injury statistics were not used because a private contractor was assumed to construct the  
37 facility. No other non-radiological or radiological impacts would occur to workers or members of  
38 the public during construction because no hazardous or radioactive materials would be present.  
39 Therefore, the facility construction impacts to implementation of Alternative 1 would be  
40 negligible.

### 41 **3.7.2.2 Alternative 2**

42 Nuclear and operational safety under Alternative 2 at WIPP would involve the same processes  
43 and procedures discussed above under Alternative 1. The difference in Alternative 2 compared  
44 to the existing environment and Alternative 1 is the location for loading and unloading of the

1 TRUPACT-II or HalfPACT. Alternative 2 is designed with an unloading station similar to the  
2 existing WHB configuration. This would allow unloading to occur either in the WHB, as depicted  
3 in Figure 3-3 shown in Section 3.7.2.1, Alternative 1, or inside the Alternative 2 facility.  
4 Alternative 2 is designed with features similar to the existing WHB (including filtered ventilation),  
5 and the processes for loading, unloading, and transporting hazardous waste would remain  
6 unchanged; therefore, impacts to nuclear and operational safety from implementation of  
7 Alternative 2 would be negligible. Alternative 2 does, however, present an increased risk of fire  
8 compared to Alternative 1 because of the potential combustible Sprung® structure covering  
9 material and the filter assembly units. WIPP's fire protection program addresses the risk  
10 associated with fire.

### 11 **3.7.2.3 No Action Alternative**

12 Under the No Action Alternative, DOE would not construct the AGSC (i.e., the proposed action  
13 would not be implemented). The existing condition (nuclear safety analysis) would remain  
14 unchanged, and the existing DSA process would continue to describe and analyze the WIPP  
15 site including waste handling and disposal operations. It has identified associated hazards and  
16 the conditions and hazard controls necessary to protect the worker, the public, and the  
17 environment. Under the No Action Alternative, the safety basis is the same as the existing  
18 environment, which demonstrates that WIPP employs the necessary controls to provide an  
19 acceptable level of safety compliant with 10 CFR 830, Subpart B. Therefore, impacts on  
20 nuclear and operational safety would not occur under the No Action Alternative.

## 21 **3.8 Visual Resources**

22 The Land Withdrawal Act (LWA) (Public Law 102-579) transferred responsibility for  
23 management of the WIPP withdrawal area from the Secretary of the Interior to the Secretary of  
24 Energy. The LWA establishes certain rights and responsibilities, one of which is the preparation  
25 of a Land Management Plan (LMP) which the DOE published in 1993 (DOE/WIPP-93-004).  
26 The WIPP LMP incorporates the restrictions of the LWA and a DOE Memorandum of  
27 Understanding with the BLM. The LMP establishes management objectives and planned  
28 actions for the use of the withdrawn land until the end of the decommissioning phase. The LMP  
29 lists 13 areas of concern: wildlife, cultural resources, grazing management, recreation, mining  
30 and oil and gas production, rights-of-way, access, emergency and facility security, fire  
31 management, water service, groundwater surveillance, salt tailings, and reclamation. Section  
32 8.2.4 of the LMP addresses visual resource management.

33 The DOE implements the BLM manual *Visual Resource Management* (BLM, 1984) to determine  
34 the degree to which any proposed projects or other activities within the WLWA would affect the  
35 visual quality of the landscape. Using this system, any anticipated unacceptable visual impacts  
36 can be mitigated during the planning and design stage. The DOE aspires to conduct WIPP-  
37 related activities in accordance with visual resource objectives. Proposed activities and projects  
38 will be evaluated for consistency with existing laws and best management practices regarding  
39 scenic quality. The impacts of each action will be evaluated by DOE. The DOE will analyze the  
40 project significance, the visual sensitivity of the affected area, and the project impacts.  
41 Stipulations will be attached as appropriate to ensure compatibility of projects with management  
42 objectives for visual resources. Painting requirements will be implemented for surface facilities  
43 in accordance with existing guidelines (e.g., BLM painting requirements).

44 The 1996 SEIS-II, Section 4.1.1, commits DOE to determine the impacts that projects will have  
45 on the "visual quality of the landscape." Three measures are used by the BLM to determine the

1 visual quality. Scenic quality is a measure of the visual appeal of a tract of land. Lands are  
2 rated based upon the apparent scenic quality which is determined using factors such as  
3 landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications. The  
4 location of the Overpack Unit rates low in each category indicating a low scenic quality rating.  
5 Sensitivity levels are a measure of public concern for scenic quality. Public lands are assigned  
6 sensitivity levels based upon type of users, amount of use, public interest, adjacent land use,  
7 special areas, and other factors specific to the location. Since the Overpack Unit would be  
8 located in an unpopulated area that can only be used for TRU waste management, the  
9 sensitivity level analysis for this location is low. Delineation of distance zones are based on the  
10 visibility of the location from population zones or public roadways.

### 11 **3.8.1 Existing Environment**

12 The location of the AGSC project is within a BLM Visual Resource Management Class IV zone.  
13 The objective of Visual Resource Management Class IV is to provide for management activities  
14 which require major modifications of the existing character of the landscape. The level of  
15 change to the characteristic landscape can be high. These management activities may  
16 dominate the view and be the major focus of viewer attention. However, every attempt should  
17 be made to minimize the impact of these activities through careful location, minimal disturbance,  
18 and repeating the basic landscape elements of color, form, line, and texture.

### 19 **3.8.2 Environmental Consequences**

#### 20 **3.8.2.1 Alternative 1**

21 This project would cause some short-term and long-term visual impacts to the natural  
22 landscape. Short-term impacts would occur during construction operations. These include the  
23 presence of construction equipment vehicle traffic.

24 Long-term impacts would be visible to the casual observer through the life of the Overpack Unit.  
25 These include the visual evidence which would cause visible contrast to form, line, color, and  
26 texture. Removal of vegetation due to construction of the proposed project would expose bare  
27 soil lighter in color and smoother in texture than the surrounding vegetation.

28 After construction and removal of construction equipment the area should return to its current  
29 condition and the visual impacts of stored concrete overpack and fences, light standards, and  
30 other utilities would be minimized.

31 Short- and long-term impacts are minimized by best management practices such as color  
32 selection, reducing cut and fill, and screening facilities with natural features and vegetation.  
33 Due to its remote location, the Overpack Unit would not be visible to the public; therefore, the  
34 delineation of distance zone would be unseen. Implementation of the Alternative 1 would have  
35 a negligible impact on visual resources and would be consistent with current land use in the  
36 project area.

37 The DOE has committed to remove surface structures and restore the surface area at the WIPP  
38 facility to as near its original contours as possible at the time the WIPP facility is closed.

39

1 **3.8.2.2 Alternative 2**

2 The analysis for Alternative 1 is applicable to Alternative 2 because the differences in  
3 construction and operation methodologies would not lead to any greater impact to visual  
4 resources. The major difference with Alternative 2 is the Sprung® structure that would be easily  
5 visible to the casual observer.

6 Implementation of Alternative 2 would have a negligible impact on visual resources and would  
7 be consistent with current land use in the project area. The DOE has committed to remove  
8 surface structures and restore the surface area at the WIPP facility to as near its original  
9 contours as possible at the time the WIPP facility is closed.

10 **3.8.2.3 No Action Alternative**

11 Under the No Action Alternative, the existing visual resources would remain unmodified.  
12 Therefore, no impacts would occur under the No Action Alternative.

1 **4. CUMULATIVE IMPACTS**

2 The Council on Environmental Quality regulations in “Cumulative Impact” (40 CFR 1508.7)  
3 define cumulative impacts as “the incremental impacts of the action when added to other past,  
4 present, and reasonably foreseeable future actions regardless of what agency (Federal or non-  
5 Federal) or person undertakes such other actions. Cumulative impacts can result from  
6 individually minor but collectively significant actions taking place over a period of time.” This  
7 chapter presents an analysis of the resource-specific cumulative impacts resulting from  
8 implementation of the proposed action in conjunction with any reasonably foreseeable projects  
9 to be initiated at the WIPP site. The focus of the cumulative impacts analysis in this DEA is on  
10 reasonably foreseeable projects that are within the same geographic and temporal space as the  
11 proposed action. Past and present actions at the WIPP site are represented in the description  
12 of the proposed action, the action alternatives and the resource impact analysis discussed in  
13 this document, and in the NEPA analyses referenced herein.

14 **4.1 Reasonably Foreseeable Projects Considered for Cumulative Impacts Analysis**

15 **4.1.1 Permanent Ventilation System**

16 As a result of the February 2014 events at the WIPP facility, the existing ventilation system is  
17 being operated in filtration mode. Operating the system in this mode cannot provide the U/G  
18 with sufficient air to support simultaneous mining and waste emplacement operations. The  
19 DOE has begun implementing a three-phase ventilation system upgrade to support increased  
20 U/G operations. The first phase, the Interim Ventilation System, is already operational. The  
21 second phase is the addition of the Supplemental Ventilation System (SVS) which is anticipated  
22 to be operational early in Fiscal Year 2018. The SVS will facilitate full-scale mining operations  
23 by creating an unfiltered exhaust path for construction air. The third phase of the ventilation  
24 upgrade includes construction and installation of a new Permanent Ventilation System (PVS).  
25 The PVS would support simultaneous waste emplacement, mining, and mine maintenance  
26 operations. The PVS would consist of the *Safety Significant Confinement Ventilation System*  
27 *project (15-D-411)* and the *Exhaust Shaft project (15-D-412)* (DOE, 2015). The Safety  
28 Significant Confinement Ventilation System project would include a new filter building on the  
29 surface and the Exhaust Shaft (now referred to as the New Ventilation Shaft) project would  
30 require the design and mining of a new 2,150-ft (655-m) vertical shaft and two new horizontal  
31 drifts (tunnels) to the WIPP U/G. The PVS is expected to be operational in the 2021 timeframe  
32 and will be the subject of a project-specific NEPA evaluation.

33 **4.2 Potential Cumulative Impacts by Environmental Resource Area**

34 **4.2.1 Geology and Soils**

35 As indicated in Chapter 3 of this DEA, implementation of action Alternatives 1 or 2 would not  
36 result in a significant increase in geology and soils impacts beyond those already realized with  
37 the construction and operation of the WIPP facility. The PVS project listed in Section 4.1 is still  
38 undergoing design and a final determination of additional geology and soil impacts cannot be  
39 made at this time. If the PVS is similar to other shaft sinking projects at the WIPP facility, then  
40 impacts to geology and soils from implementation of the proposed action in conjunction with the  
41 PVS project would be negligible.

42

1 **4.2.2 Hydrology/Water Quality**

2 Hydrology and water quality are currently being controlled by the use of lined evaporation ponds  
3 to prevent infiltration of salt-laden waters into the shallow subsurface. As indicated in Chapter 3  
4 of this DEA, implementation of Action Alternatives 1 or 2 would also use lined ponds to capture  
5 water and prevent infiltration and, therefore, would not result in significant hydrology impacts.  
6 Initial design for the PVS project listed in Section 4.1 includes lined mined-materials storage  
7 piles and lined run-off ponds so that hydrology and groundwater would not be affected.  
8 Therefore, the impacts to hydrology and water quality would be negligible as the result of the  
9 implementation of the proposed action in conjunction with the PVS project.

10 **4.2.3 Air Quality**

11 Past and ongoing operation of the WIPP facility does not significantly impact air quality. As  
12 indicated in Chapter 3 of this DEA, implementation of Action Alternatives 1 or 2 would not result  
13 in significant air quality impacts because impacts only occur during construction, which is of  
14 short duration. Likewise, construction of the PVS project listed in Section 4.1 will be for a short  
15 period of time and will not significantly impact air quality. Operation of the PVS, using filtration,  
16 will actually reduce fugitive salt emissions than what was considered in the FEIS. Therefore,  
17 the impacts to air quality would be minimal as the result of implementation of the proposed  
18 action in conjunction with the PVS project.

19 **4.2.4 Cultural Resources**

20 Management of cultural resources is an ongoing activity mandated by the Land Management  
21 Plan. New construction activities undergo archeological investigation. As indicated in Chapter  
22 3 of this DEA, implementation of Action Alternatives 1 or 2 are not anticipated to result in  
23 significant cultural resources impacts, although surveys will be conducted in undisturbed areas.  
24 Similar consideration will be given to the PVS project listed in Section 4.1. Therefore, the  
25 impacts to cultural resources from the proposed action would be negligible. Likewise, impacts  
26 from implementation of the proposed action in conjunction with the PVS project would be  
27 negligible.

28 **4.2.5 Hazardous Materials and Hazardous Wastes**

29 Hazardous materials and hazardous waste, including radioactive waste are managed as part of  
30 ongoing day-to-day activities at the WIPP facility. As indicated in Chapter 3 of this DEA,  
31 impacts from the implementation of Action Alternatives 1 or 2 would be negligible. Impact from  
32 hazardous materials and wastes and radiological waste (filter waste) will be managed in  
33 accordance with existing policies and procedures. The PVS project listed in Section 4.1 is  
34 expected to produce additional waste streams (salt waste, filter waste, brine waste); however,  
35 these are similar to waste streams already generated at the WIPP facility. The overall volume  
36 of waste is well within the capacity of the WIPP facility waste management processes.  
37 Therefore, negligible impacts from hazardous waste and hazardous materials, including  
38 radioactive waste are anticipated as the result of the implementation of the proposed action in  
39 conjunction with the PVS project.

40 **4.2.6 Nuclear and Operational Safety**

41 The WIPP facility operates under the DOE system of standards and orders to ensure the safety  
42 and protection of workers, the public, and the environment. The WIPP facility has the

1 personnel, equipment, and procedures to safely carry out its mission. As indicated in Chapter 3  
2 of this DEA, implementation of Action Alternatives 1 or 2 would not introduce either industrial or  
3 radiological risks beyond those already dealt with in the DSA and implementing procedures.  
4 Therefore, the nuclear safety impacts from the Alternatives will be negligible. PVS project listed  
5 in Section 4.1 will not introduce any nuclear safety risks, however, the industrial risks associated  
6 with shaft sinking and construction are different than the day-to-day risks encountered by WIPP  
7 facility workers. The PVS project will use the services of contractors for construction and  
8 outfitting. These individuals will be specialists in shaft sinking and construction and will have an  
9 awareness of industrial risks associated with the project. Once operational, the PVS poses  
10 industrial risks similar to those encountered in the day-to-day operation of the U/G facility.  
11 Therefore, the impacts to nuclear or operational safety would be negligible.  
12

#### 13 **4.2.7 Visual Resources**

14 The WIPP facility was constructed and is operated with visual resources in mind. The remote  
15 location and use of BLM recommended paint colors mitigate impacts to visual resources. Action  
16 Alternatives 1 or 2 would not result in significant visual resource impacts since the location is  
17 remote and the only large structure would be the Sprung® structure for Alternative 2. The PVS  
18 project listed in Section 4.1 does not include large buildings and is adjacent from the existing  
19 WIPP facility structures. After construction, a headframe and several new buildings will remain.  
20 Because of their proximity to existing structures and the remoteness of the WIPP site, they will  
21 significantly impact visual resources. Therefore, impacts to visual resources would be negligible  
22 as the result of implementation of the proposed action in conjunction with the PVS.

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**APPENDIX A, PUBLIC INVOLVEMENT**

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**APPENDIX B, Comment Resolution**

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