SUPPLEMENT ANALYSIS FOR THE PROPOSED ACTION TO EXCAVATE AND USE ADDITIONAL DISPOSAL PANELS AT THE WASTE ISOLATION PILOT PLANT FACILITY

DOE/EIS-0026-SA-13
Revision 1

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U.S. Department of Energy
Carlsbad Field Office
Carlsbad, New Mexico

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ACRONYMS AND ABBREVIATIONS

ACAM	Air Conformity Applicability Model
AF	acre-feet
AHD	American Hospital Directory
AI	Artificial Intelligence
AIS	air intake shaft
AROD	amended Record of Decision
ATWIR	Annual Transuranic Waste Inventory Report
BLM	Bureau of Land Management
BMP	best management practices
C&D	construction and demolition
CAA	Clean Air Act
CBFO	Carlsbad Field Office
CCA	Compliance Certification Application
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CH	contact-handled
Ci	curies
CO	carbon monoxide
CRA	Compliance Recertification Application
CSIS	Center for Strategic and International Studies
DMP	detection monitoring program
DOE	United States Department of Energy
DOI	United States Department of the Interior
DP	discharge permit
DSA	Documented Safety Analysis
EIA	Energy Information Agency
EIS	Environmental Impact Statement
EO	Executive Order
EUA	Exclusive Use Area
EV	electric vehicle
FEP/DUP	Fluorine Extraction and Depleted Uranium Deconversion Plant
FGE	fissile-gram equivalent
FEIS	Final Environmental Impact Statement
FR	*Federal Register*
ft^3	cubic feet
GHG	greenhouse gas
HEPA	high-efficiency particulate air
HWDU	hazardous waste disposal units
HWFP	Hazardous Waste Facility Permit
I&C	instrumentation & control
IDA	intentional destructive act
IIFP	International Isotopes Fluorine Products, Inc.
INL	Idaho National Laboratory
kW	kilowatt

LANL	Los Alamos National Laboratory
LCF	latent cancer fatality
LLW	low-level radioactive waste
LMP	Land Management Plan
LQS	large quantity sites
LWA	*Land Withdrawal Act*
LWB	Land Withdrawal Boundary
m^3	cubic meters
M&O	management & operating
MEI	maximally exposed individual
MFFF	Mixed-Oxide Fuel Fabrication Facility
MLLW	mixed low-level radioactive waste
mrem	millirem
MT	metric ton
MWh	megawatt-hours
NAAQS	National Ambient Air Quality Standards
NCES	National Center for Education Statistics
NCRP	National Council on Radiation Protection
NEF	National Enrichment Facility
NEPA	*National Environmental Policy Act*
NMAC	New Mexico Administrative Code
NMCRIS	New Mexico Cultural Resource Information System
NMED	New Mexico Environment Department
NM EMNRD	New Mexico Energy, Minerals, and Natural Resources Department
NO_2	nitrogen dioxide
NNSA	National Nuclear Security Administration
NPDES	National Pollutant Discharge Elimination System
NPS	United States National Park Service
NRHP	National Register of Historic Places
NRC	Nuclear Regulatory Commission
NWP	Nuclear Waste Partnership LLC
OLA	Off-Limits Area
ORNL	Oak Ridge National Laboratory
OSHA	Occupational Safety and Health Administration
PA	performance assessment
PAW	perched anthropogenic water
PCN	planned change notice
PCR	Planned Change Request
PCBs	polychlorinated biphenyls
PEIS	Programmatic Environmental Impact Statement
P.L.	Public Law
PM_{10}	particulate matter less than or equal to 10 micrometers in diameter
PSD	Prevention of Significant Deterioration
PMR	Permit Modification Request
PPA	Property Protection Area
RCRA	*Resource Conservation and Recovery Act*

rem	roentgen equivalent man
RH	remote-handled
ROD	Record of Decision
ROI	region of influence
RPPCR	Replacement Panels Planned Change Request
SA	Supplement Analysis
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Officer
SMA	Special Management Areas
SO_2	sulfur dioxide
SPDP	Surplus Plutonium Disposition Program
SRS	Savannah River Site
SSCVS	Safety Significant Confinement Ventilation System
SWEIS	Site-wide Environmental Impact Statement
SWPPP	Stormwater Pollution Prevention Plan
TDS	total dissolved solids
TRU	transuranic
TRUPACT	Transuranic Package Transporter
UADS	Underground Air Distribution System
U/G	underground
U.S.	United States
US	utility shaft
USAF	United States Air Force
U.S.C.	United States Code
USCB	United States Census Bureau
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UWNS	Underground Wireless Notification System
VRM	visual resource management
VTR	versatile test reactor
WAC	waste acceptance criteria
WAP	Waste Analysis Plan
WCS	Waste Control Specialists, LLC
WHB	Waste Handling Building
WIPP	Waste Isolation Pilot Plant
WLWA	WIPP Land Withdrawal Area
ZEV	zero emission vehicles

1.0 INTRODUCTION AND PURPOSE AND NEED FOR ACTION

1.1 Introduction

In 1979, the United States (U.S.) Department of Energy (DOE) was authorized to proceed with a project for the express purpose of providing a research and development facility to demonstrate the safe disposal of radioactive waste from national defense activities and programs of the U.S. Government (Public Law [P.L.] 96-164) (U.S. Congress 1979). This resulted in the selection of the site, and the design, construction, and operation of a centralized repository known as the Waste Isolation Pilot Plant (WIPP) for the disposal of transuranic (TRU) waste (DOE 1980; DOE 1981; DOE 1990a; DOE 1990b; DOE 1997; DOE 1998).

On October 30, 1992, the WIPP Land Withdrawal Act (LWA) transferred jurisdiction of 16 sections of land from the U.S. Department of the Interior (DOI) to the DOE for the construction, experimentation, operation, repair and maintenance, disposal, shutdown, monitoring, decommissioning, and other authorized activities associated with the purposes of the WIPP facility as set forth in section 213 of the *Department of Energy National Security and Military Applications of Nuclear Energy Authorization Act of 1980* (U.S. Congress 1979; U.S. Congress 1992). The LWA legislation [P.L. 102-579], and as amended by P.L. 104-201, led to the operation of the WIPP facility to demonstrate the safe disposal of TRU waste (U.S. Congress 1992; U.S. Congress 1996). The WIPP facility is located 26 miles east of Carlsbad, New Mexico (Figure 1-1).

TRANSURANIC WASTE

Transuranic (TRU) waste consists of material that is contaminated with man-made radioactive elements, which have atomic numbers greater than that of uranium. This waste consists of solid sludge, clothing, tools, rags, residues, soils, and debris. It contains more than 100 nanocuries of alpha-emitting isotopes, per gram of waste, with half-lives greater than 20 years. Exceptions include the following: (a) high-level radioactive waste; (b) waste that the Secretary of Energy has determined, with concurrence of the U.S. Environmental Protection Agency (USEPA), does not need the degree of isolation required by the disposal regulations*; or (c) waste that the Nuclear Regulatory Commission has approved for disposal on a case-by-case basis in accordance with Title 10 Part 61 of the Code of Federal Regulations (CFR).

TRU waste, acceptable for disposal at the WIPP facility, results from defense activities and programs of the U.S. Government. Several types of operations (current, past, and future) have generated, or will generate, TRU waste: (1) nuclear weapons development and manufacturing; (2) plutonium recovery, stabilization, and management; (3) research and development; (4) environmental restoration, and decontamination and decommissioning; (5) waste management at various DOE and other government facilities including laboratories; and (6) testing at private institutions and universities under contract to the DOE.

TRU waste is further classified as either contact-handled (CH) or remote-handled (RH). Direct handling of a waste container with a specified dose rate of no more than 200 millirem per hour (mrem/hour) on the outside surface of the container is defined as CH TRU waste. A surface dose rate greater than 200 mrem/hour on the outside of the container is defined as RH TRU waste. Remote manipulators are used to handle RH TRU waste containers. TRU mixed waste may contain hazardous components as well, such as lead or organic solvents regulated in accordance with RCRA. It also can be commingled with polychlorinated biphenyls (PCBs), which are regulated under the Toxic Substances Control Act.

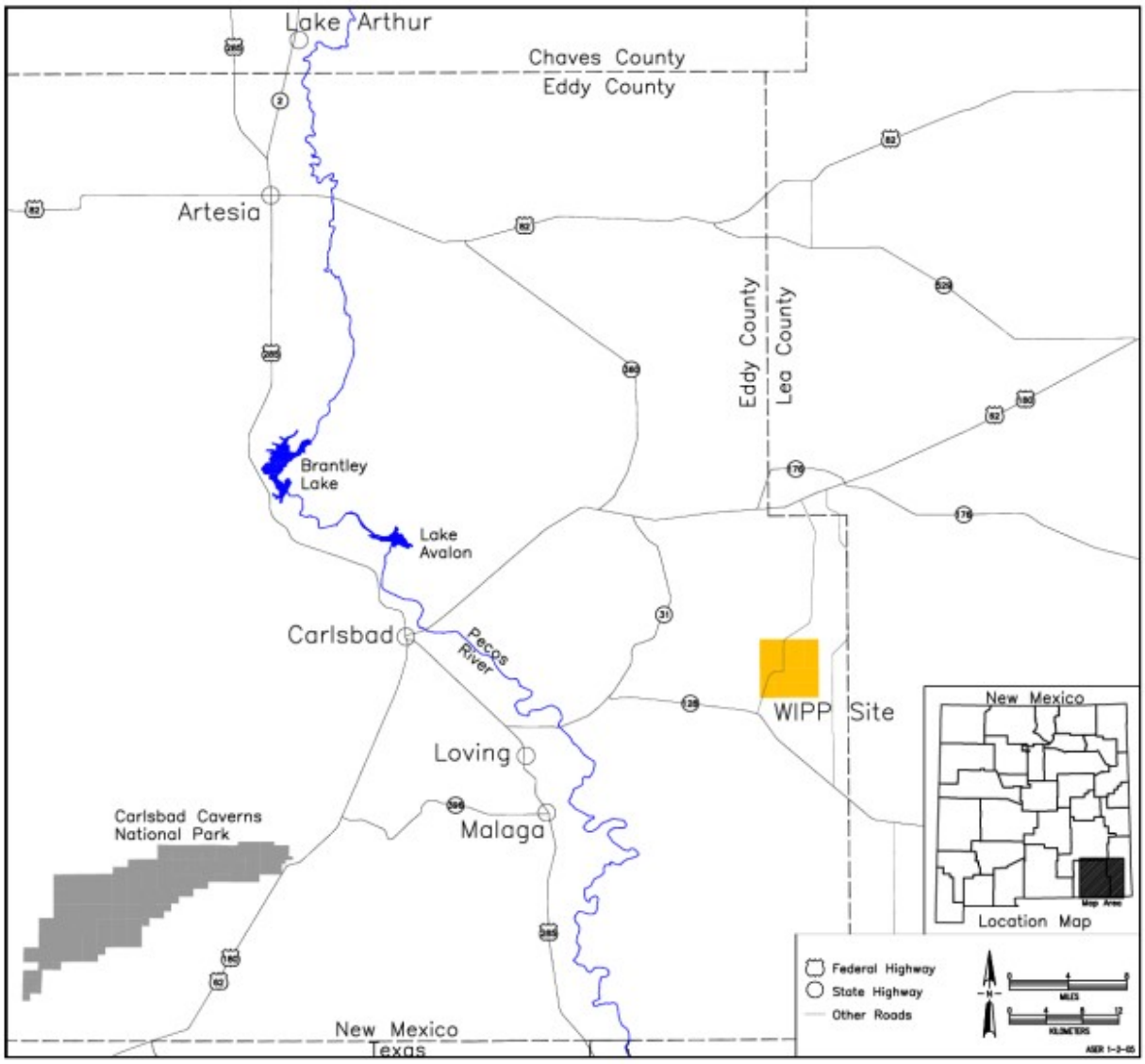


Figure 1-1. Location of the WIPP Site

The WIPP facility is a deep geologic repository mined within a substantial bedded salt formation (DOE 1980, DOE 1990a, DOE 1997). It is located in the middle of a 16-square-mile area under the jurisdiction of the DOE pursuant to the LWA known as the WIPP Land Withdrawal Area (WLWA), which is synonymous with the WIPP site (U.S. Congress 1992, U.S. Congress 1996). Figure 1-2 illustrates the underground (U/G) disposal area of the WIPP facility, where TRU waste is emplaced. The disposal area is nominally 2,150 feet beneath the ground surface.

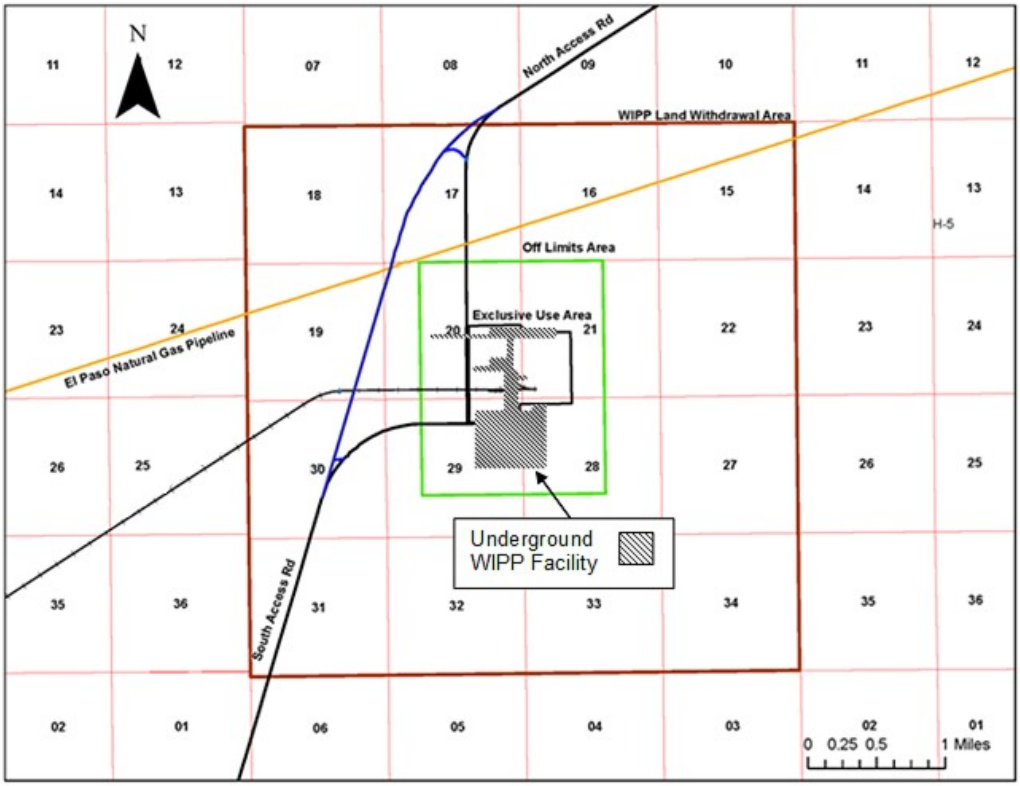


Figure 1-2. WIPP Land Withdrawal Area (i.e., WIPP Site)

In 1997, the DOE issued the *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement* (hereafter, "1997 SEIS-II") (DOE 1997), which analyzed the potential environmental impacts associated with disposing of TRU waste at the WIPP facility, including PCB-commingled TRU waste identified within the DOE inventory. On January 23, 1998, the DOE announced the implementation of the Preferred Alternative with a Record of Decision (ROD) (63 *Federal Register* [FR] 3624) affirming that the DOE will dispose of up to 175,564 cubic meters (m^3) (6.2 million cubic feet [ft^3]) of TRU waste, which was generated by defense-related activities, at the WIPP facility after preparation (i.e., treatment, as necessary, including packaging) to meet WIPP's waste acceptance criteria. In 2004, the DOE revised the ROD to include an anticipated quantity of PCBs commingled with TRU waste (69 FR 39456).

TRU waste disposal operations began on March 26, 1999, for CH TRU waste. RH TRU waste disposal operations began on January 24, 2007. The DOE conducted disposal operations at the WIPP facility continuously from March 1999 until February 2014, when two separate events—an U/G salt haul truck fire on February 5, and an exothermic reaction in a Los Alamos National Laboratory (LANL) waste disposal container resulting in a minor radiological release on February 14—resulted in the DOE suspending TRU waste disposal operations (DOE 2016a).

In response to the February 2014 salt haul truck fire and radiological release, the DOE implemented new facility processes and conducted appropriate operational readiness reviews to resume U/G waste disposal operations. The DOE resumed CH TRU waste emplacement at the WIPP facility on January 4, 2017, after the completion of comprehensive recovery efforts. The

recovery was supported by improved safety management programs including changes to nuclear safety, fire protection, radiological controls, and emergency management, along with their associated documentation, procedures, and training (DOE 2016a). Details of the recovery are discussed in the 2016 *Supplement Analysis for the Waste Isolation Pilot Plant Site-Wide Operations* (2016 SA) (DOE 2016a). On April 7, 2017, the DOE resumed receipt of off-site CH TRU waste. The DOE continues to characterize, transport, and dispose of TRU waste from authorized generator/storage sites to satisfy its mission (DOE 2025d).

After two decades of TRU waste operations, by May 13, 2023, WIPP workers have supported TRU waste cleanup at 22 generator/storage sites, processing over 13,460 TRU waste shipments, mining over 12 miles of U/G drifts, and emplacing over 177,647 TRU waste containers in the WIPP U/G. As of March 6, 2024, about 43 percent (approximately 75,849 m^3) of the total TRU waste volume capacity limit authorized by Congress in the WIPP LWA has been disposed in approximately seven disposal panels at the WIPP facility.

There has been underutilization of some TRU waste disposal capacity in several disposal panels as a result of: (1) deteriorating ground conditions in Panels 1, 7, and equivalent Panel 9; and (2) radiological contamination in Panel 7 and equivalent Panel 9 from the February 2014 radiological event. Due to concerns for worker safety, appropriate decisions were made by the DOE to continue to protect workers by prohibiting access to and abandoning equivalent Panel 9 and bypassing several of the disposal rooms in Panel 7. The DOE took these actions to protect WIPP workers.

WIPP LWA LIMITS

The LWA limits the amount and types of TRU waste that can be emplaced at the WIPP facility. The limits include the following:

- WIPP capacity is limited to 175,564 m^3 (6.2 million ft^3) total TRU waste by volume.
- No more than 5 percent by volume of RH TRU waste may have a surface dose rate in excess of 100 roentgen equivalent man (rem) per hour.
- No RH TRU waste may have a surface dose rate in excess of 1,000 rem per hour.
- RH TRU waste containers shall not exceed 23 curies per liter maximum activity level averaged over the volume of the container.
- The total curies of RH TRU waste shall not exceed 5,100,000 curies.

In addition, the Consultation and Cooperation Agreement with the State of New Mexico limits the volume of RH TRU waste to 7,080 m^3 (250,000 ft^3).

In April 2021, the DOE prepared a Supplement Analysis (SA), which was a periodic review of the 1997 SEIS-II (DOE 2021). That SA also evaluated a proposed action to construct and use two replacement panels (designated as Panels 11 and 12) to take the place of the previous underutilized disposal capacity. Following the completion of the 2021 SA, the DOE determined that the proposed action to construct and use two replacement disposal panels would not represent substantial changes to either the 1997 SEIS-II or the 2016 SA that are relevant to environmental concerns, and there were no significant new circumstances or information raising environmental concerns and bearing on the proposed action or its environmental impacts. The DOE has therefore determined that no further National Environmental Policy Act (NEPA) documentation was required (DOE 2021). Mining of Panel 11 started in December 2023, and Panel 11 would be ready to support uninterrupted TRU waste disposal operations after Panel 8 is filled.

The WIPP facility receives TRU mixed wastes and the mixed (hazardous) portion of the TRU waste regulated under the Resource Conservation and Recovery Act (RCRA), the *New Mexico Hazardous Waste Act*, Chapter 74, Article 4 New Mexico Statutes Annotated 1978, and their implementing regulations. The WIPP facility is operated pursuant to a hazardous waste permit issued by the New Mexico Environment Department (NMED) authorizing the management, storage, and disposal of TRU mixed waste at the facility. The WIPP facility received its initial Hazardous Waste Facility Permit (HWFP) from the NMED in 1999. A HWFP is typically granted for a term of 10 years.

The first WIPP HWFP Renewal Application was submitted to the NMED in May 2009 and an amended WIPP HWFP Renewal Application was submitted in September 2009. In November 2009, the NMED determined that the WIPP HWFP Renewal Application was administratively complete and that it constituted a timely and complete application. A public comment period on the draft Permit began on April 27, 2010. A public hearing was held on August 9-10, 2010, and on August 16, 2010. The NMED issued a final renewal of the WIPP HWFP on November 30, 2010.

The DOE Carlsbad Field Office (CBFO) and Nuclear Waste Partnership LLC (NWP),[1] together as the "Permittees," submitted the second WIPP HWFP Renewal Application to the NMED on March 31, 2020 (DOE 2020c). However, an updated redline/strikeout version of the Renewal Application was submitted to the NMED on March 17, 2022 (DOE 2022a) in order to incorporate a July 30, 2021, Permit Modification Request (PMR) for construction and use of hazardous waste disposal units (HWDU) 11 and 12 (i.e., Replacement Panels 11 and 12) at the WIPP facility. The NMED issued a Public Notice on December 20, 2022, along with the draft Permit, initiating the start of the public comment period for the Permit Renewal Application and the incorporated PMR for construction and use of HWDUs 11 and 12. The public comment period was scheduled to end on February 18, 2023, but was extended to April 19, 2023. On October 4, 2023, the NMED issued a 10-year renewal of the HWFP for the WIPP facility.

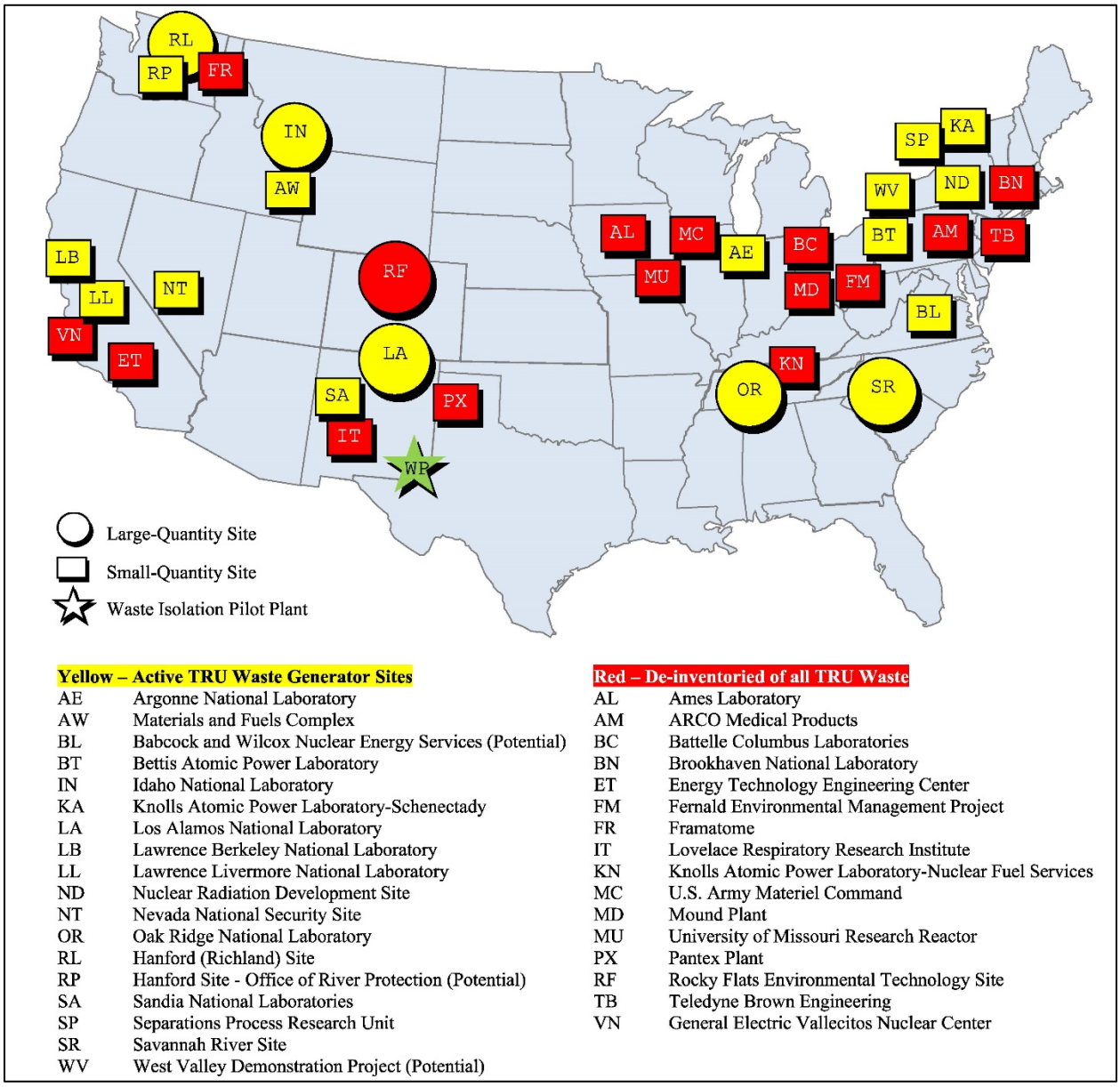
The DOE has prepared this SA (hereafter, "2026 WIPP SA") to evaluate the potential impacts of excavating and using additional TRU waste disposal panels to continue to dispose of defense TRU waste up to the WIPP LWA total TRU waste volume capacity limit in accordance with the preferred alternative decision in the 1998 ROD (DOE 1998). This 2026 WIPP SA considers new circumstances and information relevant to environmental concerns in order for the DOE to determine whether the existing 1997 SEIS-II should be supplemented, a new Environmental Impact Statement (EIS) should be prepared, or no further NEPA analysis is required. Because this 2026 WIPP SA is being prepared to evaluate the Proposed Action and consider new information since the last SA to implement the 1998 ROD, this 2026 WIPP SA is not revisiting the 1981 ROD (DOE 1981) phased approach or site selection location. This 2026 WIPP SA does not evaluate a No-Action Alternative, which is not required for an SA.

[1] A new contractor (Salado Isolation Mining Contractors, LLC) was selected and took over operations as the management and operating contractor for the WIPP facility effective February 4, 2022, and is now the current Co-Permittee on the WIPP HWFP.

In addition to this introduction, Section 1.2 describes the purpose and need for agency action; Section 1.3 provides an overview of the Proposed Action included within the scope of this 2026 WIPP SA; and Section 1.4 describes other NEPA documents relevant to this 2026 WIPP SA.

1.2 Purpose and Need for Agency Action

The purpose and need for the WIPP facility has not substantively changed since documented in the 1997 SEIS-II or authorized by the WIPP LWA. The DOE needs to safely dispose of the TRU waste that has resulted from atomic energy defense-related activities in a manner that protects the workers, the public health, and the environment. The purpose and need for the continued and uninterrupted operation of the WIPP facility is to continue to provide support to the DOE complex for TRU waste cleanup as initially directed by P.L. 96-164. With this 2026 WIPP SA, the DOE is not revisiting the 1998 ROD to dispose of up to 175,564 m^3 of TRU waste, which was generated by defense-related activities, at the WIPP facility and is only evaluating a Proposed Action that continues to support the implementation of the DOE decisions documented in the 1998 ROD. However, because additional disposal panels at the WIPP facility are required to be able to dispose of TRU waste up to the WIPP LWA total TRU waste volume capacity limit, some TRU waste that was designated for disposal in the WIPP facility would remain at various DOE generator/storage sites (Figure 1-3) if no further action were taken (*see* Section 2.1 of this 2026 WIPP SA for a discussion of the estimated volume of TRU waste at DOE generator/storage sites). The DOE is currently legally bound by agreements and orders concerning TRU waste management and disposal. If the DOE does not take action, the situation would jeopardize the ability to meet these legally binding agreements and orders, stop TRU waste cleanup at generators/storage sites across the nation, and potentially impact the national security mission of the agency as related to TRU waste risk reduction. The DOE would need to develop an alternate disposition path for TRU waste stored at and to be generated at generator sites beyond currently-approved disposal panels.



Yellow – Active TRU Waste Generator Sites

AE	Argonne National Laboratory
AW	Materials and Fuels Complex
BL	Babcock and Wilcox Nuclear Energy Services (Potential)
BT	Bettis Atomic Power Laboratory
IN	Idaho National Laboratory
KA	Knolls Atomic Power Laboratory-Schenectady
LA	Los Alamos National Laboratory
LB	Lawrence Berkeley National Laboratory
LL	Lawrence Livermore National Laboratory
ND	Nuclear Radiation Development Site
NT	Nevada National Security Site
OR	Oak Ridge National Laboratory
RL	Hanford (Richland) Site
RP	Hanford Site - Office of River Protection (Potential)
SA	Sandia National Laboratories
SP	Separations Process Research Unit
SR	Savannah River Site
WV	West Valley Demonstration Project (Potential)

Red – De-inventoried of all TRU Waste

AL	Ames Laboratory
AM	ARCO Medical Products
BC	Battelle Columbus Laboratories
BN	Brookhaven National Laboratory
ET	Energy Technology Engineering Center
FM	Fernald Environmental Management Project
FR	Framatome
IT	Lovelace Respiratory Research Institute
KN	Knolls Atomic Power Laboratory-Nuclear Fuel Services
MC	U.S. Army Materiel Command
MD	Mound Plant
MU	University of Missouri Research Reactor
PX	Pantex Plant
RF	Rocky Flats Environmental Technology Site
TB	Teledyne Brown Engineering
VN	General Electric Vallecitos Nuclear Center

Source: DOE 2025e.

Figure 1-3. DOE TRU Waste Generator/Storage Sites

1.3 Proposed Action and 2026 WIPP SA Scope

An overview of the Proposed Action analyzed in this 2026 WIPP SA is provided below (*see* Section 2 of this 2026 WIPP SA for a more detailed description). The Proposed Action is based on the need for additional disposal panels at the WIPP facility to be able to dispose of up to the WIPP LWA total TRU waste volume capacity limit as analyzed in the 1997 SEIS-II and decided in the 1998 ROD. The Proposed Action is a minor variation of the Preferred Alternative in the 1997 WIPP SEIS-II and the Proposed Action and its environmental impacts are within the spectrum of alternatives that were discussed in the 1997 SEIS-II.

Proposed Action. The DOE needs additional disposal panels to be able to dispose of TRU waste up to the WIPP LWA total TRU waste volume capacity limit. The preliminary estimate of the number of additional panels is seven (Panels 13 – 19). Under the Proposed Action, the DOE would excavate and use seven additional TRU waste disposal panels beyond Panels 11 and 12 to dispose of 175,564 m^3 of defense TRU waste.[2] The Proposed Action in this 2026 WIPP SA differs from the Preferred Alternative evaluated in the 1997 SEIS-II in the assumed number of panels, but not in the assumed volume capacity. Action alternatives in the 1997 SEIS II evaluated a number of panels greater than those considered in the Proposed Action of this 2026 WIPP SA. TRU waste disposal would occur until approximately 2083, which is 50 years longer than the 35 years evaluated in the 1997 SEIS-II Preferred Alternative.

This 2026 WIPP SA is organized as follows:

- Section 1 contains the introduction;
- Section 2 describes the Proposed Action;
- Section 3 contains the comparative environmental impact analysis;
- Section 4 presents the cumulative impacts analysis;
- Section 5 includes the preliminary determination; and
- Section 6 identifies references used.

1.4 Relevant NEPA Documents and Other Documents

This 2026 WIPP SA was prepared in accordance with the *National Environmental Policy Act of 1969*, as amended (P. L. 91-190, 42 United States Code [U.S.C.] 4321 et seq.) (NEPA) and the DOE's NEPA Implementing Procedures.[3] DOE's Implementing Procedures state that (when) it is unclear whether or not a supplement to an environmental document (EIS) is required, DOE may prepare an SA. The SA should "discuss the circumstances that are pertinent to deciding whether to prepare a supplement to an environmental document." DOE will make its determination and

[2] Panels 11 and 12 replace the lost disposal capacity from underutilization of some disposal rooms in Panels 1 and 7, and not using equivalent Panel 9. In total, the DOE estimated this lost disposal capacity to be approximately 1.8 panels. Because unmined panels are not part of the approved design, the 1.8 replacement panels needed for the continuation of TRU waste emplacement were adjusted to 2 panels. Section 1.4.3 of the 2021 SA provides a detailed explanation of this lost disposal capacity.

[3] The DOE NEPA Implementing Procedures are available on the DOE NEPA website at https://www.energy.gov/nepa/doe-nepa-implementing-procedures. The DOE NEPA Implementing Procedures are based on amendments to NEPA made by the Fiscal Responsibility Act in 2023, Executive Orders 14154 and 14301, the rescission by the Council on Environmental Quality of its NEPA implementing regulations, and the May 29, 2025, Supreme Court ruling in *Seven County Infrastructure Coalition et al. v. Eagle County, Colorado*.

the related supplement analysis available to the public for information. (DOE Implementing Instructions, Section 3.9(b)(1) and (c).)

For preparation of this 2026 WIPP SA, the DOE incorporates information by reference and tiers from previous NEPA documents prepared to analyze WIPP actions. Information from these documents provides a context for understanding the current status of NEPA analyses associated with activities at the WIPP facility, which forms the foundation for preparing this 2026 WIPP SA. The following documents are relevant to the analysis in this 2026 WIPP SA:

***Waste Isolation Pilot Plant Final Environmental Impact Statement,* DOE/EIS-0026** (1980 FEIS) (DOE 1980). In October 1980, the DOE issued the 1980 Final Environmental Impact Statement (FEIS), which analyzed the potential environmental impacts of initial construction and operation of the WIPP facility. The ROD (46 FR 9162, January 28, 1981) documented the DOE's decision to proceed with the phased construction and operation of the WIPP facility near Carlsbad, New Mexico. Because the DOE prepared two subsequent supplemental EISs (SEIS-I and SEIS-II), the 1980 FEIS is included for completeness. The only impacts analyzed in this 2026 WIPP SA that trace back to the 1980 FEIS include noise impacts and floodplains.

***Final Supplement Environmental Impact Statement for the Waste Isolation Pilot Plant,* DOE/EIS-0026-FS** (1990 SEIS-I) (DOE 1990a). In January 1990, the DOE issued the SEIS-I to evaluate the environmental impacts associated with new information and changes since issuance of the 1981 ROD. The 1990 SEIS-I included an analysis of changes in the TRU waste inventory, consideration of the hazardous chemical constituents in the TRU waste, modification and refinement of the system for the transportation of TRU waste to the WIPP facility, modification of the experimental program (i.e., test phase), and changes in the understanding of the hydrogeologic characteristics of the WIPP site. The ROD for the 1990 SEIS-I (DOE 1990b), which was issued in June 1990, continued the phased development of the WIPP facility by instituting a test phase to further examine the WIPP site's suitability as a TRU waste repository (55 FR 25689, June 22, 1990). The test phase was designed to bridge the gap between the experimental program and the implementation of the operational phase (i.e., disposal phase); however, the DOE decided to pursue the disposal phase directly while performing desired testing at off-site facilities.

***Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement, Eddy County, near Carlsbad, New Mexico,* DOE/EIS-0026-S-2** (1997 SEIS-II) (DOE 1997). In 1997, the DOE issued the 1997 SEIS-II, which analyzed the potential environmental impacts associated with disposing of TRU waste at the WIPP facility, including PCB-commingled TRU waste identified in the DOE inventory at the time. The proposed action in the 1997 SEIS-II was to proceed with the phased development of the WIPP facility by disposing of retrievably stored and future-generated defense TRU waste after treatment to the planning-basis WAC, up to the total TRU waste volume capacity limit in P.L. 102-579 (as amended by P.L. 104-201). On January 23, 1998, the DOE announced a ROD (63 FR 3624) to implement the proposed action (DOE 1998). The 1997 SEIS-II, as the most recent SEIS related to TRU waste disposal at the WIPP facility, is the foundational NEPA document for WIPP. Impacts associated with the Proposed Action are compared against the impacts presented in the 1997 SEIS-II.

Final Surplus Plutonium Disposition Supplemental Environmental Impact Statement (Surplus Plutonium SEIS) (DOE/EIS-0283-S2; DOE 2015). In keeping with the U.S. nonproliferation policies and agreements with the Russian Federation to reduce the availability of material that is readily usable in nuclear weapons, the DOE engaged in a program to disposition U.S. surplus plutonium. The Surplus Plutonium SEIS evaluated the potential disposal of 13.1 metric tons (MTs) of surplus plutonium for which a disposal path had not been assigned at that time. In 2016, the National Nuclear Security Administration (NNSA), a semi-autonomous agency within the DOE, announced its ROD (81 FR 19588) to implement the proposed action for the disposition of 6 MTs of non-pit surplus plutonium. As authorized through an amended Record of Decision (AROD) (85 FR 53350) in August 2020, the NNSA announced that an additional 7.1 MTs of non-pit surplus plutonium has been designated to be disposed of at the WIPP facility. This non-pit surplus plutonium would be prepared and packaged as CH TRU waste to meet the *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant* (WIPP WAC) for CH TRU waste and other regulatory requirements.

WIPP WAC

The WIPP WAC describes the constraints (limits) on the physical, chemical, and radiological properties of TRU waste and its packaging as determined by WIPP's authorization basis requirements. TRU waste will not be approved for shipment to and disposal at the WIPP facility until it has been certified as meeting these criteria. WAC ensure that TRU waste is managed and disposed of in a manner that protects human health and safety and the environment. The current WIPP WAC is documented in a report entitled "Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant," Revision 12, dated August 14, 2025 (DOE 2025b).

Surplus Plutonium Disposition Program Final Environmental Impact Statement **(DOE/EIS-0549)** (SPDP Final EIS) (NNSA 2022). On January 19, 2024, the NNSA published a notice in the *Federal Register* (89 FR 3642) to announce the availability of the Surplus Plutonium Disposition Program (SPDP) Final EIS. The SPDP Final EIS evaluates the NNSA's proposed action to dispose of 34 MTs of surplus plutonium. The SPDP Final EIS analyzes two alternatives in detail: the preferred alternative, consisting of four sub-alternatives, and the No-Action Alternative. Both alternatives use the dilute and dispose strategy and both address up to 7.1 MTs of non-pit surplus plutonium that the NNSA previously decided to dispose of (*see* 85 FR 53350) using the dilute and dispose strategy. The NNSA's preferred alternative, the dilute and dispose strategy, also known as "plutonium downblending," includes converting pit and non-pit plutonium to oxide, blending the oxidized plutonium with an adulterant, compressing it, encasing it in two containers, then overpacking and disposing of the resulting CH TRU waste U/G in the WIPP facility. This approach would require new, modified, or existing capabilities at the Savannah River Site (SRS) in South Carolina, LANL in New Mexico, the Pantex Plant in Texas, and WIPP. The No-Action Alternative is the continued management of the 34 MTs of both surplus pit and non-pit plutonium, including the disposition of up to 7.1 MTs of non-pit surplus plutonium using the dilute and dispose strategy based on the previous decision (85 FR 53350). All of the surplus plutonium would be disposed of at the WIPP facility. In the ROD, NNSA decided to use the dilute and dispose strategy to permanently dispose of 34 MTs of plutonium surplus to the defense needs of the Nation (89 FR 28763, April 19, 2024).

Final Environmental Impact Statement for Plutonium Pit Production at the Savannah River Site in South Carolina (SRS Pit Production EIS), **DOE/EIS-0541** (NNSA 2020a). The NNSA

prepared the SRS Pit Production EIS to evaluate the potential environmental impacts of repurposing the Mixed-Oxide Fuel Fabrication Facility (MFFF) to produce war reserve pits. In 2020, the NNSA announced its ROD (85 FR 70601, November 5, 2020) to repurpose the MFFF to produce a minimum of 50 war reserve pits per year at the SRS and to develop the ability to implement a short-term surge capacity to enable the NNSA to meet the requirements of producing pits at a rate of not less than 80 war reserve pits per year up to the analyzed limit as necessary during 2030 for the nuclear weapons stockpile (NNSA 2020b). The SRS Pit Production EIS reports that any TRU waste associated with pit production at SRS would be disposed of at the WIPP facility.

Final Site-Wide Environmental Impact Statement (SWEIS) for Continued Operation of Los Alamos National Laboratory (LANL) (DOE/EIS-0552). (NNSA 2026) The SWEIS evaluates three alternatives: No Action, Modernized Operations and Expanded Operations. DOE Environmental Management activities at LANL are included in the SWEIS. In its ROD issued on March 17, 2026, the NNSA decided to proceed with implementation of all the projects and activities described in the SWEIS for the Modernized Operations Alternative and the Expanded Operations Alternative, which includes staging facilities for TRU Waste. The NNSA estimated in the ROD that TRU waste generation would increase by about 1 percent.

Draft Plutonium Pit Production Programmatic Environmental Impact Statement (DOE/EIS-0573). (NNSA 2026a) The NNSA prepared the Draft Plutonium Pit Production Programmatic Environmental Impact Statement (PEIS) to assess the potential environmental impacts of the NNSA's proposed production of plutonium pits in support of the Stockpile Stewardship and Management Program. The Draft PEIS was issued on April 10, 2026, for a 90-day comment period.

***Final Versatile Test Reactor Environmental Impact Statement,* DOE/EIS-0542** (DOE 2022b). The Final Versatile Test Reactor Environmental Impact Statement (VTR EIS) analyzed the potential environmental impacts of alternatives for constructing and operating a VTR and the associated facilities required for post-irradiation examination of test and experimental fuels and materials. In the ROD (87 FR 47400) issued on August 3, 2022, the DOE decided to construct and operate the VTR at the Idaho National Laboratory (INL) site and to establish, through modification and construction, co-located facilities for post-irradiation examination of test products, and for management of spent VTR driver fuel. The DOE did not decide whether to establish VTR driver fuel production capabilities for feedstock preparation and fuel fabrication at the INL site, SRS, or a combination of the two sites. Once a preferred option for VTR driver fuel production is identified, the DOE will announce its preference in a *Federal Register* notice. The DOE would then publish a ROD no sooner than 30 days after its announcement of a preferred option for VTR driver fuel production. The VTR project would generate TRU waste that would be disposed of at the WIPP facility.

***Supplement Analysis for the Disposal of Certain Rocky Flats Plutonium-Bearing Materials at the Waste Isolation Pilot Plant,* DOE/EIS-0026-SA-3** (DOE 2002). The potential impacts from different proposed alternatives for the storage and disposition of surplus plutonium and waste containing surplus plutonium have been analyzed by the DOE. These analyses present the potential impacts for several disposal alternatives including conversion to mixed-oxide fuel,

immobilization, and direct disposal at the WIPP facility (DOE 2015). In 2015, the DOE issued an EIS to address changes to prior proposals on the disposition of surplus plutonium (DOE 2015). In addition, the DOE has issued a ROD and an AROD that determined the disposition paths for surplus plutonium and plutonium-bearing materials within the DOE complex (DOE 2016b; DOE 2020a).

***Supplement Analysis for Disposal of Polychlorinated Biphenyl-Commingled Transuranic Waste at the Waste Isolation Pilot Plant,* DOE/EIS-0026-SA-02** (DOE 2004b). The DOE's decision to implement the proposed action in the ROD for the 1997 SEIS-II did not include the disposal of PCB-commingled TRU waste because no facilities were then available to provide thermal treatment of that waste prior to disposal. However, in June 2004, the DOE issued DOE/EIS-0026-SA-02, which evaluated the potential impacts of disposing up to 2,500 m^3 of PCB-commingled TRU waste at the WIPP facility. The DOE determined that the 1997 SEIS-II was adequate, and therefore, the DOE did not have to supplement the EIS or prepare a new EIS. Subsequent to the determination based on that SA, on June 30, 2004, the DOE issued a revision to the 1997 SEIS-II ROD, announcing its decision to dispose of up to 2,500 m^3 of TRU waste containing PCBs at the WIPP facility (69 FR 39456) (DOE 2004a).

***Supplement Analysis for the Waste Isolation Pilot Plant Site-Wide Operations,* DOE/EIS-0026-SA-05** (DOE 2005) and ***Supplement Analysis for the Waste Isolation Pilot Plant Site-Wide Operations,* DOE/EIS-0026-SA-07** (DOE 2009a). The DOE prepared site-wide SAs in 2005 and 2009 related to the continuation of TRU waste disposal at the WIPP facility. These SAs were performed in accordance with 10 CFR §1021.330(d) and they analyzed changes that had occurred since issuance of the 1997 SEIS-II. In these site-wide SAs, the DOE determined that there were no substantial changes in the proposed action that were relevant to environmental concerns, nor significant new circumstances or information relevant to environmental concerns bearing on the proposed action or its impacts (DOE 2005, DOE 2009a). The DOE determined in each instance that no further NEPA documentation, such as a supplemental EIS or a new EIS, was needed.

***Supplement Analysis for the Waste Isolation Pilot Plant Site-Wide Operations,* DOE/EIS-0026-SA-10** (DOE 2016a). Following the February 2014 salt haul truck fire and radiological release event, the DOE improved safety management programs at the WIPP facility, including changes to nuclear safety, fire protection, radiological controls, and emergency management, along with their associated documentation, procedures, and training. Details of the recovery are discussed in the 2016 SA, which the DOE prepared to evaluate the restart of the WIPP facility. As a result of the 2016 SA, the DOE determined that no further NEPA documentation (i.e., a supplemental EIS or a new EIS) was needed. The DOE resumed TRU waste emplacement at the WIPP facility on January 4, 2017 (DOE 2016a).

***Supplement Analysis for a Proposal to Temporarily Store Defense Transuranic Waste Prior to Disposal at the Waste Isolation Pilot Plant,* DOE/EIS-0026-SA-09** (DOE 2014a). This SA examined a proposal to temporarily store a limited amount of TRU waste at the Waste Control Specialists, LLC (WCS) facility in Andrews County, Texas. The DOE determined that temporary storage of TRU waste at WCS did not substantively change the proposed action analyzed in the 1997 SEIS-II, that is, the packaging and transportation of TRU waste for disposal in the WIPP repository. Thus, the DOE did not make substantive changes that are relevant to environmental

concerns, and determined the temporary storage of TRU waste at WCS would not contribute substantively to the potential impacts identified in the 1997 SEIS-II proposed action.

***Supplement Analysis for the New Permanent Ventilation System,* DOE/EIS-0026-SA-11** (DOE 2017b). The DOE evaluated the impacts of the construction and operation of a new filter building and a new ventilation shaft at the WIPP site. Although the project name was "exhaust shaft," the SA evaluated the utility shaft (US) as an air intake shaft. The DOE determined there were no substantial changes in the proposed action that were relevant to environmental concerns, nor significant new circumstances or information relevant to environmental concerns bearing on the proposed action or its impacts. The DOE concluded that no further NEPA documentation was needed.

Categorical Exclusion: Installation of Supplemental Ventilation System to Support Underground Activities at the Waste Isolation Pilot Plant (DOE 2017a). This categorical exclusion determination addressed a temporary upgrade to the existing WIPP U/G ventilation exhaust system. Supplemental ventilation was needed to facilitate some U/G activities, such as mining of Panel 8, and maintenance, drilling, bolting, and salt handling in other areas of the U/G.

***Final Supplement Analysis of the 2008 Site-Wide Environmental Impact Statement for the Continued Operation of Los Alamos National Laboratory for Plutonium Operations,* DOE/EIS-0380-SA-06** (NNSA 2020c). The NNSA prepared this SA to reevaluate adopting elements of the Expanded Operations Alternative from the 2008 LANL SWEIS. The NNSA's September 2020 AROD enabled the production of a minimum of 30 pits/year during 2026 at LANL, with additional surge capacity, if needed, to meet the programmatic requirements of producing pits at a rate of no fewer than 80 pits/year during 2030 for the nuclear weapons stockpile (85 FR 54544) (NNSA 2020d). The NNSA evaluated the potential environmental impacts of producing up to 80 pits/year at LANL. The LANL SWEIS reports that any TRU waste associated with pit production at LANL would be disposed of at the WIPP facility.

***Supplement Analysis for the Waste Isolation Pilot Plant Site-Wide Operations,* DOE/EIS-0026-SA-12** (DOE 2021). In April 2021, the DOE prepared this 2021 SA related to the continuation of TRU waste disposal at the WIPP facility. The 2021 SA also evaluated the proposed action to construct and use two replacement panels (designated as Panels 11 and 12) to take the place of the previous underutilized disposal capacity. Following completion of the 2021 SA, the DOE determined that the proposed action would not represent substantial changes to prior NEPA documentation, which meant that the proposed action could be implemented without additional NEPA documentation.

2.0 PROPOSED ACTION AND CHANGES CONSIDERED IN THIS SA

2.1 Introduction

This section begins with a discussion of the TRU waste inventory estimates (Section 2.2), which are integral to understanding the Proposed Action and the scope of this 2026 WIPP SA. Next, Section 2.3 discusses the recertification and performance assessment (PA) process that is conducted to ensure that the WIPP disposal system long-term performance after final facility closure continues to comply with the USEPA radioactive waste disposal regulations. The Proposed

Action, described in Section 2.4, includes the excavation and use of additional TRU waste disposal panels at the WIPP facility, as well as new facilities and/or changes to existing structures listed in Table 2-4. Lastly, Section 2.5 discusses other changes that are considered in this 2026 WIPP SA that could have a bearing on environmental impacts, such as changes in the population, the WIPP workforce and the dose-to-risk factor.

2.2 TRU Waste Inventory Estimates

The LWA includes provisions that allow no more than 175,564 m^3 (6.2 million ft^3) of total TRU waste volume and 5.1 million curies (Ci) of RH TRU waste to be disposed of at the WIPP facility (U.S. Congress 1992). Based on the 1997 SEIS-II Preferred Alternative, a total of ten panel-equivalents were estimated[4] to be needed for the disposal of TRU waste up to the current WIPP LWA waste volume limit of 175,564 m^3 (6.2 million ft^3). The Proposed Action in this SA would increase the number of panels in the WIPP facility but would not increase the disposal of TRU waste beyond the current WIPP LWA waste volume limit. The TRU waste inventory estimates change frequently due to retrieval, treatment, characterization, and shipping activities. Consequently, TRU waste inventory estimates are collected annually from generator/storage sites and the DOE prepares the *Annual Transuranic Waste Inventory Report* (ATWIR). The ATWIR provides updated TRU waste inventory estimates, is used for strategic planning, and supports the DOE CBFO's input into documents (e.g., WIPP Documented Safety Analysis [DSA] and NEPA evaluations), PA, planned changes, and other design changes as needed for the WIPP project.

The ATWIR that was used in preparing the performance assessment for this SA was completed in 2022 (ATWIR-2022), with a data cutoff date of December 31, 2021 (DOE 2022c).[5] The ATWIR-2022 provided the best estimate of TRU waste inventories at generator sites and is used to support the analyses in this SA. To meet the USEPA certification and recertification requirements, the DOE describes and categorizes (explained below) the TRU waste inventory emplaced in the WIPP repository and estimates the TRU waste inventory that exists or is expected to be generated at TRU waste generator/storage sites from across the nation.

In January 2018, the DOE submitted a request to modify the NMED WIPP HWFP to clarify TRU mixed-waste disposal volume reporting (DOE 2018a; NMED 2018). In December 2018, the NMED approved the DOE's request to modify the existing WIPP HWFP (NMED 2018), and in January 2019, the DOE fully implemented the change in the method of tracking and reporting. The TRU waste inventory estimates in ATWIRs after that date (including ATWIR-2022) are based on the DOE's revised method of tracking and reporting the TRU waste disposal volumes.

[4] During preparation of the 1997 SEIS-II, the DOE had very little experience with TRU waste packaging, transportation, handling, and disposal and made some very conservative assumptions on throughput rates, that generator sites would provide containers full of TRU waste, that generator sites would provide efficiently packaged disposal containers so that every waste column in the disposal panels would be fully utilized. As such, the ten panel-equivalents are best characterized as an estimate.

[5] In January 2026, after the data cutoff date for this SA, DOE published ATWIR-2025. In preparing this SA, Sandia National Laboratories (SNL) reviewed and compared the results of the 2023 NEPA PA to the updated PA results and determined that the 2023 NEPA PA and dose calculations remain unchanged despite the updates made since the analyses were conducted (SNL 2025). As a result of that review, DOE determined that ATWIR-2022 provides a reasonably conservative estimate of TRU waste inventories that would be disposed of at the WIPP facility.

2.2.1 TRU Waste Categories

As described below, this SA considers two categories of TRU waste based on designations in the ATWIR: (1) "WIPP-bound"[6] TRU waste (through and beyond 2033); and (2) "Potential"[7] TRU waste (through and beyond 2033). Regardless of its categorization in the ATWIR, as long as it is defense-related, all TRU waste must meet the WIPP requirements (e.g., WIPP WAC and the WIPP HWFP, Waste Analysis Plan [WAP]) before it can be disposed of in the WIPP facility.

WIPP-bound TRU waste through and beyond 2033. In the ATWIR, TRU waste streams are designated as "WIPP-bound" if they appear to meet the applicable requirements for emplacement in the WIPP repository as of the data cutoff date in ATWIR. As of March 5, 2026, about 46 percent (approximately 80,576 m^3) of the total TRU waste volume capacity limit authorized by Congress in the WIPP LWA has been disposed in approximately eight disposal panels at the WIPP facility. Table 2-1 shows the CH TRU anticipated WIPP-bound waste volume[8] at the TRU waste generator sites based on the ATWIR-2025. WIPP-bound CH TRU final form[9] waste volumes are provided in three columns in the table: (1) through 2033; (2) after 2033; and (3) total volume through and beyond 2033.

[6] "WIPP-bound" is defined as TRU waste that appears to be eligible for disposal as of the data cutoff date.

[7] "Potential" is defined as TRU waste not eligible for disposal at the WIPP facility as of the data cutoff date.

[8] The LWA TRU waste volume is based on the gross internal volume of the disposal container for direct-loaded containers and the innermost disposal container for overpacked containers.

[9] Final form waste is defined as the form of waste in packaging approved for shipment to and emplacement in the WIPP facility.

Table 2-1. CH TRU WIPP-Bound TRU Waste Inventory Total Volume Through and Beyond 2033

TRU Waste Generator Site	Anticipated Final Form Volume Through 2033 (m^3)	Anticipated Final Form Volume After 2033 (m^3)	Total Anticipated Final Form Volume Through and After 2033 (m^3)
Argonne National Laboratory	38.9	6.51	45.41
Hanford (Richland) Site	16,100	3,408.6	19,508.6
Idaho National Laboratory	8,510	–	8,510
Knolls Atomic Power Laboratory - Nuclear Fuel Services	–	–	0
Knolls Atomic Power Laboratory - Schenectady	0.036	–	0.036
Lawrence Berkeley National Laboratory	0.42	0.42	0.84
Lawrence Livermore National Laboratory	423	328.56	751.56
Los Alamos National Laboratory[a]	8,820	8,877.2	17,697.2
Material and Fuels Complex	13.2	32.32	45.52
Nevada National Security Site	137	–	137
Nuclear Radiation Development Site	2.1	–	2.1
Oak Ridge National Laboratory	426	615.3	1041.3
Sandia National Laboratories	77.5	7.5	85.0
Savannah River Site	7,68	24,217	24,985
Separations Process Research Unit	6.06	–	6.06
Grand Total (rounded)	**35,300**	**37,493**	**72,793**

a. As of December 31, 2024, for the cut-off date of ATWIR-2025, approximately 55.9 m^3 of TRU waste from LANL remained in temporary storage at WCS near Andrews, Texas. The WCS inventory is accounted for in Table 2-1.

Source: DOE 2025e.

An estimated anticipated final form total volume of approximately 72,793 m^3 of CH TRU waste could be shipped to WIPP through and beyond 2033, provided all WIPP requirements are met. Approximately 98 percent of the anticipated CH TRU waste is stored or will be generated at the large quantity sites (LQSs) (Hanford Site in Washington; INL in Idaho; LANL in New Mexico; Oak Ridge National Laboratory [ORNL] in Tennessee; and SRS in South Carolina) (DOE 2025d).

Table 2-2 shows the total RH TRU WIPP-bound waste volume at the TRU waste generator sites based on the ATWIR-2025. As shown in that table, WIPP-bound RH TRU final form waste volumes are provided in three columns: (1) through 2033; (2) after 2033; and (3) total volume through and beyond 2033. An estimated anticipated final form total volume of approximately 2,019 m^3 of RH TRU waste could be shipped to WIPP through and beyond 2033, provided all WIPP requirements are met. Approximately 96 percent of the anticipated RH TRU waste is stored or will be generated at the LQSs (DOE 2025e).

Table 2-2. RH TRU WIPP-Bound TRU Waste Inventory Total Volume Through and Beyond 2033

TRU Waste Generator Site	Anticipated Final Form Volume Through 2033 (m^3)	Anticipated Final Form Volume After 2033 (m^3)	Total Anticipated Final Form Volume Through and After 2033 (m^3)
Argonne National Laboratory	24.4	2.2	26.6
Bettis Atomic Power Laboratory	5.67	0	5.67
Hanford (Richland) Site	777	113.9	890.9
Idaho National Laboratory	211	0	211
Los Alamos National Laboratory	80.1	0	80.1
Knolls Atomic Power Laboratory - Schenectady	0	13.86	13.86
Material and Fuels Complex	23.3	41.6	64.9
Oak Ridge National Laboratory	223	457.8	680.8
Sandia National Laboratories	2.2	0	2.2
Savannah River Site	35.3	0	35.3
Separations Process Research Unit	4.14	0	4.14
Grand Total (rounded)	**1,390**	**629**	**2,019**

Source: DOE 2025e.

With regard to the activity level of WIPP-bound TRU waste, Table 2-3 presents the total CH and RH TRU waste activity, by site and decayed through 2033, that could be disposed of at the WIPP facility. As shown in that table, the total activity estimate for CH + RH TRU waste is less than the LWA limit of 5.1 million Ci for RH TRU waste. This TRU waste inventory estimate update would not change the environmental impacts previously evaluated in the 1997 SEIS-II Preferred Alternative because the RH TRU waste total activity estimate is less than the LWA limit of 5.1 million Ci analyzed in that SEIS-II (U.S. Congress 1992, DOE 1997, DOE 2019a).

Table 2-3. Emplaced Activity of WIPP-Bound TRU Waste by Site Decayed through 2033

TRU Waste Generator Site	ATWIR-2025 Total (Ci)
Hanford (Richland) Site	648,000
Idaho National Laboratory	80,800
Los Alamos National Laboratory	537,000
Oak Ridge National Laboratory	42,300
Savannah River Site	742,000
Small Quantity Sites	22,900
Anticipated Total	2,070,000
WIPP (Emplaced)	2,120,000
WCS (Temporary Storage)	4,110
Emplaced/Temporary Storage Total	2,120,000
Grand Total	**4,190,000**

Source: DOE 2025e.

Potential TRU waste through and beyond 2033. In the ATWIR, TRU waste streams are designated as "potential" if there are uncertainties regarding eligibility for emplacement in the WIPP repository, as of the data cutoff date for the report. The data presented in Tables 2-1, 2-2, and 2-3 are for WIPP-bound TRU waste streams through and beyond 2033. In addition to WIPP-bound TRU waste streams, there are other waste streams that have uncertainties (e.g., have regulatory or technical constraints, no ROD, lack characterization data) as of the ATWIR data cutoff date and they are not eligible to be disposed of in the WIPP facility. These are referred to as "Potential" TRU waste. The ATWIR-2025 estimates there could be approximately 8,130 m^3 of potential TRU waste that could be disposed of at the WIPP facility (DOE 2025e). This 8,130 m^3 of TRU waste is included in the analyses of the Proposed Action in this 2026 WIPP SA.

2.2.2 Summary of TRU Waste Inventory Estimates for this 2026 WIPP SA

Based on the information above, the estimated TRU waste volumes included in the scope of this SA are as follows:

- Emplaced (approximately 78,400 m^3): TRU waste that has been disposed of in the WIPP repository, in above-ground storage at the WIPP facility, or in temporary storage at a designated storage location as of the ATWIR data cutoff date.
- WIPP-bound through and beyond 2033 (approximately 74,800 m^3): TRU waste that is stored and projected to be generated through 2033 is estimated to be 36,700 m^3, and beyond 2033 is estimated to be 38,100 m^3. Thus, the total estimated WIPP-bound TRU waste volume through and beyond 2033 is approximately 74,800 m^3.
- Potential (approximately 8,130 m^3): Potential TRU waste estimate is about 8,100 m^3.

The combination of these TRU waste volume estimates (emplaced, WIPP-bound, and potential) total approximately 153,200 m^3. Under the WIPP LWA, the WIPP is authorized to dispose of 175,564 m^3 (6.2 million ft^3) of TRU waste. Because the emplaced, WIPP-bound, and potential

waste streams volumes are less than the WIPP LWA volume capacity limit, a portion of the inventory estimates were scaled up[10] to meet the WIPP LWA volume capacity limit of 175,564 m^3 for this SA. The scaling methodology that was applied to approximate the TRU waste volume estimate for a full repository (i.e., WIPP LWA volume capacity limit) resulted in a CH TRU waste volume estimate of 168,485 m^3 and an RH TRU waste volume estimate of 7,079 m^3. Implementing this scaling methodology represents a bounding approach and is consistent with the scaling methodology performed for the 1997 WIPP SEIS-II, the WIPP Compliance Certification Application (CCA), and subsequent Compliance Recertification Applications (CRAs) (DOE 1996, DOE 1997, DOE 2004c, DOE 2009b, DOE 2014b, DOE 2019a).

The ATWIRs included analyses using historical inventory data, and showing uncertainties associated with the reported inventory increase as the projection date extends beyond 2025. Based on historical trends, the total inventory, including TRU waste projected to be generated through 2083, is likely to be overestimated. However, even taking this overestimated inventory into account, the total volume of the emplaced TRU waste plus the WIPP-bound category of TRU waste, estimated for disposal would be below the LWA capacity limit for WIPP.

2.3 Recertification and Performance Assessment

Recertification is a process in which the USEPA evaluates changes since the last recertification decision to determine whether the WIPP repository continues to meet all the requirements of the USEPA's radioactive waste disposal regulations. The recertification process helps ensure DOE's continued compliance with the disposal regulations based on the most accurate, up-to-date information available. The USEPA initially certified the WIPP disposal system on May 13, 1998, and the WIPP facility first received TRU waste on March 26, 1999. The DOE submitted applications for recertification in 2004, 2009, 2014, and 2019. The latest CRA was submitted in March 2019 (CRA-2019), and the deferred PA was submitted in December 2019. The TRU waste inventory estimate was based on the ATWIR-2018 inventory data with a cutoff date of December 31, 2017 (DOE 2019a).

Performance assessment is the primary quantitative analysis tool used by the DOE to demonstrate compliance with the long-term disposal standards in 40 CFR Part 191 (Subparts B and C) and the compliance certification criteria in 40 CFR Part 194 (DOE 1996). The PA results determine the effects significant features, events, and processes might have on the disposal system, considers the uncertainties associated with those features, events, and processes, and estimates the cumulative releases of radionuclides over a 10,000-year period. This assessment evaluates each release scenario under the assumption of a full repository (i.e., the LWA TRU waste limit of 175,564 m^3 [6.2 million ft^3] of total TRU waste volume). The PA evaluates the likelihood that the WIPP repository will meet the release limits specified by 40 CFR Part 191.13 for 10,000 years after the disposal phase ceases. The PA must consider both natural and human-initiated features, events,

[10] A scaling methodology was implemented for several of the NEPA analyses whereby a portion of the ATWIR volume estimates was scaled such that the totals reflect the WIPP LWA volume capacity limit or a "full" WIPP repository in terms of volume – 175,564 m^3. The approved scaling methodology is to scale only the WIPP-bound (not yet generated) portion of the inventory, since this represents future TRU waste.

and processes that could have an effect on the WIPP disposal system (DOE 1996, DOE 2004c, DOE 2009b, DOE 2014b, DOE 2019a).

For the CCA (DOE 1996) and each subsequent CRA, the USEPA has determined that the WIPP repository continues to comply with the criteria of 40 CFR Part 194.34(f). Information and data from previous CRAs form the basis of past and present DOE compliance positions (DOE 2004c, DOE 2009b, DOE 2014b). Past USEPA decision documents are referenced in the CRA-2019, which is the most recent CRA (DOE 2019a).

CRA-2019 PA. The PA for CRA-2019 was updated based on new information since the USEPA Certification Decision on the CRA-2014. These changes include refraining from installing panel closures in entrances to Panels 3, 4, 5, and 6, the abandonment of equivalent Panel 9, the inclusion of an additional shaft and its associated access drifts, along with updates to various technical parameters (DOE 2019a). Because PA results were used in the 1997 SEIS-II to estimate potential impacts of the Preferred Alternative, important changes to the PA are relevant and considered in this 2026 WIPP SA to determine if PA changes are substantial or represent significant new circumstances or information relevant to environmental concerns and bearing on the previous NEPA evaluations.

The results from the CRA-2019 PA compliance calculation demonstrate that the changes since CRA-2014 have little impact on the long-term performance of the WIPP repository (DOE 2019a). The updated results illustrate that for the undisturbed repository scenario there are no radionuclide releases to the accessible environment (DOE 2019a). For the disturbed scenarios, the CRA-2019 PA results (i.e., total mean releases) demonstrate a marginal increase from the CRA-2014 results; however, these results are fully compliant with the containment requirements as defined in 40 CFR Part 191.13 (DOE 2019a). The CRA-2019 PA results also illustrate that there are only minor changes to environmental and human health impacts when compared to the results of the 1997 SEIS-II Preferred Alternative (DOE 1997, DOE 2019a).

NEPA23 PA. The DOE prepared the NEPA23 PA (SNL 2024) to support the Proposed Action evaluated in this SA. Performance assessment calculations were performed to quantify the potential releases to the accessible environment over a 10,000-year post-closure period. The PA calculations (termed, "NEPA23 PA") are based on the PA calculations performed for the Replacement Panels Planned Change Request (RPPCR) analysis submitted by the DOE to the USEPA. The difference in inventory impacts PA inputs, such as waste stream activity and radionuclide solubility. The NEPA23 PA does not support a planned change request (PCR) or planned change notice (PCN) to be submitted by the DOE to the USEPA and is not performed as a compliance calculation. Instead, the planned use of the NEPA23 PA is as input into this 2026 WIPP SA. The results of the NEPA23 PA analysis are expressed in terms of normalized releases and compared to containment requirements according to the Certification Criteria in Title 40 CFR Part 194. The total mean normalized releases are shown to be less than the release limits specified in 40 CFR Part 191.13 and as referenced by in the Certification Criteria in Title 40 CFR Part 194.34(f) (SNL 2024).

2.4 Proposed Action

Under the Proposed Action, the DOE would continue the uninterrupted disposal of defense-related TRU waste up to the Congressionally authorized WIPP LWA total TRU waste volume capacity limit of 175,564 m^3 (6.2 million ft^3) by additional panel excavation. The authorized total TRU waste volume capacity limit of 175,564 m^3 (6.2 million ft^3) has remained the same since the WIPP LWA was issued. Under the Proposed Action, the DOE would excavate and use additional TRU waste disposal panels beyond Panels 11 and 12 to dispose of defense-related TRU waste up to the WIPP LWA total TRU waste volume capacity limit. The preliminary estimate of the number of additional panels, beyond Panels 11 and 12, needed to accommodate the WIPP LWA total TRU waste volume capacity limit is seven (Panels 13 – 19) (CBFO 2024).

As discussed in this section, the Proposed Action is similar to the 1997 SEIS-II Preferred Alternative in the following respects:

- Same WIPP LWA total TRU waste volume capacity limit of 175,564 m^3 (6.2 million ft^3);
- Same RH TRU waste limits authorized in the WIPP LWA (e.g., RH TRU limit of 5.1 million curies);
- Same defense-related TRU waste requirement (must meet the WIPP WAC);
- Same CH & RH TRU waste handling processes on the surface and U/G;
- Same disposal room dimensions (width and length);
- Same three-column-high CH TRU waste stack and emplacement on the floor;
- Same RH TRU waste emplacement in boreholes in ribs/wall and on floor in shielded containers;
- Same/functionally equivalent mining equipment and same just-in-time-mining technique;
- Same WIPP LWA 10,240 acres;
- Same approach on LWA – all authorized activities will occur on land reserved for use by the Secretary for the purposes of WIPP.

Continued uninterrupted disposal operations would ensure compliance agreements and State agreements are met, would support achievement of TRU waste cleanup goals at DOE sites, and would continue support of the DOE's national security missions. As discussed in Section 1.3, the scope of this 2026 WIPP SA focuses on evaluating the Proposed Action against the analyses in the 1997 SEIS-II in order to support a determination as to whether the changes are substantial and relevant to environmental concerns, or represent substantial new circumstances or information relevant to environmental concerns and bearing on the environmental impacts presented in the 1997 SEIS-II for the Preferred Alternative, which was selected in the 1998 ROD.

No changes to the LWA are needed for the Proposed Action. The LWA withdrew the 10,624 acres delineated as the WLWA. Only Congress can change this public law. The Proposed Action allows the WIPP facility to fully implement its mission per Public Law 96-164, and emplace defense TRU waste in the WIPP facility up to the Congressionally authorized total TRU waste disposal volume capacity limit of 175,564 m^3 (6.2 million ft^3). No notable changes to the WIPP facility decommissioning and closure activities are anticipated for the Proposed Action, as there would be no changes in the: (1) WIPP mission; (2) LWA total TRU waste volume capacity limit, curie limit, and disposal processes; and (3) TRU waste handling approaches, disposal techniques, and/or

equipment. Based on the Proposed Action, there would be a later date to start decommissioning and closure than assumed in the 1997 SEIS-II.

2.4.1 Mining, Waste Handling, and Disposal Operations

The 1997 SEIS-II described the conceptual ten equivalent panels and evaluated the potential impacts of mining, waste handling, and operations to dispose of defense TRU waste up to the WIPP LWA total TRU waste volume capacity limit. Although the mining processes for Panels 13-19 would be similar to the impacts presented in the 1997 SEIS-II, more mining would be required for the seven additional panels. Additionally, the excavation and use of Panels 13-19 would extend the WIPP final facility closure date. Consequently, this 2026 WIPP SA evaluates the potential impacts of this additional mining and extension of operation against the impacts presented in the 1997 SEIS-II.

Mining, waste handling, and waste disposal operations for Panels 13-19 would not substantively deviate from current facility practices; however, efficiencies might be implemented (e.g., the use of electrical equipment over diesel equipment). If new equipment is utilized, it would be evaluated for functional equivalency prior to use, and any associated new waste handling practices would have to meet applicable provisions of the NMED HWFP (NMED 2023), applicable DOE orders and standards, and be consistent with the Mine Safety and Health Administration regulations. If any changes are made, the DOE will determine the need for additional NEPA analysis, as appropriate.

The mining crews at the WIPP facility have employed the just-in-time mining approach for over 25 years to excavate disposal panels in concert with the waste shipping rate. The overall projected schedule for the Proposed Action is primarily driven by the availability of TRU waste inventory estimated in the ATWIR-2025 through 2083.

Based on the just-in-time mining approach, this 2026 WIPP SA evaluates the potential environmental impacts of constructing Panels 13-19 and emplacing TRU waste over the 2024-2083 time frame. The estimated final facility closure date for purposes of evaluating the Proposed Action would be after 2083.

To manage the mined salt for the Proposed Action, a new lined salt pile and evaporation pond would be needed (*see* Section 2.4.3 for a description). No changes or additions would be necessary for the ventilation system, design, or operations to accommodate the additional disposal panels in the mine. Ventilation would be established for disposal rooms receiving waste within a panel until waste emplacement activities are completed and the panel closure system is installed. Rooms actively being filled will receive a minimum 35,000 standard ft^3 per minute of air when workers are present to assure worker safety. Once waste emplacement activities are complete, the filled disposal room would be barricaded against entry and isolated from the mine ventilation system (NWP 2020). Consequently, the U/G ventilation process would not change compared to analyses in the 1997 SEIS-II and subsequent SAs. Underground ventilation would continue to meet the required air flow rates by using surface fans, bulkheads, air regulators, and overcasts. The panel closure system would be the same as the existing panel closure design approved by the WIPP Permit (NMED 2020) and the USEPA Rulemaking (EPA 2014).

There are no known changes to the WIPP WAC that would be required for excavation and use of additional panels at the WIPP facility. The decision made in the 1998 ROD and the 2004 revision to the 1998 ROD remains the same: TRU waste destined for the WIPP facility should be prepared (i.e., treatment as needed) and packaged according to the WIPP WAC.

2.4.2 Additional Panels Layout

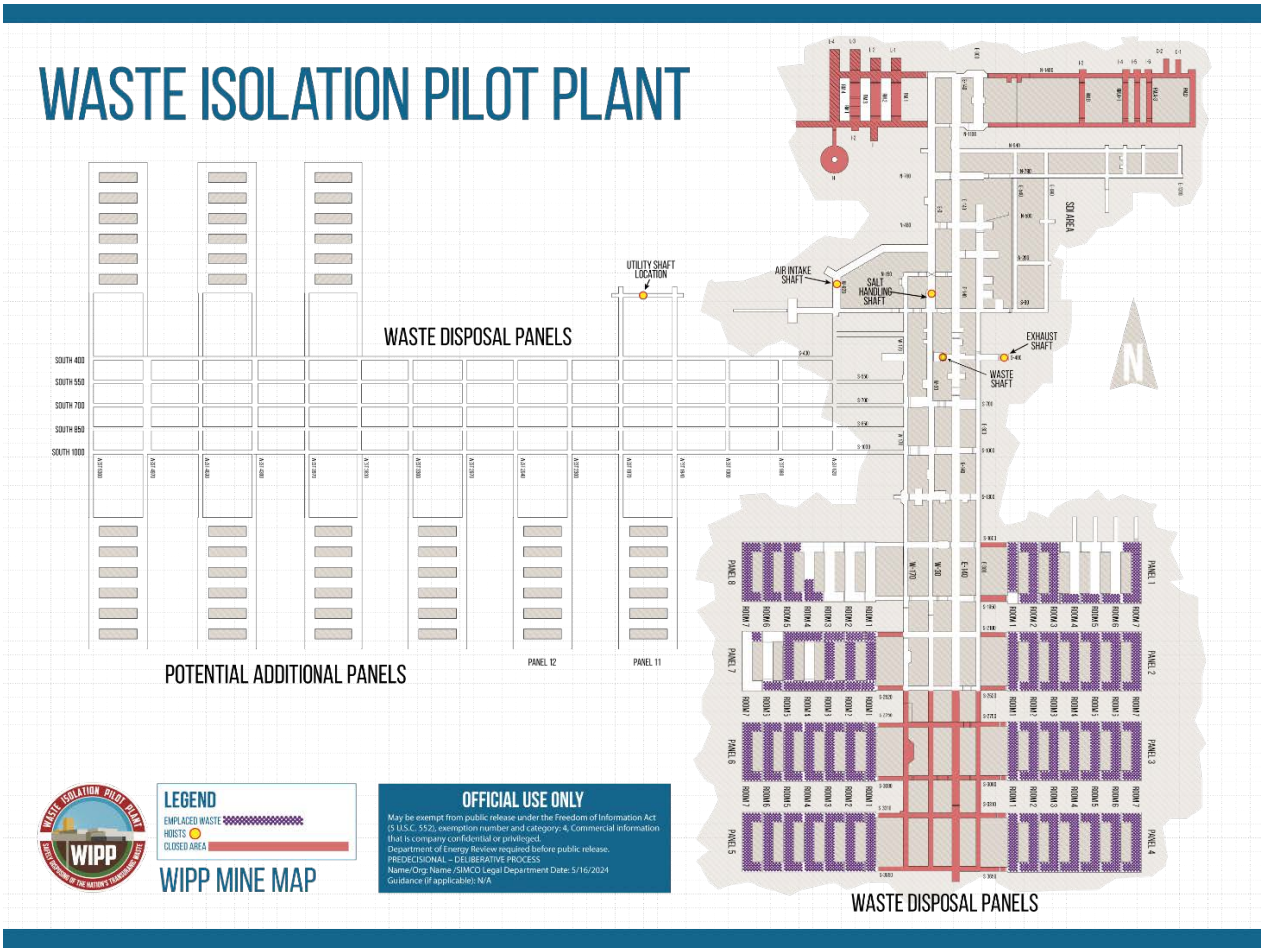
Figure 2-1 illustrates the proposed location of Panels 13-19 with their accompanying access drifts. Because the layout for Panels 13-19 would be in a different location than panels analyzed in the 1997 SEIS-II Preferred Alternative, this 2026 WIPP SA analyzes whether the environmental impacts would be substantively different than the impacts presented in the 1997 SEIS-II Preferred Alternative (DOE 1997). There would be no significant planned changes to the panel design or panel closure system for the seven additional panels. Although the additional panels would be excavated to a nominal room height of approximately 14 feet rather than 13 feet, the disposal capacity volume in a panel and disposal rooms would not change. To improve long-term U/G stability and reduce maintenance efforts (improve U/G safety) during disposal operations, there would be an increase in the abutment pillar size (i.e., abutment pillars will be 400 feet rather than 200 feet wide) and in the distance between panels (i.e., panels will be separated from each other by approximately 300 feet, as opposed to the approximately 200 feet). However, these improvements do not significantly change the panel design, panel disposal capacity, or mining operations. Once the panels are operationally filled, panel closures are expected to be installed in the panel entries (NWP 2020).

The WIPP facility is designed to accommodate the TRU waste generator sites defense TRU waste disposal needs by being able to process different sizes of disposal containers (e.g., 55-gallon drums in 7-packs, standard waste boxes, shielded containers) that generator sites use to safely and compliantly remove TRU waste from their site. Because the size of disposal containers can vary between generator sites, the TRU waste volume of a disposal panel will vary according to the types and sizes of the disposal containers and whether or not disposal containers are direct loaded or overpacked. As previously mentioned, DOE has preliminarily estimated that seven additional panels beyond Panel 12 will be needed to dispose of TRU waste up to the WIPP LWA volume capacity limit. To monitor the number of panels needed, DOE is tracking the emplacement of TRU waste containers and the resultant volume of TRU waste emplaced in a panel. As disposal panels are filled there will be opportunities to reevaluate the number of panels needed, and then to adjust by either staying on the same path, adding a disposal panel(s), or possibly not constructing all seven panels. In the future, if there is a need to change the number of disposal panels, and if that change results in the need to submit regulatory change requests, the applicable WIPP regulatory change processes will be followed.

2.4.3 New Salt Pile and Salt Storage Pond

Currently, there is an existing salt pile that is permitted, and it can accommodate run-of-mine salt for the initial main access drifts (to the west of the facility). The 1997 SEIS-II analyzed the environmental impacts of a 30-acre working salt pile during disposal operations. The new proposed salt pile and connected salt storage pond would support mining of additional panels and drifts, and would likely be located near the US or existing salt piles. The estimated area for the

new salt pile is approximately 33 acres and the area for the connected salt storage pond is approximately 17 acres. These estimates are based on similar salt piles and ponds at the WIPP site. The majority of this area was previously disturbed when it was used as a soil lay-down area due to the construction of Salt Storage Pond 3. [Note: the 2021 SA (DOE 2021) evaluated the impacts of a lined salt pile and evaporation pond for mined salt disposal and runoff management associated with the proposed action to construct and use two replacement panels (designated as Panels 11 and 12). The new proposed salt pile and connected salt storage pond would be in addition to the lined salt pile and evaporation pond evaluated in the 2021 SA.]



Note: Proposed Panels 13-19 are analyzed in this 2026 WIPP SA. Panels 11-12 were analyzed in the 2021 SA (DOE 2021).

Figure 2-1. Location of Proposed Panels 13-19

2.4.4 Hoisting Capability Project

The proposed Hoisting Capability Project is a conceptual approach to view the shafts, hoisting, ventilation, and haulage as a system. The scope of the proposed action is to refurbish, replace, and/or upgrade the shafts, the hoists, and other aspects of the hoisting/shaft, ventilation (e.g., bulkheads), and salt haulage infrastructure (e.g., drifts) as an integrated system and as needed. Currently there are five shafts into the WIPP U/G (Figure 2-1). They include the Utility Shaft (US), the Air Intake Shaft (AIS), the Salt Handling Shaft, the Waste Shaft, and the Exhaust Shaft. Summary descriptions for each of these shafts are shown below:

- The US was recently constructed; it has been excavated to a diameter of 26 feet and to a depth of about 2,150 feet to station, then an additional 125 feet to bottom, for total depth of about 2,275 feet. The station area at the bottom of the US has been connected to the existing drifts in the WIPP U/G.
- The AIS varies in diameter from about 18 feet in the upper portion of the shaft, to about 20 feet in the lower portion of the shaft. The AIS extends to a depth of 2,150 feet and does

not have a sump. The diameter of the Salt Handling Shaft varies from about 10 feet from the surface to about 844 feet below land surface, and increases to about 11 feet, 10 inches from 884 feet to 2,150 feet.

- The Salt Handling Shaft has a sump and a salt loading pocket that extends nominally 114 feet below the 2,150-foot horizon. The salt loading pocket supports an 8-ton skip for removing salt (haulage) from the U/G.
- The Waste Shaft is nominally 19 feet in diameter in the upper portion of the shaft and nominally 20 feet in diameter in the lower portion of the shaft. The Waste Shaft has a sump that extends about 124 feet below the 2,150-foot horizon.
- The Exhaust Shaft is about 14 feet in diameter in the upper portion of the shaft and about 15 feet in diameter in the lower portion of the shaft. The Exhaust Shaft extends to a depth of 2,150 feet and does not have a sump.

The overall scope can be summarized as follows: The proposed activities include using the US for material and personnel transport to and from the U/G. Using the US for these activities would necessitate a new hoist motor and several ropes and some other upgrades to the deck and hoisting equipment/infrastructure. In addition, there is a proposal to upgrade the AIS to a salt hoisting shaft by installing the proper hoisting infrastructure. Upgrading the AIS to provide the function of salt hoisting will increase the capability for salt haulage out of the U/G, as well as provide backup salt hoisting capability to mitigate a single-point failure in the salt haulage system.

The proposed activities are designed to complement and support capability, reliability, efficiency, and safety for hoisting, shaft utilization, ventilation, and salt haulage. These proposed activities would improve the functions and capabilities and perform as an interrelated hoisting and haulage system.

The proposed Hoisting Capability Project conceptual approach is very early in its development, but several NEPA-related considerations can be discussed. The proposed Hoisting Capability Project activities (refurbish, upgrades, and/or replacement) would be performed on existing structures on DOE-owned property that is already disturbed or developed. Electrical power upgrades would be based on power availability at the WIPP site and are not expected to be significant. The estimated durations for the various refurbishments, upgrades, and/or replacements for the hoisting project varies from about 1.5 years up to approximately 4 years. Therefore, the estimated construction duration would be minimal compared to the years of operation and the number of construction personnel would be transitory. Short duration construction projects and a transitory construction workforce was evaluated by Action alternatives in the 1997 WIPP SEIS-II (CBFO 2024).

2.4.5 Active and Passive Institutional Controls

During the closure period, when a berm and permanent markers would be constructed over the U/G disposal area, a land area greater than 173 acres would be disturbed for additional panels (i.e., panels beyond 11 and 12). The entire area west of the current facility is approximately 234 acres when projected onto the surface. Active and passive institutional controls under consideration by the DOE are the following:

- Construction of an "information center," located in the middle of the area, with more information on the type of waste disposed of at the WIPP facility, why the waste is dangerous, and why TRU waste should not be disturbed.
- Placement of additional warning messages approximately 6 meters (20 feet) beneath the surface, within the perimeter.
- Placement of large permanent magnetic materials and radar reflectors within the berm so that the site could be remotely detected.
- Creation of off-site archival records at several local, state, and federal organizations.

Based on the active institutional controls monitoring requirements, the plans for a fence, and consequently, the unpaved roadway that borders it, would need to be changed to accommodate the added footprint of additional panels. This increased perimeter size would increase the level of disturbance that berms, markers, fences, roads, and motorized vehicles would cause. In addition, the new patrol perimeter would add to the time it takes to patrol the fence line and increase potential vehicle emissions from each patrol over the course of the Active Institutional Control period, as well as possibly require additional personnel.

A permanent markers conceptual design was proposed in the 1996 CCA and approved by the USEPA. Through correspondence in early 2008, the DOE requested to extend the testing of planned passive institutional controls and the USEPA granted the request. In 2010, the DOE requested an indefinite extension to that schedule due to international research being conducted in the realm of records knowledge and memory, but, to date, the USEPA has not responded to that request. The design from the CCA continues to be the approved design.

2.4.6 New Facilities or Changes to Existing Structures

Table 2-4 identifies the proposed projects (new facilities or changes to existing structures) associated with the Proposed Action. Most of these projects would modernize facilities, support longer-term operations, and/or improve efficiency of operations at the WIPP facility. Figure 2-2 shows the proposed locations for these projects. In 2025 DOE instituted new priorities to assert U.S. leadership in artificial intelligence (AI) and energy infrastructure, including AI data centers, small modular nuclear reactors and advanced nuclear reactors. DOE is exploring interest from these sectors in building AI data centers or additional energy infrastructure on DOE-managed land, including WIPP. Plans are not sufficiently developed or certain to include in this SA but could materialize in the coming years.

Table 2-4. Proposed Projects (New Facilities or Changes to Existing Structures)

Project Number[a]	Project Name	Description	Size (ft^2)
1	North Gate Upgrade	Would be sited along the North Access Road to serve the increased vehicular salt waste handling traffic. With advanced scanning and monitoring systems, this new Security Gate would utilize the latest in security technology to protect against any threats, while remaining as efficient as possible.	100
2	General Plant Project Facility	Would replace the current Procurement and Purchasing building (950) and the Work Control building (951).	12,000
3	Modular Small Arms Training Facility	Would house an indoor gun range for small arms training.	7,500
4	Warehouse	Would be repurposed from an existing warehouse and would manage all non-waste shipments into the site.	13,125
5	Security Building (TRU Waste)	Would only manage TRU waste shipments and its isolated position from the site would provide an additional layer of safety by providing distance from critical mission facilities and personnel. The Security Gate would remain under 1,000 square feet and would house the latest technologies in security and scanning to increase shipment efficiencies and operations.	600
6	Medical Facility	Would be located in the center of the growing and expanding site to reduce response time and maximize its reach to potential high risk areas.	3,350
7	Visitors Center/Cafeteria, and Badging Facility	Would manage general visitor check-ins and badging, while also housing the site's cafeteria with a maximum occupancy of 350 people. The central placement of this building along the southern Property Protection Area (PPA) edge would allow for a clear arrival sequence for new visitors, while providing a central hub for the site's expanding facilities.	20,000
8	Emergency Preparedness Facility and Emergency Management Administration Center	Would provide work space and equipment harbor for emergency services (including fire department and rescue) personnel and would be provided with backup power and be able to sustain habitability during an emergency.	18,000
9	Utility Shaft Office and Changing Rooms	Would support daily operations of the US and its team, and would also provide changing rooms for the necessary equipment for personnel.	5,000
10	U/G Supply Storage Warehouse	Would provide the necessary space for daily operations and rotating equipment needs.	6,000
11	Security Operations Center (Repurpose)	Formerly the Guard and Security Building (458), the existing structure would be repurposed and designated as the new Security Operations Center. The current auditorium and cafeteria would be relocated to the new Visitors Center and Badging Facility outside the PPA.	10,000
12	Management & Operating (M&O) Facility (4 Buildings)	Would be modular facilities to provide mission support to approximately 360 personnel from across the organization. The designated population for this facility are personnel who do not regularly physically interface with the facility, but provide essential compliance, safety, technical, and management support.	64,800

Project Number[a]	Project Name	Description	Size (ft^2)
13	DOE Administration Building	Would be a modular facility to provide mission support to approximately 120 personnel from across the CBFO organization who provide essential compliance, safety, technical, and management support.	9,100
14	Maintenance/Work Control & Shops	Would house a large open work facility capable of managing site specific repairs while offering enough space to maintain and house the site's new electric vehicle (EV) Fleet.	21,150
15	Data Center	Would be placed in close proximity to adjacent Mission Support facilities to ensure maximum security and visibility against any potential security threats.	4,000
16	Track	Would provide fitness and training components in the building and would have a 1/8 mile 4-lane oval outdoor track.	2,000
17	Instrumentation & Control (I&C) Shop	Would provide facility for I&C work at the site.	2,000
18	Training Simulator	Would provide the necessary facilities to train new hires on specific tasks related to the daily operations and safety protocols.	8,050
–	–	**Total square feet**	**206,775**

a. Note:
Near-term (within 2 years): Project numbers 1–4
Mid-term (within 5-10 years): Project numbers 5–16
Long-term (within 10-20 years): Project numbers 7 and 18

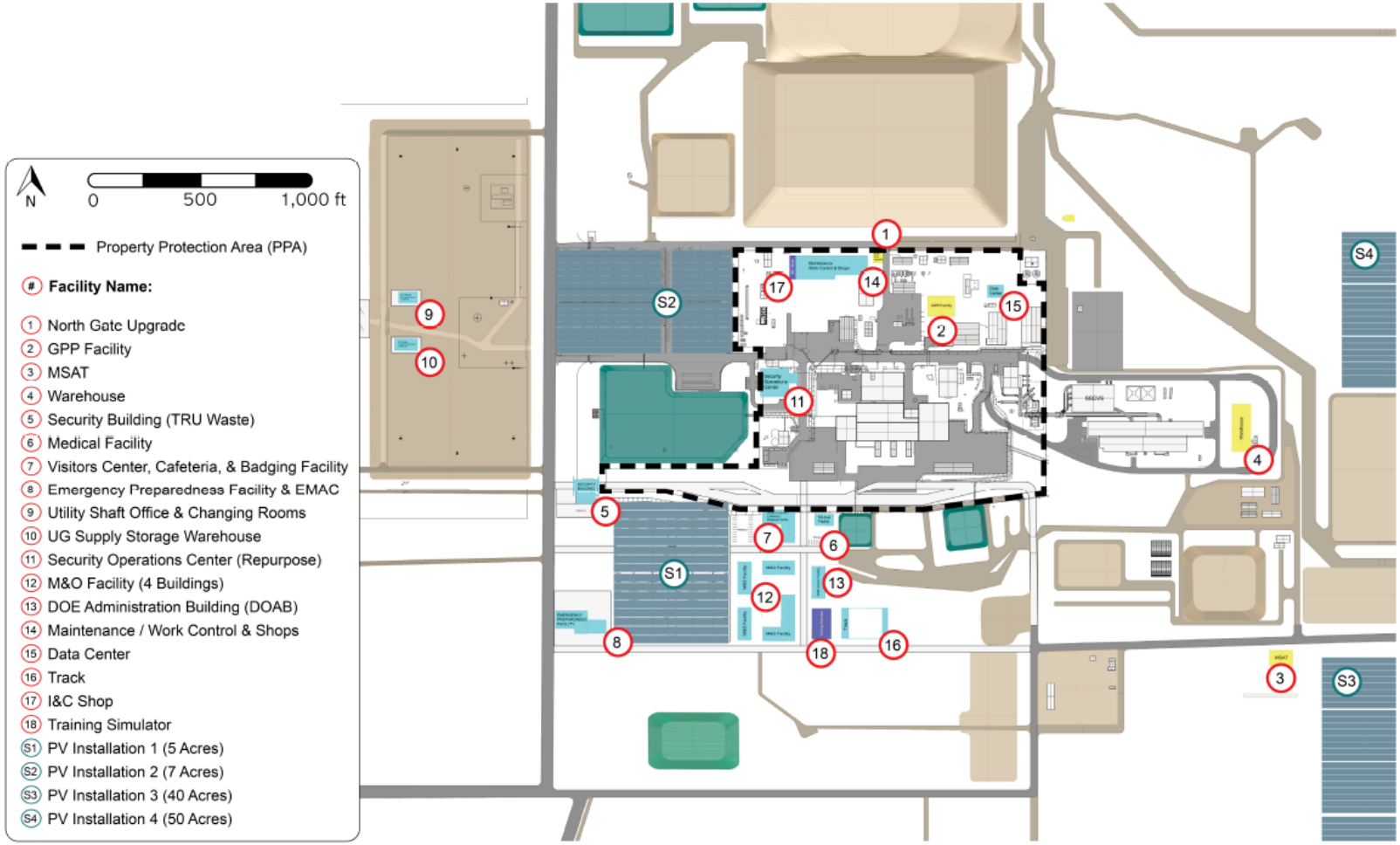


Figure 2-2. Location of Proposed New Facilities at the WIPP Site

Solar Arrays and Potential Additional Facilities. In addition to the projects identified in Table 2-4, the DOE is proposing to construct solar arrays at the WIPP site to provide a source of continual and resilient power for the site's daily operation. In order to meet the current electrical demand at the WIPP facility, the DOE would need to deploy solar panels on an estimated 65 acres of land. However, over the next 20 years, the site's electrical demand is expected to rise and the DOE has identified approximately 102 acres of land for solar panels to supply future power requirements at the WIPP site (CBFO 2024). Figure 2-3 shows the proposed locations of the solar arrays. In addition, the DOE is proposing to deploy and expand vehicle fleet fueling/charging infrastructure to support new zero emission vehicles (ZEV), including when building or renovating existing federal facilities and parking areas. The site's infrastructure (ZEV charging stations) would need to support an electric light-duty fleet.

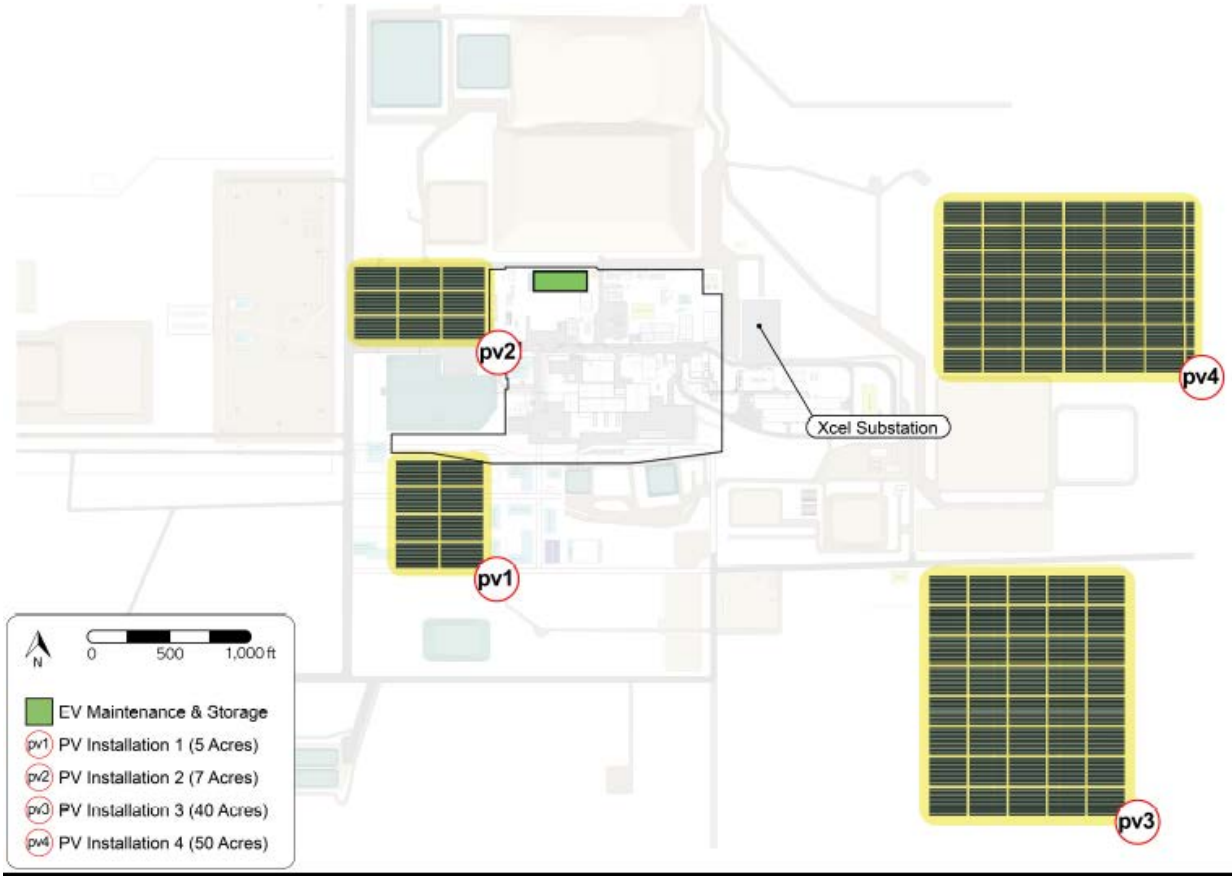


Figure 2-3. Location of Proposed New Solar Arrays and EV Fleet Maintenance and Storage Facility at the WIPP Site

In addition to the proposed solar arrays, in 2025 DOE instituted new priorities to assert U.S. leadership in AI and energy infrastructure, including AI data centers, small modular nuclear reactors and advanced nuclear reactors. DOE is exploring interest from these sectors in building AI data centers or additional energy infrastructure on DOE-managed land, including WIPP. Plans are not sufficiently developed or certain to include in this SA but could materialize in the coming years.

2.4.7 Regulatory Change Submittals

If the Proposed Action is implemented, there would be three primary regulatory change submittals: (1) future Renewal Application submittal to the NMED to modify the WIPP HWFP for additional waste disposal panels; (2) future change submittal to the USEPA Region 6 for changes to PCB/TRU Waste Conditions of Approval to mirror changes to the WIPP HWFP; and (3) future PCR submittal to the USEPA for additional waste disposal panels. Additionally, the discharge permit (DP-831) may need to be modified for management of water runoff from constructed areas. There are no environmental impacts associated with permit actions or regulatory change submittals.

2.4.8 Construction and Operational Parameters Associated with the Proposed Action

Tables 2-5 and 2-6 present notable parameters associated with construction and operation for the Proposed Action.

Table 2-5. Construction Requirements at the WIPP Site for the Proposed Action

Requirements	Consumption/Use
Land Disturbance	-
• New Salt Pile and Salt Storage Pond (acres)	50
• Total for new facilities shown in Table 2-4 (acres)	5
• Solar arrays (acres)	102
Electrical requirements for construction (kilowatt-hour [kW-hr]/year)	minimal
Water requirements for construction (gallons/year)[a]	1,650,000
Wastewater (gallons/year)[b]	3,750
Annual construction employment (workers)	150
Construction period (years)	20 years

a. Based on 8 gallons/square feet and potable water use of 35 gallons/day/person.
b. Based on wastewater generation of 25 gallons/person/day
Source: CBFO 2024.

Table 2-6. Operational Changes at the WIPP Site for the Proposed Action

Requirements	Consumption/Use
Change in Operational Workers (number of workers)	0
Change in Electricity Use (kW-hr/year)[a]	+4,635,000
Greenhouse Gas Reductions (metric tons CO_2e)[b]	-10,500
Change in Radiological Emissions (Ci/year)	0
Change in Radiological Effluents (Ci/year)	0
Change in Water Use (gallons/year)[c]	0
Change in Wastewater (gallons/year)[d]	0
Change in Dose to Maximally Exposed Individual (MEI) (mrem/year)	0
Change in Average Worker Dose (mrem/year)	0
Change in LLW Generated (m^3/yr)	0
Change in Hazardous Waste Generated (m^3/yr)	0

Requirements	Consumption/Use
Change in Nonhazardous Waste Generated (tons/yr)[e]	0

a. Based on 22.5 kilowatt-hours/square foot/year. The new facilities would total approximately 206,000 square feet.
b. Based on 10,500 metric tons of CO_2e associated with building electrical and heating/cooling requirements (DOE 2016a).
c. Based on potable water use of 35 gallons/day/person.
d. Based on wastewater generation of 25 gallons/person/day.
e. Based on generation of 3 pounds of nonhazardous waste/person/day.
Source: CBFO 2024.

2.5 Other Changes Considered in this 2026 WIPP SA

2.5.1 Population

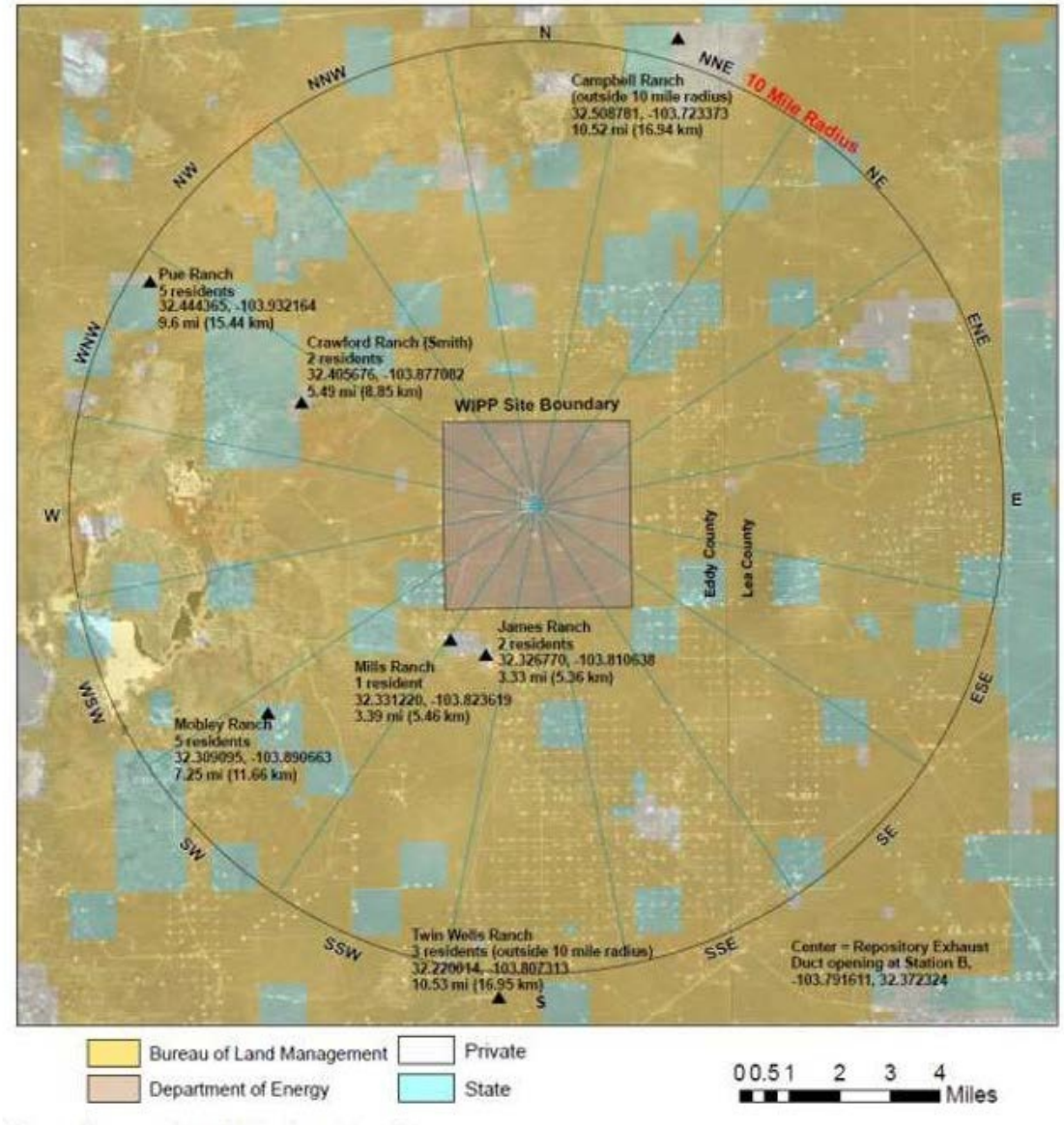
Potential consequences to human health from normal operations and accidents are evaluated within a specific group region of influence (ROI). In the 1997 SEIS-II, these groups included workers at the WIPP site, the 50-mile population surrounding the WIPP site (for which the populations of Eddy and Lea counties are substituted), and the population along the transportation corridors from the generator/storage sites.

WIPP Project Workforce. The WIPP Project workforce evaluated in the 1997 SEIS-II Preferred Alternative was 1,095 persons (DOE 1997). The workforce has remained reasonably constant throughout the 25 years of WIPP operations (DOE 2025d). In the Waste Isolation Pilot Plant Five-Year Site Plan FY 2018 – FY 2022, the current workforce was listed at 970 persons (DOE 2018b). While no substantive changes in workforce staffing are anticipated, minor, temporary changes associated with construction activities may occur, as shown in Table 2-5. This 2026 WIPP SA addresses these changes in Section 3.

50-Mile Population Surrounding the WIPP Site. In 2019, there were five permanent residences (i.e., ranches) within 10 miles of the WIPP site (DOE 2021) compared to two ranches identified in the 1997 SEIS-II (*see* Figure 2-4). The population associated with these residences primarily involves ranching activities. This area has not had noticeable population growth since the issuance of the 1997 SEIS-II.

The majority of the population within 50 miles of the WIPP site is concentrated in and around Eddy County and Lea County (referred to as the combined population) among the communities of Carlsbad, Hobbs, Eunice, Loving, Jal, Lovington, and Artesia. The 1997 SEIS-II used a combined population of 104,370 from 1990 census data for the 50-mile population estimate surrounding the WIPP site (DOE 1997). According to 2020 census data, the estimated population within this radius has increased to 131,854 (U.S. Census Bureau [USCB] 2020). The current population represents a 26.3 percent increase over the ROI population since the issuance of the 1997 SEIS-II. By the year 2083, the current population in the ROI (131,854 persons) is expected to increase to 149,229 persons, which represents an additional 13.1 percent increase. In total, by 2083, the population in the ROI is estimated to increase by 43 percent compared to the ROI population analyzed in the 1997 SEIS-II (USCB 2020, New Mexico 2021). The 1997 SEIS-II evaluated the completion of TRU waste disposal in the WIPP facility in 2033. Because the Proposed Action would extend TRU waste disposal in the WIPP facility until approximately 2083, this 2026 WIPP SA addresses the environmental impacts associated with population changes due to this elongated disposal schedule. That change is addressed in Section 3. The analysis in this 2026 WIPP SA uses the

2083 projection as the assumed population for all impacts, which produces a conservative estimate of impacts because the exposed population through most of the Proposed Action would be smaller.



Source: DOE 2021.

Figure 2-4. Estimated Ranch Populations within a 10-mile Radius of the WIPP Facility

Transportation Corridor Population. Given that the transportation corridors span much of the continental U.S., this 2026 WIPP SA assumes that changes in the population along the corridors are likely to be similar to the overall changes in the U.S. population. In 1990, the U.S. population was 248,709,873 (DOE 2021). The 2021 estimated U.S. population of 329,725,481 persons (USCB 2021) is expected to reach 369,213,000 persons by the year 2083. In total, this represents a 48 percent increase in the U.S. population in 2083 compared to the U.S. population analyzed in

the 1997 SEIS-II. The effects of this change, as related to the potential impacts to the population along the transportation corridor, are also discussed in Section 3.

2.5.2 Dose-to-Risk Factor

Since the publication of the 1997 SEIS-II, updated DOE guidance (DOE 2004d) recommends the use of a dose-to-risk factor of 6×10^{-4} latent cancer fatalities (LCF) per rem for both workers and members of the public versus 4×10^{-4} and 5×10^{-4}, respectively. The change in the dose-risk factor has been applied in previous WIPP site-wide SAs and is accounted for in the data presented in this 2026 WIPP SA.

2.5.3 Background Radiation

Background radiation includes radiation resulting from (1) naturally occurring radioactive materials as they exist in nature prior to removal, transport, or enhancement or processing by people; (2) cosmic and natural terrestrial radiation; (3) global fallout as it exists in the environment; (4) consumer products containing nominal amounts of radioactive material or emitting nominal levels of radiation; (5) medical procedures/sources; and (6) radon and its progeny in concentrations or levels existing in buildings or the environment that have not been elevated as a result of current or past human activities.

In 1994, ambient radiation (i.e., cosmic), atmospheric particulates, soil, surface water and sediment, groundwater, and biota (vegetation, fish, rabbit, and deer) samples in the vicinity of the WIPP site were collected and analyzed radiologically (DOE 1997). An estimated annual dose of approximately 65 mrem/year was determined from these sources, indicating that no unusual levels of environmental radioactivity exist at the WIPP site (DOE 1997). According to the most recent *Annual Site Environmental Report* (DOE 2025a), there have been no substantive changes in background radiation at the WIPP site since the 1997 SEIS-II. For comparison, a typical person residing in the U.S. receives an effective dose equivalent of about 350-620 mrem/year from background radiation, with 50 - 80 mrem/year from cosmic and terrestrial sources (National Council on Radiation Protection [NCRP] 2009).

Residual contamination from the 2014 radiological event resulted in an estimated maximally exposed off-site individual of less than 1 mrem, with a dose closer to 0.006 mrem (DOE 2021). The radiological release from the WIPP U/G repository did not measurably affect the public or the environment (DOE 2021). Because this dose is well below the estimated annual background dose, the radiological event did not affect background radiation. No substantive changes have occurred in the understanding of background radiation at the WIPP site since the 1997 SEIS-II.

3.0 ENVIRONMENTAL IMPACTS

3.1 Introduction

As described in Section 2, the Proposed Action analyzed in this 2026 WIPP SA includes the excavation and use of additional TRU waste disposal panels at the WIPP facility, the construction of new facilities, the emplacement of TRU waste over the 2024-2083 time frame, and other changes to existing facilities and operations that could give rise to environmental impacts. This 2026 WIPP SA evaluates the potential environmental impacts of the Proposed Action against the information presented in the 1997 SEIS-II to determine if any of the changes associated with the Proposed Action are substantial or new circumstances are substantial and relevant to environmental concerns. Based on this 2026 WIPP SA, the DOE will determine whether the 1997 SEIS-II remains adequate, if a new SEIS is warranted, or if the 1997 SEIS-II should be supplemented. This section presents the comparative analysis of impacts for the Proposed Action for each of the resources evaluated in the 1997 SEIS-II. A "sliding scale" method of analysis is utilized, in which the potential impacts are discussed in proportion to their significance (40 CFR 1502.2(b)).

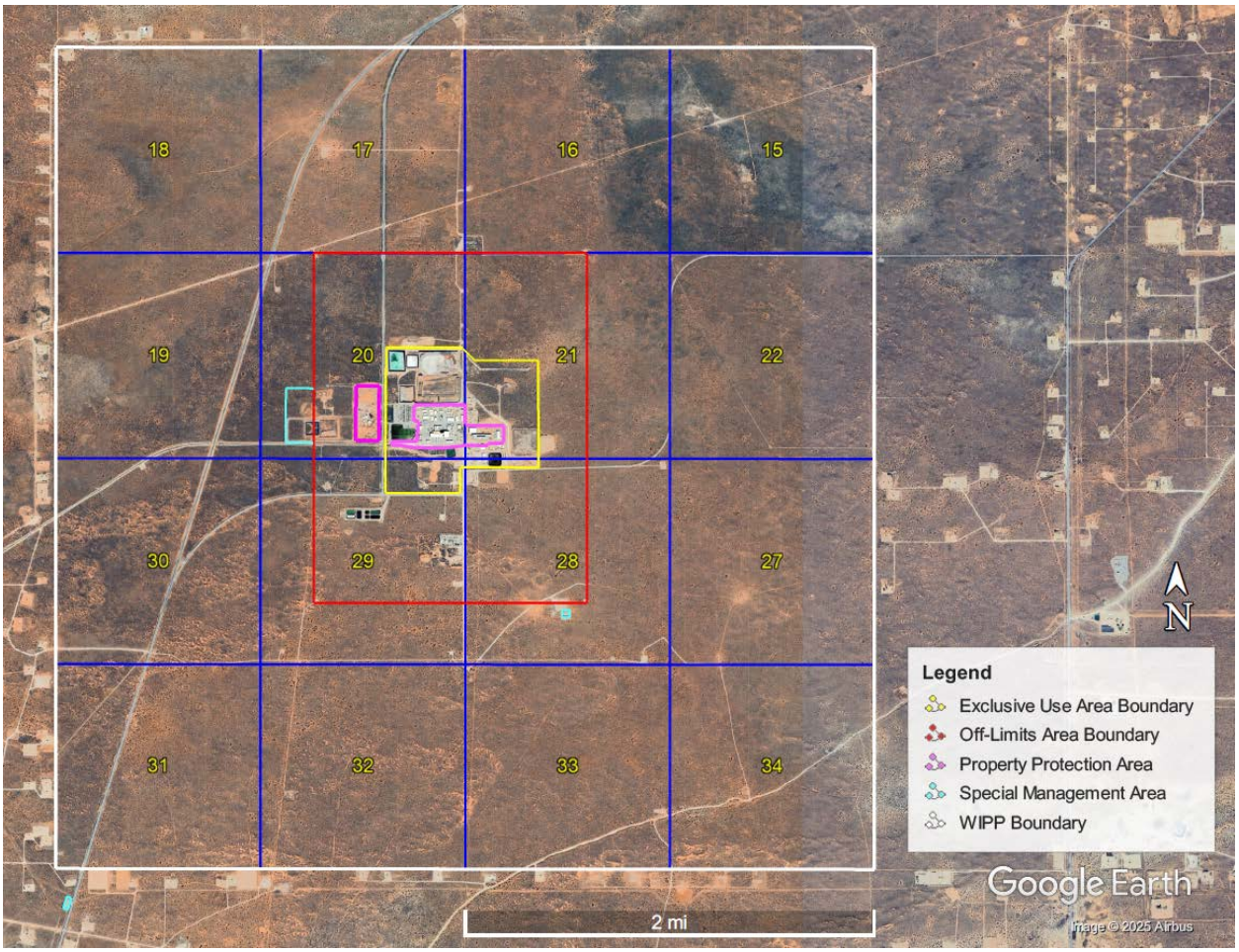
3.2 Land Use and Management

Overview. As shown on Figure 1-1, the WIPP facility is situated within Eddy County, in the Chihuahuan Desert of southeastern New Mexico, 26 miles east of Carlsbad. Spanning an area of 16 square miles or 10,240 acres, the WIPP site is characterized by low population density and an arid landscape. Land usage in the vicinity primarily revolves around livestock grazing and the extraction of potash, oil, and gas resources. The geographical center of the facility lies in Los Medaños, an area recognized for its sparse habitation and relatively flat terrain.

Surrounding Land Use. The majority of lands surrounding the WIPP site are controlled by the U.S. Department of the Interior Bureau of Land Management (BLM) and the New Mexico State Land Office. These lands support multiple activities such as livestock grazing, potash mining, and oil and gas exploration. The lands also accommodate recreational pursuits like hunting, camping, hiking, and bird watching. There are additional properties outside of the WLWA boundary that are managed under the right-of-way reservations granted by the BLM or the State of New Mexico. These areas primarily consist of groundwater monitoring well pads, access roads, and environmental monitoring sampling stations.

Entry to the WLWA is facilitated via U.S. Highway 62/180, located 13 miles north, and New Mexico State Highway 128, situated 4 miles south. Additionally, a rail spur once linked the WIPP site to the Burlington Northern Santa Fe railroad near the Nash Draw mine, positioned 6 miles southwest of the WIPP facility. While the rail spur is presently inactive, the associated frontage road remains accessible.

WIPP Land Area Types. The WIPP site boundary or Land Withdrawal Boundary (LWB) delineates the perimeter of the WLWA. The withdrawal area generally encompasses sections 15 through 22 and 27 through 34, all inclusive, of Township 22 south, Range 31 east, New Mexico Principal Meridian (*see* Figure 3-1).



Source: DOE 2025a.

Figure 3-1. WIPP Facility Area Types

As depicted on Figure 3-1, the LWB contains (from largest to smallest):

(1) Off-Limits Area (OLA) – 2.27 square miles – The OLA boundary defines the exclusion zone where unauthorized entry is prohibited as outlined in 10 CFR § 860.3 and § 860.4. Applicable prohibitions and penalties (10 CFR § 860.5) are posted as directed in 10 CFR § 860.6 along the perimeter of the OLA. WIPP facility security personnel conduct patrols within this area to identify and deter unauthorized activities or infractions. The areas outside of the OLA but within the LWB are open to public use and recreation. Livestock grazing and public access for recreational use (e.g., hunting) will continue to be permitted until those functions present a threat to the security, safety, or environmental quality of the WIPP site.

(2) Exclusive Use Area (EUA) – 0.46 square miles – The EUA is surrounded by a security fence and is restricted exclusively for the use of the DOE and its contractors and subcontractors in support of the WIPP facility operations. This area is marked by public warning signs and is patrolled by WIPP facility security personnel to detect unauthorized activities or uses.

(3) Property Protection Area (PPA) – The PPA contains the WIPP facility's active operations. It is surrounded by a permanent security barrier posted with warning signs and is continuously monitored and controlled in accordance with applicable requirements. This area provides security and protection for all major surface structures. A second PPA surrounds the US.
(4) Special Management Areas (SMA) – Certain properties critical to WIPP facility operations may be designated as special management areas under the Land Management Plan (LMP). These areas safeguard valuable resources or sensitive environments, such as construction zones or areas with safety hazards. Other areas suitable for SMA designation include active construction zones, fragile plant and/or animal communities, sites of archaeological significance, and other regions of unique resources facing peril.

Proposed Action Impacts. As discussed in the 1997 SEIS-II, DOE would continue to occupy the land transferred to it by the WIPP LWA. DOE estimated the total aboveground disturbed area to be 50 acres, which was equal to the area of the current aboveground facilities. Additional construction at WIPP would be limited to its underground disposal area. During the closure period when a berm and permanent markers would be constructed over the underground disposal area, DOE estimated that a total of 173 acres would be disturbed.

Other than increased development activity, the type of land uses at and surrounding the WIPP facility have not substantively changed since the preparation of the 1997 SEIS-II. The Proposed Action includes: (1) the excavation of seven additional U/G panels and surface structures and facilities to support the new panel development including a new salt pile and pond; (2) new support facilities; and (3) four solar arrays totaling 102 acres. No changes to the LWB would occur under the Proposed Action.

The associated salt pile and pond associated with the new panel excavation is needed to store excavated salt and manage runoff. In total, they would result in approximately 50 acres of disturbance near the US. Much of this area was previously disturbed during past surface construction. Fifty acres represents 0.5 percent of the total LWB. Because the proposed salt pile would likely be sited within the acreage impacted by decommissioning and closure of the WIPP facility, the Proposed Action would not affect land use and management beyond what was analyzed in the 1997 SEIS-II for the Preferred Alternative. Long term, reclaimed salt may be used to backfill shafts or as a base for a berm upon decommissioning. The proposed hoisting capability project activities (refurbish, upgrades, and/or replacement) would be performed on existing structures on DOE-owned property that is already disturbed or developed.

The Proposed Action also includes the planned construction of 18 facilities with a total land disturbance of 5 acres. None of the planned facilities would be considered a notable structure (those greater than 50,000 square feet). The proposed M&O facility complex would total 64,800 square feet in four buildings. In total, the 18 facilities would average approximately 11,500 square feet; 18 facilities over a 20-year period would represent less than one new facility annually. This frequency of building and aggregate square footage is in-line with past construction activities at the WIPP facility and consistent with the land use impacts analyzed in 1997 SEIS-II for the Preferred Alternative (DOE 1997).

The Proposed Action proposes four solar array installations in an area totaling 102 acres as shown on Figure 2-3. Disturbance of 102 acres would account for approximately one percent of the WLWA but would not have a notable impact compared to the land use impacts analyzed in 1997 SEIS-II for the Preferred Alternative (DOE 1997). Although renewable energy projects represent a new land use for DOE at the WIPP facility, such land use would be necessary for the DOE to achieve its WIPP facility operational goals to lower greenhouse gas (GHG) emissions and reduce the use of off-site power.

During the decommissioning and closure period, when a berm and permanent markers would be constructed over the U/G disposal area, a land area greater than 173 acres would be disturbed due to the additional panels (i.e., panels beyond 11 and 12). The entire area west of the current facility is approximately 234 acres when projected onto the surface. This would represent an increase of less than one percent of the WLWA.

3.3 Visual Resources

Visual resources are natural and man-made features that give a particular "landscape" (visible features of an area of land) or "viewshed" (view of an area from a vantage point) its character and aesthetic quality. The WIPP site was selected for its unique underground geology. To that end, the WIPP facility can be classified as a "visual iceberg" in that the operations that occur below the surface do not have a visual footprint.

The Chihuahuan Desert containing the WIPP site is North America's largest, at 250,000 square miles covering Mexico, New Mexico, and Texas (U.S. National Park Service [NPS] 2024). The Desert contains an arid landscape characterized by vast stretches of sandy plains adorned with rugged mountains and sparse vegetation, including cacti and desert shrubs. Much of the WIPP site remains undeveloped in a natural state with limited land use activities. This landscape and the undeveloped lands serve as buffer zones between the WIPP site and the few nearby private lands and federal and state land users.

To rate the scenic quality of the WIPP facility and the surrounding areas, the DOE uses the BLM's Visual Resource Management (VRM) Classification System. Although this classification system is designed for undeveloped and open land managed by the BLM, this system is valid in the analysis of visual resource management and planning activities. The VRM system was employed as the basis for this analysis because it is a proven and established means for determining visual values based on a set of objectives. Table 3-1 outlines the objectives of the four VRM Classes.

Table 3-1. Bureau of Land Management Visual Resource Management Class Objectives

Class	Objective	Change Allowed (relative level)	Relationship to the Casual Observer
I	Preserves the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity.	Very Low	Activities should not be visible and must not attract attention.

Class	Objective	Change Allowed (relative level)	Relationship to the Casual Observer
II	Retains the existing character of the landscape. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.	Low	Activities may be visible but should not attract attention.
III	Partially retains the existing character of the landscape. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.	Moderate	Activities may attract attention but should not dominate the view.
IV	Provides for management activities which require major modification of the existing character of the landscape. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.	High	Activities may attract attention, may dominate the view but are still mitigated.

Source: BLM 1986.

The degree to which development affects the aesthetic quality of a landscape depends on the contrast created between the project elements and the existing landscape. This 2026 WIPP SA uses the BLM's degree of contrast criteria to assess the level of contrast between the proposed or existing element and the landscape in which it sits (Table 3-2). The four levels of contrast (i.e., none, weak, moderate, and strong) correspond to the VRM class objectives, I, II, III, and IV, respectively. For example, a "moderate" contrast rating is generally acceptable in a Class III area but may also meet the VRM objectives for a Class IV area when there are accumulating elements.

Table 3-2. Bureau of Land Management Degree of Contrast Criteria

Degree of Contrast	Criteria
None	The element contrast is not visible or perceived.
Weak	The element contrast can be seen but does not attract attention.
Moderate	The element contrast begins to attract attention and begins to dominate the characteristic landscape.
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

Source: BLM 1986.

A sensitivity level analysis is an important component of the VRM. Sensitivity levels are a measure of public concern, and lands are assigned high, medium, or low sensitivity levels. A sensitivity analysis is conducted by evaluating the following factors: types of users, amount of use, public interest, adjacent land use, special areas, distance zones (foreground to midground, background, and seldom seen), and other dynamics.

The bulk of land at the WIPP facility is largely undeveloped and isolated, consistent with a VRM Class I or II rating. The developed areas inside the EUA present a high level of contrast between the desert landscape and the physical improvements to the land and are more consistent with VRM Class IV. Within the EUA, there are major modifications to the landscape that dominate views

on- and off-site. The area is marked by high- and medium-intensity development and major modifications to the landscape supporting the U/G mining operations.

Proposed Action Impacts. The Proposed Action land disturbances would occur entirely within the WLWA. Special consideration is given to actions within visually sensitive locations and viewpoints from visually sensitive locations.[11] As outlined in Section 2 and Section 3.2 above, the Proposed Action includes: (1) the excavation of additional U/G panels, an above-ground salt pile and pond, and a Hoisting Capability Project; (2) support facilities; and (3) solar arrays.

The excavation of additional U/G panels would not have notable visual impacts as this is an ongoing activity within the WLWA. The Hoisting Capability Project would not introduce new visual impacts. The associated surface-based structures (a lined salt pile and its accompanying evaporation pond) would total approximately 50 acres of development on mostly previously developed land. They would be located adjacent to the existing salt pile and pond and would not introduce a wholly new visual feature compared to the visual resource impacts analyzed in 1997 SEIS-II for the Preferred Alternative (DOE 1997).

Construction of support facilities would result in short-term visual impacts due to the presence of heavy construction equipment, new building and infrastructure in various stages of construction and demolition, and possibly increased dust. Cranes used during construction and temporary construction laydown areas would also create short-term visual impacts but would not be out of character for the WIPP facility. Most of these projects would be located in the interior of the WIPP site, within the EUA, and would not be noticeable at or beyond the WLWA. Such construction-related activities would be similar to the past construction activities and would not introduce a wholly new visual feature compared to the visual resource impacts analyzed in the 1997 SEIS-II for the Preferred Alternative. With regard to eventual closure activities, the increased perimeter size would increase the level of disturbance that berms, markers, fences, roads, and motorized vehicles would cause, but would also not introduce a wholly new visual feature compared to the visual resource impacts analyzed in the 1997 SEIS-II for the Preferred Alternative (DOE 1997).

The four solar arrays would result in short-term visual impacts due to construction activity similar to those described for the construction of support facilities. Long-term impacts would be unique as large-scale solar installations in the southwestern U.S. create distinct and obvious visual impacts because of their large size, strong regular geometry, highly reflective surfaces, and contrast with the natural brown tones of the landscape.

All visual impacts stemming from the implementation of the Proposed Action would be mitigated by the WIPP facility's remote location away from major population centers. Moreover, most projects would take place U/G or within the EUA, towards the site's interior. Implementation of the Proposed Action would have a minor impact on visual resources, would not change the existing VRM Classes, and would not introduce a wholly new visual feature compared to the visual resource impacts analyzed in 1997 SEIS-II for the Preferred Alternative (DOE 1997).

[11] No visually sensitive areas were identified within the WIPP viewshed.

3.4 Geology and Soils

Geology. The WIPP site is located in southeastern New Mexico, in the Pecos Valley Section of the Great Plains Physiographic Province. The terrain throughout the province varies from plains and lowlands to rugged canyons. In the immediate vicinity of the WIPP site, numerous small mounds formed by windblown sand characterize the land surface. A high plains desert environment characterizes the area (DOE 2017b).

The WIPP site has been extensively characterized in site investigations summarized in numerous publications, including the WIPP Geological Characterization Report (Powers et al., 1978); the WIPP Design Validation Final Report (DOE 1986); and Summary of Site-Characterization Studies Conducted from 1983 through 1987 at the Waste Isolation Pilot Plant (WIPP) Site Southeastern New Mexico (Lappin 1988). No substantive changes have occurred in the understanding of the site or regional geology since publication of these reports (DOE 2021).

The WIPP facility repository is located within the Salado Formation (Salado) at a depth of approximately 2,150 feet below grade. The Formation is composed of massive halite (salt) beds. In the halites, the presence of circulating groundwater is restricted because halites do not readily maintain primary porosity, solution channels, or open fractures (DOE 2025a). The geologic information from the cores related to the US indicate the same stratigraphic/geologic sequences as seen in the other four shafts (DOE 2021).

There are no active faults (i.e., active within the last 150 years) near the WIPP site (U.S. Geological Survey [USGS] 2022). Since 1926, seismic events have been recorded in the Delaware Basin. These events have had no observable effects on WIPP facility structures. In the 30-plus years of site investigations and ongoing awareness of the geologic setting at and around the WIPP facility, no substantive changes have occurred in the understanding of the site and regional and local geology over this time period and since publication of the 1997 SEIS-II (DOE 2021).

Although the geology and seismology in the area surrounding the WIPP site have not changed since publication of 1997 SEIS-II, more recent seismic activity data are available. Seismic activity within 186 miles of the WIPP site is currently monitored by seismographs installed and operated by the New Mexico Institute of Mining and Technology (DOE 2017b). The number of detected events remained approximately constant in this region, as compared to previous years. The strongest recorded event (magnitude 5.1) occurred on September 17, 2024; this event was approximately 103.5 miles southwest of the WIPP site. The seismic event closest to the WIPP site occurred approximately 20 miles southwest and had a magnitude of 1.1. A total of 4,672 events were recorded within 31 miles of the WIPP site during 2022, with 477 of those events being magnitude 2.5 or greater (DOE 2025a).

Soils. At the WIPP site, the Mescalero caliche, Berino soil, and surficial sands overlie the Gatuña Formation (Gatuña), which is characterized by a wide range of lithologies (coarse conglomerates to gypsum-bearing claystone) (DOE 1997). The Mescalero caliche is widespread in southeastern New Mexico and is a continuous stratigraphic unit at the WIPP site. The Mescalero caliche near the WIPP site is about 5 feet thick and about 5-10 feet below ground surface. Overlying the Mescalero is the Berino soil, overlain by surficial sands. The surface sand across much of the

WIPP site is aeolian, generally fine to medium grained and well sorted. Sand dunes in the vicinity of the WIPP facility are generally stabilized by vegetation.

Proposed Action Impacts. The Proposed Action would require excavation of seven U/G panels for future TRU waste emplacement. The excavation would occur using the just-in-time mining approach to excavate disposal panels in concert with the waste shipping rate. When the WIPP facility is filled to the WIPP LWA volume capacity limit, which for the purposes of this analysis is assumed to happen in approximately 2083, the WIPP facility would be closed. During closure, a berm and permanent markers would be constructed at surface level over the U/G disposal area, which would disturb approximately 175 acres for the existing panels plus an additional 234 acres for Panels 13-19.

The Proposed Action would include additional surface-based structures (e.g., a lined salt pile and its accompanying lined evaporation pond) for mined salt disposal and runoff management. The new proposed lined salt pile would require approximately 33 acres and its associated lined evaporation pond would require approximately 17 acres, and would likely be located near the US or existing salt piles. These structures do not require the modification of the Berino soil at the WIPP site. Soils would be temporarily removed where necessary to make room for properly engineered base material for the lined salt pile and associated drainage pond features. Removal of topsoil would be a minor change and the topsoil would be stored for eventual reclamation activities as is the practice at the WIPP facility (DOE 2026). Therefore, impacts to soils from implementation of the Proposed Action would be short-term and minor. In addition, much of the proposed salt pile and pond area was disturbed during the construction of Salt Storage Pond 3 when it was used for a construction lay-down area.

The Proposed Action would include new facilities or changes to existing structures, as shown in Table 2-4. The construction is planned over a period of about 20 years, and would involve 18 projects that would disturb approximately 5 acres. Construction activities would cause minor impacts to the existing geologic and soil conditions at the WIPP site. The near surface geologic conditions and existing soil column would be disturbed by construction, especially for new facility construction. However, no viable geologic or soil resources would be lost from construction activities. Grading, excavation, and other site development activities associated with the Proposed Action would occur generally within or immediately south of the developed portion of the WIPP facility in both previously disturbed and undisturbed areas. Total soil disturbance would be less than 5 acres. Grading would temporarily disturb soils, and site contours would be permanently changed from site grading to support building foundations. Because of soil disturbance, the potential for increased soil erosion due to stormwater runoff and wind would increase during construction.

During the closure period, construction of a berm and permanent markers over the U/G disposal area, and placement of additional warning messages approximately 6 meters (20 feet) beneath the surface, within the perimeter, would not have notable changes to geology and soils compared to the impacts analyzed in 1997 SEIS-II for the Preferred Alternative (DOE 1997).

In addition to the projects identified in Table 2-4, the DOE is proposing to construct solar arrays at the WIPP site to provide a source of power for the site's daily operation. To meet the current

and future electrical demand at the WIPP facility, the DOE would deploy solar panels on an estimated 102 acres of land, the majority of which is undeveloped within the off-limits area. During construction, soil disturbance and removal of vegetative cover would increase the potential for erosion from wind and stormwater runoff.

During construction of the facilities and solar arrays, potential impacts from erosion would be minimized through implementation of erosion and sediment control measures during construction and implementation of a revegetation plan for areas disturbed by construction. Site topsoil would be stripped and stockpiled prior to grading activities, and reapplied post-construction to facilitate revegetation. Soils in areas used to stage equipment and materials have the potential to be compacted; such areas could be mechanically de-compacted prior to the revegetation phase of the project to facilitate re-growth. With implementation of the above measures, impacts to geology and soils during construction would be minimized. Once construction is complete, areas used for laydown would be restored to pre-construction conditions. Meanwhile, open areas around the facility buildings would be cleaned up, restored, and revegetated. Although erosion from stormwater runoff and wind action would occur occasionally during construction, it is anticipated to be minimal. Overall, impacts to geology and soils would be consistent with the impacts analyzed in 1997 SEIS-II for the Preferred Alternative (DOE 1997).

3.5 Water Resources

Surface Water. The WIPP site is in an arid climate, where the rate of evapotranspiration exceeds normal precipitation by about a factor of four. In general, precipitation does not infiltrate deeply into the soil except in areas where there are sand dunes. At the WIPP site, infiltration does not generally extend beyond the Mescalero Caliche. There are no natural surface water bodies within the WIPP site or the proposed project area. Surface water bodies within a 25-mile radius of the center of the site include the Pecos River, Laguna Grande de la Sal, and livestock ponds (termed "tanks"), which are fed from surface runoff. The nearest substantial surface water body, Laguna Grande de la Sal, is 8 miles west-southwest of the center of the WIPP site in Nash Draw, where shallow brine ponds occur (DOE 2025a).

The WIPP facility does not discharge wastewater or stormwater runoff into waters of the U.S. and therefore is not subject to regulation under the National Pollutant Discharge Elimination System (NPDES) program. Wastewater generated at the WIPP facility is either disposed of off-site or managed on-site in lined evaporation ponds. Stormwater runoff is also collected in lined retention ponds (DOE 2025a).

The NMED Ground and Surface Water Protection regulations set forth in 20.6.2 New Mexico Administrative Code (NMAC) regulate discharges that could impact surface water or groundwater. The WIPP facility does not discharge to surface water but does have a discharge permit (DP)-831 for the operation of the sewage treatment facility as well as evaporation ponds and salt storage facilities. In accordance with the DP, monthly inspections are conducted at each of the stormwater ponds, salt storage ponds, and salt storage cells to ensure they are maintained in good condition. The DP requires semi-annual sampling of the sewage lagoons and Evaporation Pond H19. The sewage lagoons are analyzed for nitrate, total Kjeldahl nitrogen, total dissolved solids (TDS), sulfate, and chloride, while Evaporation Pond H19 is analyzed for only TDS, sulfate, and chloride.

The stormwater ponds and salt storage ponds must be sampled annually after a 2-inch rain event for TDS, sulfates, and chlorides (DOE 2025a).

The *Waste Isolation Pilot Plant Environmental Monitoring Plan* (DOE/WIPP-99-2194) (DOE 2024c) includes routine regional and local surface water and sediment sampling that extends as far north as Artesia, New Mexico, on the upper Pecos River, to as far south as Pierce Canyon on the lower Pecos River. Surface water and sediment sampling is normally performed in late summer of every year. The surface water and sediment samples are analyzed for Pu-238, Pu-239/240, and Am-241, which are related to WIPP facility operations. None of these radionuclides were detected in the surface water or sediment samples in 2024 (DOE 2025a).

Groundwater. In the vicinity of the WIPP site, there are limited occurrences of potable water, and several water-bearing zones that produce poor-quality water. Limited amounts of potable water are found in the middle Dewey Lake Redbeds Formation (Dewey Lake) and the overlying Santa Rosa Formation (Santa Rosa) and Gatuña in the southern part of the WIPP site. Two water-bearing units, the Culebra Dolomite (Culebra) and the Magenta Dolomite (Magenta), occur in the Rustler Formation (Rustler) and produce brackish water at and near the WIPP site. In the immediate vicinity of the WIPP site, groundwater is commonly of such poor quality that it is not usable for most purposes (DOE 2021).

Hydrology and water quality has been studied at the WIPP site for over 40 years. Water-bearing units (Culebra and Magenta) are deep and separated from the surface by several hundred feet of low-permeability geologic formations (aquitards), limiting or preventing infiltration. Recharge to the Culebra is north and northwest of Nash Draw. Discharge from the Culebra is south of Laguna de la Sal near Malaga Bend. Recharge for the Magenta is north of the WIPP site near Bear Grass Draw and in Clayton Basin (Mercer 1983). Vertical infiltration into these water-bearing zones does not exist at the WIPP site (DOE 2021).

Groundwater is monitored to detect and document the quality and quantity of groundwater, and to show compliance with applicable federal and state laws and regulations.[12] Groundwater samples were collected once in 2024 from each of six detection monitoring program (DMP) wells on the WIPP site. The DMP wells are completed in the Culebra. The groundwater from the DMP wells was collected from depths ranging from 591 to 886 feet from the six DMP wells (WQSP-1 to WQSP-6). Isotopes of naturally occurring uranium (U-234, U-235, and U-238) that were detected in the groundwater well samples were consistent with detections from previous years. The groundwater samples were also analyzed using alpha spectroscopy for the following radionuclides: Pu-238, Pu-239/240, and Am-241. These isotopes, which are related to WIPP facility waste disposal operations, were not detected in any of the groundwater samples (DOE).2025c).

Sampling of perched anthropogenic water (PAW) is required by the Waste Isolation Pilot Plant Discharge Permit (DP-831). The PAW exists due to runoff and infiltration that occurred from the salt cells and ponds before the liners were completed in 2005. The PAW occurs beneath the WIPP

[12] Data obtained through the WIPP groundwater monitoring program support two major regulatory programs: (1) the RCRA, DMP supporting the Permit in compliance with 20.4.1.500 NMAC, and (2) Title 40 CFR Part 191 Subparts B & C Compliance Certification Application for the Waste Isolation Pilot Plant (DOE/CAO-96-2184) and 40 CFR Part 194.42 Monitoring and Compliance Recertification Applications.

site at a depth of 39-69 feet below ground level at the contact between the Santa Rosa and the Dewey Lake. Elevated TDS and chlorides have been documented in this water and are believed to be primarily from anthropogenic sources, with some contribution from natural sources. Based on water chemistry, there is no indication that the PAW has affected the naturally occurring groundwater in the Dewey Lake (DOE 2025a).

Floodplains. Floodplains are areas of low, level ground along rivers, stream channels, or coastal waters that are subject to periodic or infrequent inundation due to rain or melting snow. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, nutrient cycling, water quality maintenance, and provision of habitat for a diversity of plants and animals. There are no floodplains at the WIPP facility. Surface structures at the WIPP facility are approximately 500 feet above the Pecos River bed, which is 12 miles to the southwest, and over 400 feet above its 100-year floodplain. No major surface water bodies exist within an 8-mile radius of the WIPP facility (DOE 1990a, DOE 2021a).

Proposed Action Impacts. The Proposed Action would require excavation of seven U/G panels for future TRU waste emplacement. To manage excavated mined salt, additional surface-based structures (e.g., a lined salt pile and its accompanying lined evaporation pond) would be constructed for mined salt disposal and runoff management. The new proposed lined salt pile would require approximately 33 acres and the associated lined evaporation pond would require approximately 17 acres. These facilities would likely be located near the US or existing salt piles. Stormwater runoff from managing the salt stockpile would be managed in accordance with the requirements and conditions in the existing DP-831, which contains provisions to prevent discharge of saline water from the salt stockpiles and lined evaporation pond into groundwater and surface water. As such, the continued management of excavated salt from panel construction does not pose new operational or significant environmental impacts on the hydrologic characteristics at the WIPP site beyond those already analyzed in the 1997 SEIS-II for the Preferred Alternative (DOE 1997).

The Proposed Action would include new facilities or changes to existing structures, as shown in Table 2-4. The construction is planned over a period of about 20 years, and would involve 18 projects that would disturb approximately 5 acres. Construction activity would lead to soil disturbance, removal of protective vegetative cover, and both loosened and compacted soil conditions, which could potentially lead to impacts to the existing surface water hydrology. During construction, potential impacts to surface water hydrology include increased stormwater runoff, sediment transport, and impacts to stormwater quality, such as changes in water temperature and sediment load. Once operational, the new facilities, which generally would be constructed of impervious surfaces, could cause long-term alteration of the existing surface water hydrology, such as increased stormwater flow rates and decreased infiltration. During the closure period, impacts to water resources would be essentially the same as the impacts analyzed in 1997 SEIS-II for the Preferred Alternative (DOE 1997).

In addition to the projects identified in Table 2-4, the DOE is proposing to construct solar arrays at the WIPP site to provide power for the site's daily operation. The DOE would deploy solar panels on an estimated 102 acres of land, the majority of which is undeveloped within the off-limits area. During construction, soil disturbance and removal of vegetative cover would increase

the potential for erosion from wind and stormwater. During construction, potential impacts to water resources would be similar to new building construction. However, the solar arrays would be constructed on piles, and the creation of impervious surface would be much less than that of a similarly sized new facility. The existing land contours generally would be maintained, which would reduce impacts to existing drainage patterns. After construction, native vegetation would be re-established within open areas of the array, which would also help restore pre-construction evapotranspiration and stormwater infiltration rates.

Potential impacts to stormwater quality (e.g., introduction of silt, flow rates, flow volumes, and flow duration) and alteration of existing hydrology from new facility construction would be reduced through implementation of requirements specified in Section 438 of the *Energy Independence and Security Act*, which addresses stormwater management and requires any development/redevelopment project involving a federal facility with a footprint over 5,000 gross square feet to maintain or restore pre-construction hydrology to the maximum extent feasible. Therefore, stormwater management would be incorporated into new facility construction to reduce impacts to stormwater quality (e.g., reduce sediment-laden water from exiting the site) and existing hydrology (i.e., reduce alteration to existing/natural overland drainage). In addition, it may be necessary to obtain a modification of DP-831 for discharges of stormwater associated with construction activities. As part of the DP-831, the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) would be required to help minimize any pollution. The SWPPP would contain a detailed site plan and schematics for the installation of temporary and permanent stormwater and erosion control devices to effectively manage the site during construction and facility operation, as well as housekeeping best management practices (BMPs).

3.6 Air Quality

The USEPA has classified Eddy County, New Mexico, where the WIPP facility is located, as an attainment area for all six of the criteria pollutants (i.e., ozone, carbon monoxide [CO], total suspended particulates, sulfur dioxide [SO_2], lead, and nitrogen dioxide [NO_2]) under the National Ambient Air Quality Standards (NAAQS). The WIPP facility is also in a Class II Prevention of Significant Deterioration (PSD) area, and any new sources of emissions would have to adhere to the standards for such an area.

Air quality monitoring data collected since 1990 are summarized in annual site environmental reports (DOE 2025a). The WIPP facility has completed inventories of potential pollutants and emissions in accordance with USEPA and New Mexico Air Quality Control Regulations. Based on these inventories, the WIPP facility has no permitting or reporting requirements except for those applying to two primary backup diesel generators. The diesel generators are assumed to emit four criteria pollutants: NO_2, SO_2, CO, and particulate matter less than or equal to 10 micrometers in diameter (PM_{10}) (DOE 2021).

Proposed Action Impacts. Principal emission sources at the WIPP site under the Proposed Action would be: (1) exhaust from U/G mining, (2) particulate from surface salt handling and wind erosion of the salt pile, (3) fuel combustion from backup diesel generators, mining, and construction equipment, and (4) fugitive dust and particulate air matter from land disturbance

associated with new facilities and the solar panels. Fuel combustion would be the principal source of NO_2, SO_2, and CO.

While mining for Panels 13-19 would be performed in a different location than existing panels, the activities would be similar to previous panel mining, which had negligible air quality impacts (DOE 2021). Because excavation operations, TRU waste handling operations at the surface, CH TRU waste emplacement operations, RH TRU waste emplacement operations, panel closures, facility closure, and decommissioning would be similar to those analyzed in the 1997 SEIS-II Preferred Alternative, the excavation and use of seven additional panels for TRU waste disposal would not change the air quality impacts previously evaluated in the 1997 SEIS-II for the Preferred Alternative. The WIPP facility would remain an attainment area for all criteria pollutants, and there would be no impact to nearby national parks (Carlsbad Caverns and Guadalupe Mountains), which are Class I attainment areas.

Construction or modification of facilities under the Proposed Action would result in minor emissions of criteria air pollutants, of which particulate matter would be a primary concern. The DOE performed a net change in emissions analysis to assess the potential air quality impacts associated with the Proposed Action using the Air Conformity Applicability Model (ACAM) (U.S. Air Force [USAF] 2020). "Threshold values" were used in the analysis to provide an indication of the significance of the Proposed Action's potential impacts to local air quality. The threshold values represent *de minimis* levels that have been demonstrated to have little to no impact to air quality. For actions occurring in areas that are in attainment (i.e., do not exceed any NAAQS), such as Eddy County, New Mexico, the *de minimis* levels are as follows: 250 tons per year PSD major source threshold and 25 tons per year for lead. These *de minimis* values do not define a significant impact for purposes of NEPA; however, they do provide a threshold to identify actions that are insignificant under the Clean Air Act (CAA). Any action with net emissions below the *de minimis* values for all criteria pollutants is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQS. Table 3-3 provides the results of the ACAM modeling, assuming that a maximum of 25 acres of land (primarily associated with the solar array installation) would be disturbed in a given year. That table also compares construction emissions associated with the Proposed Action against the *de minimis* values.

Table 3-3. Proposed Action Construction Emissions Compared to *De Minimis* Values

Pollutant Not in a Regulatory Area	Proposed Action Emissions (ton/year)	*De Minimis* Value Threshold (tons/year)	*De Minimis* Value Exceedance (Yes or No)
Volatile Organic Compound	0.474	250	No
NOx	5.30	250	No
CO	4.634	250	No
SOx	0.011	250	No
PM_{10}	130.18	250	No
$PM_{2.5}$	0.161	250	No
Pb	0.000	25	No
NH_3	0.055	250	No

NOx = oxides of nitrogen; SOx = oxides of sulfur; $PM_{2.5}$ = particulate matter less than or equal to 2.5 micrometers in diameter; Pb = lead; NH_3 = ammonia
Source: USAF 2020.

Construction equipment criteria pollutant emissions would be minimized by using specific fuels (e.g., low-sulfur diesel fuel, alternative ethanol-containing fuel) and by maintaining equipment to ensure that emissions control systems and other components are functioning at peak efficiency. Soils exposed in excavations and slope cuts during construction would be subject to wind or rain erosion if left exposed. In addition, fugitive dust emissions would result from land disturbed by heavy equipment and motor vehicles. Construction emissions would be minimized through using water to control dust emissions from exposed areas, revegetation of exposed areas, watering of unpaved roadways, and minimizing construction activities under certain dry or windy conditions.

During operations, no notable changes in air emissions are expected compared to impacts presented in the 1997 SEIS-II; however, scope 2 GHG emissions are expected to be reduced significantly from current values once the solar arrays become operational.[13] The DOE estimates that approximately 18 million kW-hr of electricity (which is the current WIPP site annual electricity demand) could be generated by 65 acres of solar arrays (CBFO 2024). Once 102 acres of solar arrays are operational, approximately 27 million kW-hr of electricity could be generated.

Radionuclide releases would not change compared to existing operations and would remain less than 0.1 percent of the limit specified in the National Emissions Standard for Hazardous Air Pollutants (40 CFR 61, Subpart H). Section 4.15 of this 2026 WIPP SA presents the potential human health impacts associated with radionuclide releases under normal operations.

The plans for decommissioning and closure of the WIPP facility under the Proposed Action would be essentially the same as described in the 1997 SEIS-II for the Preferred Alternative, although it would occur at a later date. Potential air quality impacts could result from the construction of berms around and permanent markers in the surface area overlying the U/G disposal area, dismantling all the aboveground structures on the site (except those incorporated into the permanent marker system), and reclaiming the salt pile. Specifically, air quality impacts would be the result of fugitive dust and emissions from heavy-duty construction equipment typical of a large construction project. Reclaimed salt may be used to either close the shafts or as a base for the berm. Excess salt may be sold for other purposes and transported off-site by private carrier. Decommissioning and closure of the WIPP facility would produce temporary increases in dust and other criteria air pollutants, but no substantial long-term impacts.

3.7 Noise

The DOE requires its facilities to comply with Occupational Safety and Health Administration (OSHA) standards regarding noise exposure to workers. The WIPP facility noise sources with the potential to exceed those standards are mitigated and are maintained in compliance with those standards. Additionally, new projects are required to undergo a noise impacts analysis as part of the design and construction process. Since publication of the 2016 SA, no known new noise receptors have been identified in the WIPP facility region of interest and there are no sensitive noise receptors (e.g., hospitals, daycare centers, schools) within 5 miles of the WIPP facility. The nearest noise receptor remains the Mills Ranch, 3 miles to the south of the WIPP facility. Any WIPP facility noise sources with the potential to exceed these standards have been mitigated (for

[13] The 1997 SEIS-II did not address GHG emissions.

example, noise dampers have been installed in the U/G air exhaust fans) and are in compliance with 29 CFR §1910.95.

Proposed Action Impacts. Construction and operation workers could be exposed to noise levels higher than acceptable limits, particularly for confined areas, as specified in OSHA noise regulations. The DOE has implemented hearing protection programs that meet or exceed OSHA standards to minimize noise impacts on workers. These include the use of standard silencing packages on construction equipment, sequencing and scheduling work shifts, administrative controls, engineering controls, and personal hearing protection. Operations would not increase noise levels over existing activities, although there could be some minor additional noise due to construction activities and additional worker traffic to support additional activities. Any noise impacts from decommissioning and closure of the WIPP facility under the Proposed Action would be essentially the same as described in the 1997 SEIS-II for the Preferred Alternative, although it would occur at a later date. Overall, any additional noise impacts would be similar to the impacts presented in the 1997 SEIS-II for the Preferred Alternative (DOE 1997).

3.8 Biological Resources

The WIPP site area is characterized by sand dunes. The vegetation is dominated by shinnery oak (*Quercus havardii*), mesquite (*Prosopis grandulosa*), sand sage (*Artemisia filifolia*), dune yucca (*Yucca campestris*), smallhead snakeweed (*Gutierrezia microcephala*), three-awn (*Aristida spp.*), and numerous species of forbs and perennial grasses. Wildlife at the site include the black-tailed jack rabbit (*Lepus californicus*) and the desert cottontail (*Sylvilagus auduboni*); other common small mammals include Ord's kangaroo rat (*Dipodomys ordii*), plains pocket mouse (*Perognathus flavescens*), and northern grasshopper mouse (*Onychomys leucogaster*). Large mammals include mule deer (*Odocoileus hemionus*), pronghorn (*Antilocapra americana*), and coyote (*Canis latrans*). Loggerhead shrike (*Lanis ludovicianus*), Pyrrhuloxia (*Cardinalis sinuata*), and black-throated sparrow (*Amphispiza bilineata*) are common resident birds. The Harris hawk (*Parabuteo unicinctus*) is a resident raptor. Aquatic habitats near WIPP, which include stock watering ponds and tanks, may be frequented by yellow mud turtles (*Kinosternon flarescens*) and tiger salamanders (*Ambystoma tigrinum*) (DOE 1997).

In 1995, the DOE contacted the U.S. Fish and Wildlife Service (USFWS) to determine the occurrence of threatened, endangered, and proposed species at the WIPP site. It was determined that there were no designated critical habitat for special status species at the WIPP site. In 1996, the DOE conducted a large-scale biological survey on the WLWA and waterline right-of-way. The 1996 survey determined that no threatened, endangered, or state-listed species were found on the WLWA. The data reported in the survey, which support the conclusion of other studies, suggest that dense and permanent population of these species are not presently established on WIPP site lands (DOE 1997).

In May 2022, a small-scale biological survey was performed on undisturbed land focusing on an 80-acre area near the main WIPP facility by CEHMM (CEHMM 2022). No federal- or state-listed threatened or endangered plant species were observed during the surveys. Habitat that dominates much of the survey area is not conducive to the growth of threatened and endangered cacti species. Potential habitat was identified for Scheer's beehive cactus (*Coryphantha robustispina* ssp.

Scheeri), a BLM-sensitive species and New Mexico Energy, Minerals, and Natural Resources Department (NM EMNRD)-designated endangered species; however, no individual plants were observed. Sand Sagebrush (*Artemisia filifolia*) and Little Bluestem grass (*Schizachyrium scoparium*), and important plant species of the Lesser Prairie-Chicken nesting habitat were also observed in the survey area (CEHMM 2022).

Although survey results reported that no threatened or endangered wildlife species were found within the surveyed area, three special status bird species were reported as encountered. The report notes that the sand dunes within the WLWA are favorable to the burrowing owl and some areas near the main WIPP facility are potential habitat for the State-listed endangered Scheer's pincushion cactus. Because this survey did not capture the entire WLWA, and due to the transient and cryptic nature of some species, the possibility exists of other special-status species (including threatened and endangered) occurring within the WLWA. Scaled quail, identified by the BLM as a watch species, were also reported (CEHMM 2022).

According to the most recent annual site environmental report (DOE 2025a), there have been no substantive changes in the biological resources at the WIPP site since the 1997 SEIS-II. In 2024, it was determined that no imperiled species that are protected by the *Endangered Species Act* or *New Mexico Wildlife Conservation Act* were identified within the WLWA (DOE).2025c). In 2023, a list of special-status species that could be encountered during WIPP operations (not including waste transport from generator sites) was compiled from multiple sources and included in the LMP (DOE 2026). The updated list includes the new federal listing for the lesser prairie-chicken (*Tympanuchus pallidicinctus*). Although there are no known species of plants or animals at the WIPP site that are protected by the *Endangered Species Act*, the WIPP site is within a 10-mile buffer of favorable habitat for the lesser prairie-chicken. Biologists with the BLM have also identified areas suitable to the species and included the WIPP site in their habitat evaluation area (DOE 2025a).

Proposed Action Impacts. Potential impacts to biological resources are evaluated based on the degree to which various habitats or species could be affected by the Proposed Action. Impacts to wildlife are evaluated in terms of disturbance, displacement, or loss of wildlife. Important biological resources include cover sites, nest or burrow sites, roost sites, or water sources important to sensitive species.

Under the Proposed Action, potential impacts during construction could include erosion and sedimentation, human disturbance, and noise. Most projects under the Proposed Action would be on previously disturbed land. Beyond removal of existing grasses in some construction areas, there would be no impacts to biological resources. In addition, the presence of human activity and associated construction noise can cause wildlife species to avoid habitats surrounding a construction site; however, no new impacts to wildlife species are expected from human presence and noise from construction.

In addition to the projects identified in Table 2-4, the DOE is also proposing to construct solar arrays on approximately 102 acres of land, the majority of which is undeveloped within the off-limits area. During construction removal of vegetation, communities would be disturbed and habitat loss would occur causing the dislocation of small, urban-type species (i.e., rodents). Large

animals would be largely excluded from controlled areas. Because the area on which the solar arrays would be constructed does not have suitable habitat for special status species, there would be minimal impacts to these biological resources.

There are no known species of plants or animals at the WIPP site that are protected by the *Endangered Species Act* and no critical habitat designated for threatened or endangered species has been identified at the WIPP site; therefore, there would be no impacts to special status species from construction or operation activities from the Proposed Action.

The plans for decommissioning and closure of the WIPP facility under the Proposed Action would essentially be the same as described in the 1997 SEIS-II, although it would occur at a later date. Decommissioning and closure of the WIPP facility would result in the dismantling of all aboveground structures (except for those incorporated into the Permanent Marker System) and reclamation of the area resulting in the loss of much of the plant community and avian and small mammal habitats within and near the area. The DOE would return decommissioned lands used in the operation of the WIPP site to a stable ecological condition and maintain or enhance the ecological condition of wildlife habitat within the WLWA.

Overall, any additional impacts to biological resources would be similar to the impacts presented in the 1997 SEIS-II for the Preferred Alternative (DOE 1997). The DOE is subject to, and complies with, existing laws, regulations, and policies regarding protection of sensitive and otherwise regulated plant and animal species and has established practices to minimize or avoid potential adverse effects on biological resources. Potential impacts to biological resources at the WIPP facility will be minimized through implementation of protective measures and continued biological monitoring. Existing disturbed lands will be used to the greatest extent possible for new projects and activities. The DOE will continue to complete necessary biological assessments and obtain concurrence from the USFWS on any identified impacts.

3.9 Cultural and Paleontological Resources

Cultural resources investigations at the proposed WIPP site began in 1976 and have continued to the present. There have been 197 previous investigations, including archaeological surveys, site monitoring, site evaluation, and site testing or mitigation projects within the WIPP site. A total of 79 archaeological sites have been previously documented within the WIPP site.

In August 1978, the Agency for Conservation Archaeology from Eastern New Mexico University conducted an archaeological survey of the area around the WIPP site. The agency surveyed various north/south corridors in the areas south of the WIPP site. None of these corridors indicated any archaeological sites within or near the corridors except in areas farther south of the WIPP site. A Class III cultural resource inventory was conducted and no Historic Properties were identified. In 1987, a Class II survey and testing of the cultural resources was conducted at the WIPP facility as well. There were no known Native American sacred sites or burials found within the WLWA (DOE 2021).

Recent surveys include a Class I (New Mexico Cultural Resource Information System [NMCRIS] Investigation Number 151291) archaeological investigation performed by Tetra Tech, Inc., in October 2022 to collect up-to-date information on cultural resources located within the WIPP

property boundaries. As part of the Class I archaeological investigation, archival research and survey efforts documented 39 cultural resources, which were previously documented archaeological sites. Of these, one has been determined Eligible for listing in the National Register of Historic Places (NRHP) with the State Historic Preservation Officer (SHPO) concurrence; 10 sites are recommended Eligible for listing in the NRHP, but require DOE and SHPO concurrence; three sites have been determined Not Eligible for listing in the NRHP; and 13 sites are recommended Not Eligible. Three sites have been determined Unevaluated for listing in the NRHP with SHPO concurrence. Finally, nine sites, six of which were not found during the survey, are recommended Unevaluated for the NRHP. No NRHP-listed or New Mexico State Register of Cultural Properties-listed properties or districts were identified within the Project or Research Area (Tetra Tech 2024b).

Tetra Tech, Inc., also conducted a Class III archaeological investigation. An archaeological survey (NMCRIS Activity Number 151228) was performed to support this 2026 WIPP SA and provide clearance for installation of new subsidence monuments. No cultural resources were discovered during the survey (Tetra Tech 2022). Lastly, an archaeological survey (NMCRIS Activity Number 150820) was performed in 2022 to obtain Land Use Request clearance for an area of the WLWA proposed for site expansion (DOE 2023a).

Proposed Action Impacts. The Proposed Action would involve ground disturbance. Future ground-disturbing activities at the WIPP site might include physical destruction of or damage to all or part of the property; change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance; and introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features. Effects to cultural resources are normally considered permanent as these resources are finite and disturbance of them, particularly archaeological sites, cannot be reversed. However, effects on historic landscapes or the viewsheds of historic or other significant areas can be temporary if projects to do not permanently impact associated resources and are removed at a future date.

Cultural resources impacts would potentially occur as a result of activities that involve modification of buildings and ground disturbance in previously undisturbed locations. These impacts would occur through drilling; grading; excavation; fencing; cleanup activities; construction of buildings, roads, firebreaks, and utilities; and building modification. Vehicular and pedestrian access to areas containing cultural resources would increase the potential for vandalism or unauthorized artifact collection to occur that could affect archaeological sites and archaeologically sensitive areas. Any potential cultural impacts from decommissioning and closure of the WIPP facility under the Proposed Action would be essentially the same as described in the 1997 SEIS-II for the Preferred Alternative, although it would occur at a later date. Overall, any additional cultural impacts would be similar to the impacts presented in the 1997 SEIS-II for the Preferred Alternative (DOE 1997).

Measures for ensuring protection of known archaeological and historic resources, or others that may be inadvertently discovered during ground-disturbing activities, are discussed in the Waste Isolation Pilot Plant Land Management Plan (DOE 2026). These measures include identifying, inventorying, evaluating, and treating cultural resources under the *National Historic Preservation*

Act of 1966. The DOE will avoid, to the maximum extent possible, sites found eligible for inclusion in the NRHP. Where avoidance is not possible, mitigation measures will be developed under the Joint Powers Agreement with the State of New Mexico.

3.10 Socioeconomics

Socioeconomics considers the attributes of human social and economic interactions associated with the proposed DOE actions at the WIPP site and the impacts that such actions may have on the ROI. The ROI is a two-county area in New Mexico comprised of Eddy and Lea counties. The socioeconomic ROI is defined on the basis of current residential location of full-time DOE workers directly involved in WIPP activities, and encompasses the area in which most of these workers spend their wages and salaries. For this analysis, the ROI is defined as Eddy and Lea counties, New Mexico. Socioeconomic impacts may be defined as the environmental consequences of a proposed action in terms of potential demographic and economic changes. Table 3-4 provides a summary of socioeconomic characteristics within the ROI.

Table 3-4. Socioeconomic Characteristics and Employment (2024)

Characteristics	Eddy County	Lea County	ROI
Employment Profile			
Labor Force	31,083	35,133	66,216
Employed	30,056	33,903	63,959
Unemployed	1,027	1,230	2,257
Unemployment rate (percent)	3.3	3.5	3.4
Median household income (dollars)	78,426	80,482	$79,454
Demographics			
Population	62,314	74,455	136,769
Minority population (percent)	41.8	53.9	47.8
Households below poverty line (percent)	13.8	15.4	14.6
Housing			
Total housing units	26,839	27,854	54,693
Occupied housing units	23,620	24,379	47,999
Median value (dollars)	$212,600	$184,000	$198,300
Vacant units	3,219	3,733	6,952
Homeowner vacancy rate (percent)	1.0	1.9	1.4
Rental vacancy rate (percent)	7.9	8.9	8.4

Source: Bureau of Labor Statistics (BLS) 2024, USCB 2024a, USCB 2024b, USCB 2024c, USCB 2024d, USCB 2024e.

The WIPP Project workforce evaluated in the 1997 SEIS-II Preferred Alternative was 1,095 persons (DOE 1997). The workforce has remained reasonably constant throughout the 25 years of WIPP operations. Currently, approximately 1,500 people are employed at the WIPP facility (DOE 2023e).

From 2010 through 2024, the labor force in the ROI increased 21.6 percent to 66,216 persons (BLS 2024). During the same time period, employment in the ROI increased by 24.4 percent to 63,959

persons, and the number of unemployed decreased by 41 percent. Over that same period, the unemployment rate declined from 6.9 percent to 3.4 percent. Major employment sectors in the ROI included educational services, and health care and social assistance; agriculture, forestry, fishing and hunting, and mining; retail trade, transportation and warehousing, and utilities; construction; and oil and gas activities.

In 2024, the population in the ROI was estimated to be 136,769 (USCB 2024a). From 2010 to 2024, the total population in the ROI increased 15.8 percent, which was similar to the growth rate in New Mexico (USCB 2010, USCB 2024a). Between 2024 and 2033, the population of the ROI is projected to steadily increase. In 2033 the population of the ROI is projected to be approximately 140,588 and would continue to slowly increase to approximately 148,857 by 2083 (New Mexico 2021). As of 2024, the ROI had 54,693 housing units of which 9.8 percent were vacant. Of the estimated 6,952 vacant units, 584 were estimated to be vacant rental units, or 8.4 percent of the housing stock.

In 2024, there were eight school districts with 65 schools serving a student population of 26,951. (Eddy County, NM School Districts 2025, Lea County, NM School Districts 2025.) There are four hospitals serving the ROI with approximately 291 beds (American Hospital Directory [AHD] 2023).

Proposed Action Impacts. The Proposed Action would not result in any appreciable effects to the local or regional socioeconomic environment beyond those already evaluated in the 1997 SEIS-II. The Proposed Action would have minor beneficial effects associated with temporary employment of construction personnel and transportation of goods and materials to the WIPP site. While no substantive changes in workforce staffing are anticipated, minor, temporary changes associated with construction activities may occur.

Construction activities under the Proposed Action would require approximately 150 construction workers annually over a 20-year period. It is anticipated that some portion of construction materials would be purchased locally. Payroll and materials expenditures would have a positive impact on the local economies. Estimated direct construction jobs may result in additional indirect jobs providing increased local revenue. Most construction materials and temporary construction workers would most likely be drawn from the local community. As a result, permanent increases in population would not occur and housing and community services would not be permanently impacted. Because the construction workforce (150 persons) would be negligible compared to the projected population in the ROI, socioeconomic impacts during construction, although beneficial, are expected to be negligible. The increase in economic activity would be temporary and would subside when construction is completed.

While construction activities may necessitate an increase in the temporary workforce, they would not result in permanent changes to the size of the WIPP workforce. Daily spending by these new workers would positively affect the area surrounding the WIPP site, creating a minor beneficial impact on economic activity. Projected rates of population growth would not be altered as a result of new workers. Sufficient housing exists in the area to support an increase in population and would result in a reduction in housing vacancy rates. Only negligible impacts on population and housing are anticipated. The demand for public services would increase during construction;

however, the impact would be negligible and would not affect the level of service provided. No additional operational workforce would be required. Any socioeconomic impacts from decommissioning and closure of the WIPP facility under the Proposed Action would be essentially the same as described in the 1997 SEIS-II for the Preferred Alternative, although it would occur at a later date. Overall, any additional socioeconomic impacts would be similar to the impacts presented in the 1997 SEIS-II for the Preferred Alternative (DOE 1997).

3.11 Infrastructure

The WIPP facility has infrastructure needs in line with typical industrial sites with respect to electrical and water consumption but also requires unique requirements to facilitate its subterranean mining activities. These specific needs include shafts for material and personnel transportation, special communication infrastructure, ventilation systems, and fire suppression mechanisms.

Electrical. The WIPP facility relies on utility power supplied by the regional electric utility, Xcel Energy. In the event of a power outage, operations related to TRU mixed waste handling cease. On-site backup power is provided by diesel generators. These generators are designated to sustain specific loads, including lighting and ventilation for U/G facilities, as well as lighting, ventilation, and the Air Intake Shaft Hoist in the TRU mixed waste handling zones. Table 3-5 presents the annual electrical consumption in kilowatt-hours (kW-hr) over the last three fiscal years.

Table 3-5. Annual Electrical Usage at the WIPP Facility

Year	Annual Usage (kW-hr)
2023	18,906,000
2022	16,340,000
2021	15,578,000

Source: CBFO 2024.

Communications. The current network fiber infrastructure in use at the WIPP facility was installed approximately 20 years ago and supports data speeds up to 1 Gbit/s. It is in need of an upgrade to meet modern cyber security requirements and enable teleconferencing (DOE 2019b).

Mine Pager Phone. The mine pager phone system is a self-contained, hard-wired, battery-powered communication system utilized in the U/G and designated surface areas to facilitate daily operations and emergency response. These phones are interconnected via a two-wire system, featuring a speaker for receiving messages and a handset for initiating communications with other mine pager phones (CBFO 2024).

Underground Wireless Notification System (UWNS). The UWNS facilitates communication between surface and U/G personnel and enables personnel tracking during emergencies. This system consists of a network comprising Tracking Beacon Nodes, Battery Mesh Nodes equipped with antennas, Gateway Nodes, and Miner Mesh Radios (CBFO 2024).

Potable Water, Wastewater, Stormwater, and Fire Water. The WIPP facility consumes around 4,800,000 gallons of potable fresh water annually (Table 3-6). Personnel account for

approximately 70 percent of this usage, while the remaining 30 percent is attributed to heating, ventilation, and air conditioning, and operational equipment, such as the compressed air system.

Table 3-6. Annual Water Usage at the WIPP Facility

Year	Annual Usage (gallons)
2024	8,020,000
2023	5,551,000
2022	6,104,000
2021	6,809,000
2020	4,409,000
2019	3,749,000
2018	6,738,000
2017	3,687,000
2016	5,182,000
2015	4,271,000
2014	3,258,000
2013	3,350,000
2012	4,596,000

Source: DOE 2025a.

Water for WIPP facility operations is sourced from a well field located northeast of Carlsbad. The site receives up to 6.6 million gallons of water annually via a no cost agreement with the City of Carlsbad. Stormwater management is conducted by collecting into holding ponds for effluent evaporation over several days after a precipitation event.

The fire water supply system at the WIPP facility draws water from a 180,000-gallon ground-level storage tank within the on-site water distribution system. This system, known as the "yard compound-loop distribution system," provides fire water to all site facilities with sprinkler systems and fire hydrants located approximately every 300 feet across the site. It includes multiple sectionalizing and control valves, which are kept locked open and undergo visual monthly checks (DOE 2019b).

Ventilation and Underground Air Distribution System (UADS). Ventilation is a critical infrastructure component in subterranean mining operations. Ensuring adequate airflow is fundamental for U/G worker safety and the aboveground processes of filtration and aerated salt reduction. Prior to the upgrade, the ventilation system at the WIPP facility functioned in filtration mode with an airflow of 170,000 cubic feet per minute (cfm), supporting essential ground control, mining, and waste emplacement tasks. The ventilation system was upgraded with two parts that includes: (1) the Safety Significant Confinement Ventilation System (SSCVS), and (2) a new utility shaft.

The SSCVS at the WIPP facility is a critical part of the new U/G ventilation system, designed to provide 540,000 cfm of U/G airflow. This system includes a salt reduction component before air passes through high-efficiency particulate air (HEPA) filters in the New Filter Building. The utility shaft component consists of a 2,150-foot vertical ventilation shaft connected to the existing

WIPP repository by two new horizontal drifts. Commissioning of this new system was completed in July 2025. This modernization effort will enhance operational efficiency and prioritizes the health and safety of workers, the public, and the environment.

The UADS is another vital and distinct component to mining operations. This UADS comprises piping, valves, gauges, and connections designed to supply sufficient compressed air to U/G operations; e.g., the operation of pneumatic tools, pneumatic door operators, hoists, and ventilation damper controls. Each surface compressed air generating facility is designed to produce a minimum of 560 cfm at 120 pounds per square inch, with redundancy in the form of a backup compressor. The UADS components are securely affixed to U/G walls, but are also easily movable to accommodate mining activities, such as excavating additional panels, adjusting roof beams, realigning rib lines, and closing filled panels (CBFO 2024).

Proposed Action Impacts. The Proposed Action includes: (1) the excavation of seven additional U/G panels and construction of surface structures and facilities to support the new panel development, including a new salt pile and pond; (2) Hoisting Capability Project; (3) new support facilities; and (4) four solar arrays totaling 102 acres. Impacts to infrastructure stemming from these four major actions are analyzed below:

Under the Proposed Action, there would be no notable changes in annual electricity consumption associated with construction and decommissioning/closure activities. The addition of 18 new facility projects over the next 20 years, totaling approximately 207,000 square feet, would be a primary reason for any increased annual electrical demand. However, the site would average less than one 11,000-square-foot facility annually and there would be sufficient electrical capacity to handle demands from the increased construction activity. During operations, electricity demand at the WIPP facility would be expected to slightly increase on a year-over-year basis, consistent with past electrical demand growth. Although annual electricity consumption would be expected to slightly increase, DOE acknowledges that continuing TRU waste emplacement for an additional 50 years would increase total electricity use.

Under the Proposed Action, up to four solar arrays totaling 102 acres would be constructed and operated at the WIPP facility. Associated power transmission lines would be constructed within existing transmission corridors. The DOE estimates that approximately 27 million kW-hr of electricity (which is the maximum annual electricity demand expected at the WIPP facility over the timeframe of this SA) could be generated by 102 acres of solar arrays (CBFO 2024).

The Proposed Action does not include any upgrades to the current network fiber infrastructure, although upgrades to the system may occur independently of the Proposed Action. Upgrading would include new fiber optic cabling capable of speeds 100 times faster than the current system. The mine pager phone system and UWNS would be expanded as development of additional panels proceeds.

The Proposed Action is not expected to result in any significant changes in annual water consumption related to either construction activities or operations. Water usage is expected to align with historical levels. Correspondingly, annual wastewater generation is expected to remain consistent with past levels. The fire water system would be expanded as necessary to support the

development of additional panels. DOE acknowledges that continuing TRU waste emplacement for an additional 50 years would increase total water consumption and wastewater generation.

The design of the compressed air piping system that would extend the UADS as additional panels are developed is expected to remain in accordance with the American National Standard Code for Pressure Piping, ASME-B31.3, "Process Piping." Two or more surface compressed air facilities would be capable of supplying the compressed air to operate the WIPP facility as required. Any infrastructure impacts from decommissioning and closure of the WIPP facility under the Proposed Action would be essentially the same as described in the 1997 SEIS-II for the Preferred Alternative, although it would occur at a later date. Overall, any additional annual infrastructure impacts would be similar to the annual impacts presented in the 1997 SEIS-II for the Preferred Alternative (DOE 1997).

3.12 Transportation

In support of this SA, the DOE prepared a report entitled, "Waste Isolation Pilot Plant Supplement Analysis Transportation Analysis Technical Report" (DOE 2024a), to provide an overview of the approach used to assess the human health risks that could result from transportation of TRU wastes (both CH and RH) between generator-sites and the WIPP facility. As documented in that report, impacts associated with the transportation of TRU waste and the operation of the WIPP facility have not substantially changed since the preparation of the 1997 SEIS-II (DOE 1997), the updated transportation analysis in the 2009 site-wide SA (DOE 2009a), the 2016 site-wide SA (DOE 2016a), or the 2021 site-wide SA (DOE 2021). Table 3-7 shows the anticipated shipping projections through 2083 from all generator sites, which on an annualized basis, are less than the 1997 SEIS-II's annualized shipping projections. For the 1997 SEIS-II Preferred Alternative, the DOE estimated that an average of 1,078 shipments per year would occur during the previously assessed 35-year WIPP facility disposal phase, whereas the DOE has estimated that an average of 391 shipments per year would occur during the 60-year span (2024-2083) for the Proposed Action in this 2026 WIPP SA. Accordingly, the Proposed Action in this 2026 WIPP SA extends beyond the estimated facility closure date of 2033 in the 1997 SEIS-II by 50 years and evaluates the use of additional disposal panels at the WIPP facility. The overall volume of TRU waste to be disposed of at the WIPP facility (i.e., the LWA total TRU waste volume capacity limit of 175,564 m^3), however, would not change compared to the 1997 SEIS-II analysis.

Table 3-7. Estimated Shipments of TRU Waste to the WIPP Facility from Generator Sites over the Proposed Action Period (2024-2083)

Generator Site	CH TRU	RH TRU
Argonne National Laboratory	109	0
Materials & Fuels Complex	8	95
Bettis Atomic Power	0	12
Idaho National laboratory	1,255	334
Knolls Atomic Power Laboratory	46	22
Knolls Atomic Power Laboratory – Nuclear Fuel services	8	0
Los Alamos National Laboratory	2,974	90
Lawrence Berkeley National Laboratory	1	0
Lawrence Livermore National Laboratory	186	0
Nuclear Radiation Development Site	1	0
Nevada National Security Site	40	0
Oak Ridge National Laboratory	401	2,281
Hanford (Richland) Site	6,752	182
Sandia National Laboratories	23	5
Separations Process Research Unit	2	4
Savannah River Site	8,619	8
TOTAL Estimated Number of TRU Waste Shipments to WIPP	**20,425**	**3,033**

TRU = transuranic waste; CH = contact-handled; RH = remote-handled

Notes: A total of approximately 23,460 waste shipments (CH+RH) over the 60-year Proposed Action period is anticipated (~391 shipments per year). TRU-waste total number of shipments is the sum of both CH and RH forms shipped via Transuranic Package Transporter (TRUPACT)-II, TRUPACT-III, HalfPACT, and the RH-TRU-72B shipping package. A single shipment can haul up to three TRUPACT-IIs or HalfPACTs, whereas only one TRUPACT-III or RH-TRU-72B can be hauled within a single shipment. Any shipment of RH waste (regardless of whether in an RH-TRU-72B or HalfPACT) is accounted for as an "RH TRU" shipment.

Proposed Action Impacts. DOE assesses transportation activities in terms of potential lifetime risks from radiological materials.

Lifetime Incident-Free Radiological Impacts. For the Proposed Action in this 2026 WIPP SA, the major factor that would affect potential health impacts from WIPP facility operations would be population changes in the ROI (i.e., the 50-mile radius around the WIPP facility). The updated dose-risk factor (*see* Section 2.5.2) would also have a minor effect on the estimate of human health impacts to the public. These changes are detailed in Sections 2.5.1 and 2.5.2. In the 1997 SEIS-II, the DOE calculated that the bounding lifetime incident-free radiological impact to the MEI from truck transportation for the Preferred Alternative would be 0.009 LCFs. Applying the aforementioned updated dose-risk factors (*see* Section 2.5.2) since the issuance of the 1997 SEIS-II, this lifetime incident-free radiological impact to the MEI from truck transportation would increase to 0.01 LCFs. As such, even though annual doses would be expected to somewhat vary to this individual from year-to-year due to varying numbers of annual shipments from generator sites, the associated incident-free collective transportation impacts to the MEI associated with this 2026 WIPP SA's Proposed Action period would result in a negligible increase compared to the impacts previously analyzed in the 1997 SEIS-II for the Preferred Alternative.

In the 1997 SEIS-II, the DOE determined that the aggregate incident-free population radiological impacts (non-occupational) from truck transportation for the Preferred Alternative would be approximately 3.0 LCFs; in comparison, the cumulative population radiological impacts determined under the Proposed Action in this 2026 WIPP SA would be approximately 2.5 LCFs, which would not be statistically different than the results in the 1997 SEIS-II.

In the 1997 SEIS-II, the aggregate incident-free occupational radiological impacts from truck transportation for the Preferred Alternative were determined to be approximately 0.3 LCFs. Applying the aforementioned updated dose-risk factors since the issuance of the 1997 SEIS-II, the aggregate incident-free occupational radiological impacts from truck transportation would accordingly increase from 0.3 LCFs to about 0.5 LCFs. In comparison, the cumulative occupational radiological impacts determined under the Proposed Action in this 2026 WIPP SA would be approximately 1.8 LCFs, the difference of which can be attributed to the greater number of overall shipments to which crews would be exposed during the longer Proposed Action period (i.e., through 2083). As such, the aggregate incident-free occupational transportation impacts associated with the Proposed Action would result in a small increase compared to the impacts in the 1997 SEIS-II for the Preferred Alternative. Any transportation impacts from decommissioning and closure of the WIPP facility under the Proposed Action would be essentially the same as described in the 1997 SEIS-II for the Preferred Alternative, although it would occur at a later date.

Lifetime Radiological Impacts from Potential Truck Transportation Accidents. The 1997 SEIS-II evaluated the bounding potential doses to the population within the transportation corridor from potential vehicle accidents and presented those results in Table 5-9, "Aggregate Radiological Impacts from Potential Truck Transportation Accidents for the [Preferred Alternative] (LCFs)." In the1997 SEIS-II, the DOE estimated 0.43 LCFs occurring to the aggregate population within the transportation corridor from TRU waste disposal over the lifetime of WIPP facility operations. As a result of the population increase and the updated dose-risk factor, the lifetime potential human health impacts to the transportation corridor population would increase to approximately 0.7 LCFs. This shows a minor increase in impacts from potential accidents (of note, the *average* accident impact estimate for the Proposed Action in this 2026 WIPP SA was calculated to be approximately 0.02 LCFs [*see* DOE 2024a]).

FRACTIONAL LCFs

Sometimes calculations of the number of LCFs associated with radiation exposure do not yield whole numbers, and, especially in environmental applications, may yield numbers less than 1.0. For example, if each member of a population of 100,000 were exposed to a total dose of 0.001 rem (i.e., 1 mrem), the collective dose would be 100 person-rem, and the corresponding estimated number of LCFs would be 0.06 (100,000 persons x 0.001 rem x 0.0006 latent cancer fatalities/person-rem = 0.06 latent cancer fatalities).

How should one interpret a fractional number of LCFs, such as 0.06? The answer is to interpret the result as a statistical estimate. That is, 0.06 is the ***average*** number of deaths that would result if the same exposure situation were applied to many different groups of 100,000 people. For most groups, no one would incur an LCF from 0.001 rem dose each member would have received. In a small fraction of the groups, 1 latent fatal cancer could result; in exceptionally few groups, two or more latent fatal cancers could occur. The ***average*** number of deaths over all of the groups would be 0.06 latent fatal cancers (just as the average of 0, 0, 0, 0, 0, 0, 0, 0, 0, 0 and 1 is 0.1 for ten groups). The most likely outcome is zero LCFs.

Lifetime Non-Radiological Impacts from Potential Truck Transportation Accidents. The 1997 SEIS-II evaluated impacts from potential non-radiological transportation accidents and presented those results in Table 5-6, "Non-Radiological Impacts of Transporting TRU Waste by Truck for the Proposed Action." The SEIS-II analysis assumed shipments from 10 sites and estimated impacts over the transportation period of 35 years at 56 accidents, 39 injuries, and five traffic-related fatalities.

The 2026 SA calculates the number of potential non-radiological fatalities from accidents considering the number of remaining shipments from sixteen sites and route distance (Table 3-7), using data from the Federal Motor Carrier Safety Administration, to estimate accident fatality rate for heavy trucks of approximately 1.77 traffic fatalities per one million heavy truck mile traveled. (FMCSA 2023). Non-radiological fatalities from all expected shipments across all routes, aggregated through 2083 is estimated to be less than 0.5.

3.13 Waste Management

TRU Waste. Department of Energy Order 435.1, *Radioactive Waste Management*, requires that all radioactive waste be managed in accordance with DOE Manual 435.1-1, *Radioactive Waste Management Manual*. Relative to TRU waste generated off-site and disposed of at the WIPP facility, DOE Order 435.1 requirements are implemented through the WIPP WAC and procedures governing the management and disposal of waste in the WIPP facility.

The WIPP HWFP authorizes the DOE and the M&O contractor (collectively known as the "Permittees") to manage, store, and dispose of CH and RH TRU mixed waste at the WIPP facility. Two storage units (the Parking Area Unit and the Waste Handling Building [WHB] Unit) are permitted for storage of TRU mixed waste. Transuranic waste disposal is currently ongoing in Panel 8. The second 10-Year Renewal Permit included approval for the construction and use of Replacement Panels 11 and 12. Transuranic mixed waste generated as the result of operations is characterized as derived waste in accordance with the HWFP and is managed as CH TRU mixed waste at the WIPP facility (DOE 2025d).

The handling of TRU waste at the WIPP facility involves several systems and components. Waste arrives from designated areas of the country by truck on specialized trailers. The trailers are brought into the WIPP facility through the vehicle trap. The trucks are driven around to the south side of the WHB. The loaded trailer is parked behind the WHB where it is unloaded by site personnel. This parking area is an approved storage area for the loaded waste transporters while they wait to be taken into the WHB to be unloaded. Site personnel conduct a radiological survey of both the transporter and the trailer. Radiological Control technicians would release the transporters for processing, after which site personnel would remove the transportation packages from the trailer and move them into the WHB (DOE 2017b).

For CH waste transported in TRUPACT or HalfPACT transportation packages, once inside the CH bay of the WHB the transportation package is loaded into the TRUDOCK for venting, opening, and waste removal, with radiological monitoring (continuous air monitoring and/or swipes) at every step. At the TRUDOCK, the waste (see description of various waste packages below) is loaded onto facility pallets for movement to the Waste Hoist and emplacement in the U/G. In the cases of unavailability of the Waste Hoist or the inability to otherwise emplace the waste in the U/G, the waste is temporarily stored on facility pallets within the floor space of the WHB (DOE 2017b).

Within the transportation packages, waste is packaged in a variety of approved containers. Acceptable containers include: standard 55-gallon drum, standard waste box, ten-drum overpack, 85-gallon drum, 100-gallon drum, standard large box-2, and shielded container (a shielded container holds a 30-gallon inner drum containing RH TRU waste shielded so that it can be managed as a CH TRU waste container) (DOE 2017b). As of March 6, 2024, about 43 percent (approximately 75,849 m^3) of the total TRU waste volume capacity limit authorized by Congress in the WIPP LWA has been disposed in approximately seven disposal panels at the WIPP facility.

The Waste Certification program helps ensure compliance requirements are met for wastes being disposed of at the WIPP facility. Profiles for each waste stream are reviewed to verify that the characterization information provided by the waste generator is complete and accurate, and that

waste streams comply with the WIPP HWFP WAP and the WIPP WAC (DOE 2025b). Under the Waste Certification program, the permittee confirms waste containers have no ignitable, corrosive, or reactive waste prior to shipment of waste to the WIPP facility. Waste characteristics are determined using acceptable knowledge, radiography, and/or visual examination of a statistically representative subpopulation of the waste in each shipment. This program satisfies requirements in the HWFP WAP and WIPP WAC (DOE 2025b).

MLLW/LLW. Mixed low-level radioactive waste (MLLW) and low-level radioactive waste (LLW) are occasionally generated during site operations and is managed to comply with DOE Order 435.1. The requirements from the order are implemented through WIPP procedures governing the characterization, management, and disposal of radioactive waste generated on-site. The procedures are the *Low-Level and Mixed Low-Level Waste Management Plan* (WP 02-RC.05) and the *Low-Level and Mixed Low-Level Waste Characterization for Off-Site Release for Disposal* (WP 02-RC3110). These procedures contain steps that ensure that site-generated MLLW and LLW are disposed of off-site in accordance with DOE Order 435.1 and DOE Manual 435.1-1 requirements. The MLLW and LLW are shipped off-site to treatment, storage, or disposal facilities that are permitted and licensed to treat and dispose of these types of wastes. During 2024, MLLW and LLW was disposed of via WCS in Andrews, TX (DOE 2025d).

Hazardous Waste. Non-radioactive hazardous waste is currently generated through routine facility operations. During 2024, hazardous wastes were sent off-site for disposal via Veolia North America, LLC, Henderson, Colorado. Hazardous wastes are managed in satellite accumulation areas at the WIPP site. The WIPP facility has a Central Accumulation Area (less-than-90-days storage area) on the surface, and a Central Accumulation Area (less-than-90-days storage area) U/G.

Nonhazardous Waste. An active pollution prevention (P2) program is in place with recycling as a key component of the program. The WIPP facility has historically recycled site-generated waste that can be recycled within its regional infrastructure. Nonhazardous site-generated waste recycled by the P2 program includes lead acid batteries, alkaline batteries, aluminum, cardboard, ink and toner cartridges, paper, number 1 polyethylene terephthalate plastics, wood pallets, hard hats, and construction and demolition (C&D) waste, which includes asphalt, concrete, wood, and scrap metal. During 2024, a total of 554.55 MTs of municipal solid waste, recycling, and C&D waste was generated at the WIPP facility. The WIPP facility successfully diverted 80.33 percent, or 442.88 MTs, of that waste from the local landfill. The recycling numbers show continued improvement of waste diversion at the WIPP facility (DOE 2025a).

Proposed Action Impacts. Under the Proposed Action, the DOE would continue the uninterrupted disposal of defense-related TRU waste up to the Congressionally authorized WIPP LWA total TRU waste volume capacity limit of 175,564 m^3 by additional panel excavation. Mining, waste handling, and waste disposal operations for Panels 13-19 would not substantively deviate from current facility practices. Transuranic waste would meet the WIPP requirements (e.g., WIPP WAC and the WIPP HWFP WAP) before being disposed of in the WIPP facility. In addition, annual quantities of MLLW/LLW, hazardous waste, and nonhazardous waste from routine WIPP facility operations, are not expected to change due to the Proposed Action. Although annual generation of waste would not change, the elongated period of operations at the WIPP

facility would result in the generation of approximately 143 percent more waste as originally analyzed in the 1997 SEIS-II. However, because annual quantities of waste generated would be the same, those wastes would be managed in the same way and impacts would be similar. Any waste management impacts from decommissioning and closure of the WIPP facility under the Proposed Action would be essentially the same as described in the 1997 SEIS-II for the Preferred Alternative, although it would occur at a later date. Overall, any additional waste management impacts would be similar to the impacts presented in the 1997 SEIS-II for the Preferred Alternative (DOE 1997).

3.14 Human Health Impacts

Proposed Action Impacts. This section evaluates the differences or changes that have occurred, or are expected to occur, at the WIPP facility that are related to human health impacts. Potential differences in human health impacts are presented for the 50-mile population surrounding the WIPP facility, the MEI, and workers.

3.14.1 Public Health Impacts from Normal Operations in the Region of Influence

Population Impacts. For the Proposed Action in this 2026 WIPP SA, the two major factors that would affect potential health impacts from WIPP facility operations involve: (1) population changes in the ROI (i.e., the 50-mile radius around the WIPP facility) and (2) the longer duration of waste emplacement operations (i.e., waste emplacement is estimated to continue until 2083, which is 50 years longer than the 35 years evaluated in the 1997 SEIS-II). In addition to these two major factors, the updated dose-risk factor would have a minor effect on the estimate of human health impacts to the public. These changes are detailed in sections 2.5.1 and 2.5.2. This 2026 WIPP SA evaluates the potential changes related to human health for each of these factors.

Table 3-8 presents the 50-mile population dose for WIPP operations over approximately the past five years (2018-2022). Future doses to the 50-mile population surrounding the WIPP facility are expected to be similar to the doses received from 2020 through 2024, as waste emplacement operations would be similar. Between 2020-2024, the average annual dose to the 50-mile population was 1.1×10^{-5} person-rem/year, which equates to an annual LCF risk of 6.6×10^{-9}. Over the next 60 years of operation, the total additional LCFs to the 50-mile population would be 4.0×10^{-7}.

Table 3-8. 50-Mile Population Dose from WIPP Operations

Year	Public Dose (person-rem/year)
2020	3.7×10^{-6}
2021	1.8×10^{-5}
2022	1.4×10^{-5}
2023	1.2×10^{-5}
2024	6.5×10^{-6}
5-year average (2020-2024)	1.1×10^{-5}

Source: DOE 2021c, DOE 2022d, DOE 2023a, DOE 2024c, DOE 2025c.

The 1997 SEIS-II evaluated the potential dose to the 50-mile population surrounding the WIPP facility from normal operations (DOE 1997a [Table 5-11]) and estimated 3.0×10^{-4} LCFs occurring in the exposed population from operations over the WIPP facility lifetime (until approximately 2033) for the Preferred Alternative. Under the Proposed Action, approximately 4.0×10^{-7} LCFs could occur in the 50-mile population from operations over the next 60 years. This is about 1,000 times less than the impacts presented for the Preferred Alternative in the 1997 SEIS-II.

MEI Impacts. The MEI is a hypothetical member of the public residing at the WIPP Exclusive Use Area fence line (defined as the 290-acre area containing the WIPP facility that is surrounded by a barbed wire fence, posted "no trespassing," and restricted to DOE use only). Table 3-9 presents the MEI dose for WIPP operations over approximately the past five years (2020-2024). Future doses to the public MEI are expected to be similar to the doses received from 2020 through 2024, as waste emplacement operations would be similar. The DOE expects that the average public MEI dose from implementing the Proposed Action would be no greater than 1.0×10^{-3} mrem/year, which is a conservative estimation.[14] This equates to a maximum annual LCF risk of 6.0×10^{-10}. Over the next 60 years of operation, the total LCF risk to the MEI would be 3.6×10^{-8}.

Table 3-9. Public MEI Dose from WIPP Operations

Year	Public MEI Dose (mrem/year)
2020	3.4×10^{-5}
2021	3.2×10^{-6}
2022	2.5×10^{-6}
2023	1.5×10^{-6}
2024	2.0×10^{-6}
5-year average (2020-2024)	8.9×10^{-6}

Source: DOE 2021c, DOE 2022d, DOE 2023a, DOE 2024c, DOE 2025a.

The 1997 SEIS-II evaluated the potential dose to the public MEI (DOE 1997a [Table 5-11]) and estimated that the risk of an LCF to the public MEI would be 3.0×10^{-7} over the lifetime of operations (35 years) for the Preferred Alternative. This equates to a maximum annual risk of 8.6×10^{-9} LCF. The potential annual risk of an LCF to the public MEI from implementation of the Proposed Action (6.0×10^{-10} LCF) would be less than the estimated value in the 1997 SEIS-II (8.6×10^{-9} LCF). Although waste emplacement over a longer period would increase the lifetime MEI risk, the additional lifetime risk (3.6×10^{-8} LCF) would remain below the estimated value in the 1997 SEIS-II (3.0×10^{-7} LCF).

3.14.2 Worker Dose from WIPP Operations

This section evaluates the differences or changes that have occurred, or are expected to occur, at the WIPP facility that are related to worker health impacts. Three main factors are used to minimize potential worker exposures from WIPP facility operations: (1) using appropriate personal protective equipment; (2) minimizing times of exposure; and (3) configuring the U/G

[14] As shown in Table 3-9, the MEI doses from WIPP facility operations over the past five years have averaged 8.9×10^{-6} mrem/year; consequently, an estimated annual dose of 1×10^{-3} mrem/year is very conservative.

ventilation so that airflow is typically away from the involved workers towards areas of potential contamination and then to the HEPA filtration system.

Table 3-10 depicts actual worker dose information from WIPP facility operations from 2018 through 2022. For comparison, aggregated historical doses are provided from 1999 through 2017. Data are presented for the total effective dose to all workers, the average dose to a worker, and the maximally exposed worker dose. Per 10 CFR 835.202, *Occupational Dose Limits for General Employees*, the occupational dose received by general employees shall be controlled such that a total effective dose of 5,000 mrem (i.e., 5 rem) for an employee is not exceeded in any one year.

Table 3-10. WIPP Facility – Annual Worker Dose

Receptor	1999-2019 (annual avg.)	2020	2021	2022	2023	2024	2020-2024 (annual avg.)
Number of workers monitored	713	398	423	708	844	836	641
Number of workers with measurable dose	45	67	78	25	9	15	38.8
Total effective worker dose (person-rem/yr)	0.80	1.1	1.3	0.45	0.163	0.268	0.65
Average worker dose (mrem/yr)	16.8	17	16	16	18	17	16.8
Maximally Exposed Worker (mrem/yr)	<250[a]	<100	<100	<100	<100	<100	<100

Between 1999 and 2019, the annual maximally exposed worker dose was less than 100 mrem, except in 2010 when the dose was less than 250 mrem. Source: DOE 2024b.

The 1997 SEIS-II estimated the radiological impacts to workers at the WIPP facility from emplacement operations to be less than or equal to 1.0 LCF over the 35-year lifetime of operations (DOE 1997a [Table 5-13]). This equates to a maximum annual risk of 3.0×10^{-2} LCFs to all workers, which results in a collective dose of 50 person-rem/year. As shown on Table 3-10, the actual annual collective worker doses are well below the estimates evaluated in the 1997 SEIS-II. For the Proposed Action, the DOE estimates that the annual dose to workers conducting future operations at the WIPP facility would be similar to the actual annual doses that have been measured. Thus, based on an annual total effective dose of 0.98 person-rem per year, the Proposed Action would result in approximately 0.04 LCFs over the next 60 years, or 6×10^{-4} LCFs annually. Lastly, any human health impacts from decommissioning and closure of the WIPP facility under the Proposed Action would be essentially the same as described in the 1997 SEIS-II for the Preferred Alternative, although it would occur at a later date.

Table 3-11 presents a comparative summary of the human health impacts for the public and workers for the Proposed Action in this 2024 SA versus the 1997 SEIS-II. As shown in that table,

all dose estimates for the Proposed Action are below estimates for the Preferred Alternative in the 1997 SEIS-II.

Table 3-11. Comparative Summary of Human Health Impacts

1997 SEIS-II vs. 2024 SA	MEI LCF[a]	Population LCF[a]	Worker LCF[a]	MEI LCF[b]	Population LCF[b]	Worker LCF[b]
1997 SEIS-II (35 years of operation)	8.6×10^{-9}	8.6×10^{-6}	3.0×10^{-2}	3.0×10^{-7}	3.0×10^{-4}	1.0
2024 SA (50 additional years of operation)	6.0×10^{-10}	5.8×10^{-9}	5.9×10^{-4}	3.6×10^{-8}	3.5×10^{-7}	2.4×10^{-2}

a. Annual Impacts
b. Total Impacts over Lifetime of Operations

3.15 Facility Accidents and Intentional Destructive Acts

3.15.1 Facility Accidents

The principal operations at the WIPP facility involve the receipt and disposal of TRU waste. The WIPP facility CH TRU waste operations considered in the *Waste Isolation Pilot Plant Documented Safety Analysis* (WIPP 2025) include the processes for receipt, movement, and emplacement of CH TRU waste containers with battery-powered and diesel-fueled forklifts, electric-powered automated guided vehicles, cranes, and the waste hoist. The DOE uses the safety analysis process to describe and analyze the hazards and risks associated with the WIPP facility (i.e., site-wide operations). Regarding the condition of the existing environment, the safety basis demonstrates that the DOE employs the necessary controls to provide an acceptable level of safety compliance with 10 CFR 830, Subpart B.

Transuranic waste eligible for disposal at the WIPP facility is characterized to demonstrate that it meets the WIPP WAC, including defined Pu-239 fissile-gram equivalents (FGE) limits based on individual containers and the WAP. The planning-basis WAC has established material-at-risk limiting criteria for both CH TRU and RH TRU wastes, which define the maximum allowable quantities of fissile material permitted in the differing waste packages accepted at the WIPP facility. The planning-basis WAC allows up to 200 Pu-239 FGEs for a 55-gallon drum, 325 Pu-239 FGEs for a ten-drum overpack and a standard waste box, and 380 FGEs for a criticality control overpack.

Each disposal accident scenario analyzed in the 1997 SEIS-II for the Preferred Alternative utilized the planning-basis WAC. Assessed annual occurrence frequency and radiological consequences were based on TRU waste handling operations at the surface, CH TRU waste emplacement operations, and RH TRU waste emplacement operations. In support of this 2026 WIPP SA, the DOE prepared a report entitled, “Facility Accident Analysis Technical Report” (DOE 2023c), to provide an overview of the approach used to assess the human health risks that could directly result from the probabilities (i.e., expected frequencies) and consequences (i.e., unmitigated doses) of potential accident scenarios/events associated with the receipt, handling, and disposition of TRU wastes (both CH and RH) at the WIPP facility. Because there have been no substantive changes to the planning-basis WAC or the modes/types of principal operations at the WIPP facility since

the SEIS-II was published, the annual occurrence frequencies and the radiological consequences of the previously assessed WIPP facility disposal accidents remain unchanged. Accordingly, the DOE determined that the Proposed Action of this 2026 WIPP SA would have no additional impacts to (or upon) the facility accident scenarios that were previously evaluated in the 1997 SEIS-II for the Preferred Alternative (*see* DOE 2023c).

The 1997 SEIS-II evaluated eight potential accidents that could occur at the WIPP facility during emplacement operations (*see* DOE 1997, Table 5-18, "WIPP Disposal Accident Scenarios for the [Preferred Alternative]"). These accidents include container drops, a container fire, a hoist failure, a roof fall, and a container breach. Table 5-19, "Radiological Consequences of WIPP Disposal Accident Scenarios for the [Preferred Alternative]," of the 1997 SEIS-II shows the consequences for each of these individual accident scenarios. Of note, one additional accident event was added to this 2026 WIPP SA given its recent actual occurrence in February 2014: an U/G exothermic event resulting in the energetic breaching of a waste container.

The 2021 site-wide SA (DOE 2021) evaluated changes that occurred from 2009 through 2021, including reasonably foreseeable activities. During this period, the DOE had performed and ultimately documented a comprehensive revision of the WIPP DSA hazards analysis (WIPP 2025). The updated analysis included potential exothermic chemical reactions in noncompliant containers at the WIPP facility and the resultant propagation of fires involving/impacting multiple nearby waste containers. The unmitigated dose to the public MEI from this event was estimated at 3.1 rem (2×10^{-3} probability of an LCF). In comparison, the 1997 SEIS-II estimated the probability of an LCF to the public MEI from a container fire to be 4×10^{-3} (applying the updated dose-risk factor would increase this to approximately 5×10^{-3} LCFs). As such, it was determined that the potential MEI impacts of an exothermic chemical reaction in a noncompliant container would be bounded by the container-fire analysis performed in the 1997 SEIS-II. As a point of additional comparison, the new container-breach scenario evaluated in this 2026 WIPP SA estimates a dose of 4.1 rem (2.5×10^{-3} probability of an LCF), which is still well below the SEIS-II's 4×10^{-3} LCF value.

Moreover, in the 1997 SEIS-II (Table 5-19), the probability of an LCF to an exposed worker from a container fire was estimated to be 3×10^{-3} (applying the updated dose-risk factor would increase this to 4.5×10^{-3}). Using reported data from the aforementioned 2014 container-breach radiological release event, the exposed worker dose of "<100 mrem" equates to an LCF probability of less than 6×10^{-5}. Accordingly, the potential dose to the exposed worker from a container fire thus remains bounded by the original values estimated in the 1997 SEIS-II by roughly two orders of magnitude.

Lastly, as provided in the 1997 SEIS-II (Table 5-19), the radiological impact to the aggregate population from a container fire was estimated to be 0.3 LCFs. Adjusting for population increases and applying the updated dose-risk factor, this value would increase from 0.3 LCFs to about 0.5 LCFs. As such, the associated risk to the aggregate population associated with the Proposed Action of this 2026 WIPP SA would result in a negligible change compared to the impacts previously analyzed in the 1997 SEIS-II for the Preferred Alternative.

With regard to non-radiological accidents, potential annual impacts would likely be similar to the impacts previously analyzed in the 1997 SEIS-II for the Preferred Alternative because annual operations would be similar. Any accident impacts from decommissioning and closure of the WIPP facility under the Proposed Action would be essentially the same as described in the 1997 SEIS-II for the Preferred Alternative, although it would occur at a later date.

3.15.2 Intentional Destructive Acts

The potential impacts from intentional destructive acts (IDAs) (i.e., acts of sabotage or terrorism) would be similar to the impacts of a severe accident scenario as originally analyzed in the 1997 SEIS-II Preferred Alternative. The initiating forces and resulting quantities of radioactive or hazardous materials potentially released by an IDA would be similar to those for severe accident scenarios. Intentional destructive acts and severe accident scenarios both involve the same containers with the same radionuclide loadings. The hoist-failure accident scenario (*see* Table 7 of the "Facility Accident Analysis Technical Report" [DOE 2023c]) would be expected to bound any IDA scenario by a considerable margin.

The 1997 SEIS-II estimated the probability of an LCF to the public MEI from a hoist failure, which is considered the worst accident scenario, to be 0.08. When applying the dose-risk factor changes put into place since the issuance of the 1997 SEIS-II, the probability of an LCF to the public MEI from a hoist failure is determined to be about 0.1. The potential impacts from the implementation of the Proposed Action would result in a negligible change compared to the impacts previously evaluated in the 1997 SEIS-II for the Preferred Alternative. The SEIS-II's estimated radiological impacts to the aggregate population from a hoist failure was approximately five LCFs; adjusting for population increases and applying the updated dose-risk factors, the risk would increase to approximately eight LCFs (*see* Table 7 of the "Facility Accident Analysis Technical Report" [DOE 2023c]). As such, the IDA radiological risk to the aggregate population associated with the Proposed Action would result in a moderate increase as compared to the impacts previously analyzed in the 1997 SEIS-II for the Preferred Alternative.

4.0 CUMULATIVE IMPACTS

4.1 Introduction

This section discusses the potential cumulative impacts resulting from the Proposed Action. DOE's NEPA Implementing Procedures do not provide a definition of cumulative impacts; therefore, for the purpose of this SA and for continuity with prior NEPA analyses, DOE defines "cumulative impacts" consistently with previous SAs and NEPA analyses of WIPP operations.

> … effects [or impacts] on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

For the purposes of this SA, DOE will apply its discretion to analyze cumulative impacts as consistent with the U.S. Supreme Court's May 29, 2025, decision in Seven County Infrastructure Coalition v. Eagle County,[15] which stated that federal agencies may reasonably focus their environmental reviews on the direct impacts of the projects under review, without accounting for environmental effects of unrelated or future projects, particularly those within the jurisdiction of other regulators.

For the purposes of this SA, DOE views cumulative impacts as the total effects on a resource (e.g., land, air, water, soil), ecosystem, or human community of that action. It is possible that a potential impact that may be small by itself could result in a moderate or large cumulative impact when considered in combination with the impacts of other actions on a particular affected resource. For example, if a resource is regionally declining or imperiled, even a small, individual impact could be substantial if it contributes to or accelerates the overall resource decline.

Cumulative impacts can also result from spatial (geographic) and/or temporal (time) crowding of environmental perturbations (i.e., concurrent human activities and the resulting impacts on the environment are additive if there is insufficient time for the environment to recover). The geographic area over which reasonably foreseeable future actions could contribute to cumulative impacts is dependent on the type of resource considered.

4.2 Methodology and Assumptions

The following approach was used to estimate cumulative impacts for this 2026 WIPP SA:

- In general, potential cumulative impacts are determined by considering the baseline affected environment, the Proposed Action, and other regional current and reasonably foreseeable future actions. The baseline affected environment, which is described in Section 3 of this 2026 WIPP SA, includes the impacts of past actions and ongoing WIPP

[15] *Seven County Infrastructure Coalition v. Eagle County*, 605 US 168 (2025).

operations and serves as the baseline for the cumulative impacts analysis. That section also discusses the impacts of the Proposed Action.

- Regional current and reasonably foreseeable future actions include projects and activities that could result in impacts to resources, ecosystems, or human communities within the defined ROI. These current and reasonably foreseeable future actions are described in Section 4.3.

- In its discretion, DOE is choosing to assess cumulative impacts in this 2026 WIPP SA by combining the effects of the Proposed Action with the impacts of other present and reasonably foreseeable future actions in the ROI. Many of these actions occur at different times and locations, and the potential impacts may not be truly additive. For example, actions affecting air quality occur at different times and locations across the ROI; therefore, it is unlikely that the impacts would be completely additive. DOE is choosing an approach that produces a conservative estimate of cumulative impacts, so this analysis combines the effects irrespective of the time and location of the impact.

- This cumulative impact analysis is conducted for all resource areas identified with impacts analyses in Section 3. Some cumulative impacts analyses are quantitative, while others are limited to a qualitative discussion.

4.3 Current and Reasonably Foreseeable Future Actions

In addition to the Proposed Action evaluated in this 2026 WIPP SA, other regional actions that may contribute to cumulative impacts include off-site projects conducted by federal, state, and local governments or the private sector that are within the ROIs of this 2026 WIPP SA. DOE is choosing to include these regional actions in its analysis. Information on current and reasonably foreseeable future regional actions was obtained by reviewing publicly available information for the region, site-specific actions, and relevant NEPA documents.

In addition to the WIPP facility, there are currently three facilities in southeastern New Mexico that are licensed to handle nuclear material, and another facility that intends to apply for a license. The DOE used the Nuclear Regulatory Commission (NRC) EISs (or supporting documents) for these facilities, the management plans for the BLM-owned lands in the vicinity, and other publicly available information to determine past, present, and reasonably foreseeable future actions in the vicinity of the WIPP facility. Table 4-1 summarizes the current and reasonably foreseeable future actions.

Table 4-1. Projects and Other Actions Considered in the Cumulative Impacts Analysis

Project Name	Summary of Reasonably Foreseeable Projects	Status/ Schedule
National Enrichment Facility (NEF)	There is an operating uranium enrichment facility known as the NEF near Eunice, New Mexico, approximately 50 miles east of the WIPP facility. It is the only operating commercial enrichment facility in the U.S., producing approximately one-third of the nation's annual enriched uranium for commercial nuclear power reactors (NRC 2022). The NRC licensed the NEF in 2006 for 30 years, and it began operation in 2010 (NRC 2005).	Ongoing
International Isotopes Fluorine Products, Inc. (IIFP) Fluorine Extraction and Depleted Uranium Deconversion Plant (FEP/DUP)	In October 2012, the NRC issued a license to IIFP for construction and operation of a depleted uranium deconversion facility. The FEP/DUP, which would be located east of Hobbs, New Mexico, and approximately 40 miles northeast of the WIPP facility, would convert depleted uranium hexafluoride into fluoride products for commercial resale and uranium oxides for disposal (NRC 2012). Since the issuance of the license, no construction activities have occurred.	Planned
Eden Medical Isotopes Production Facility	On June 11, 2019, Eden informed the NRC of its intent to submit a license application to construct and operate a Medical Isotopes Production Facility to possess and transport molybdenum-99 for medical applications. Eden has stated its intent to build their facility east of Eunice, New Mexico, 1.9 miles west of the New Mexico-Texas state line approximately 60 miles east of the WIPP facility (Eden 2019). To date, no NRC license has been issued and no construction activities have occurred.	Planned
Solar Energy Projects	New Mexico has a high potential for solar energy generation. Within the region, there are six operating solar power facilities: one in Eddy County and five in Lea County (EIA 2022a). According to New Mexico's Energy, Minerals, and Natural Resources Department, New Mexico has plans to generate an additional 1,103 MWh of energy from solar sources within the state of New Mexico (NMEMNRD 2017).	Ongoing and Planned
Electrical Grid Improvements	New Mexico is within the Southwest Power Pool (SPP) transmission planning area. In a 2024 Integrated Transmission Planning (ITP) market economic modelling effort, the New Mexico area was identified as having significant emergency energy issues indicating there is not enough transmission to deliver energy (SPP 2024 Integrated Transmission Planning Assessment Report, SPP Engineering, V. 1.0, 2025). The list of ITP Projects for SPP includes a proposed 293-mile long Phantom-Crossroads-Potter 765 kV transmission line leading from Texas into southeast New Mexico. Phantom is an Xcel substation located approximately 15 miles southwest of WIPP. The need date listed for this project is January 2025.	Ongoing and Planned

Project Name	Summary of Reasonably Foreseeable Projects	Status/ Schedule
Mining and Oil and Gas Development	The Permian Basin is one of the largest and most active oil basins in the U.S. and has recently risen to be the world's top oil producer. It covers more than 86,000 square miles, stretching approximately from Lubbock, Texas, to the Rio Grande and into southeast New Mexico. The area continues to be the focus of extensive exploration, leasing, development, and production of oil and gas with the most heavily concentrated area of wells being located in eastern Eddy County and western Lea County. The WIPP facility is located in the Permian Basin oil hub, near the Lea County and Eddy County borders. Lea County and Eddy County are consistently the top two producers of oil in the state and rank in the top five in gas production. The oil and gas industry in the region is anticipated to continue to have stable production output with some expansion over the foreseeable future (EIA 2022b, BLM 2018). Potash mining is also a major part of Lea County and Eddy County economies. Mosaic and Intrepid Mining LLC (Intrepid), the two largest producers of potash in New Mexico, have multiple operations in both counties. Caliche is mined near the surface and is crushed for use in surface roads and pads for the oil and gas industry, as well as other road construction activities. There is one caliche mine in Eddy County, and although caliche forms the basis of the Llano Estacado throughout northern and central Lea County, desirable caliche only occurs sporadically in the southern portion of Lea County. Both Lea County and Eddy County have high potential for the development of caliche, and as the oil and gas industry continues to grow over the next 20 to 30 years, the demand for caliche will increase (BLM 2018). Salt has been mined since 1931 in the vicinity of the WIPP facility with variable production. There are currently three salt mines in Eddy County. According to BLM (BLM 2018), the potential for development of salt mines is high, but because of the unpredictable demand, it is not possible to anticipate the actual land development areas.	Ongoing and Planned

4.4 Cumulative Impacts by Resource Area

4.4.1 Introduction

Section 3 of this 2026 WIPP SA presents the potential environmental impacts associated with the Proposed Action. This section combines Section 3 impact information with the potential impacts from current and reasonably foreseeable future actions identified in Table 4-1. The potential cumulative impacts (Sections 4.4.2–4.4.15) are presented in the same order as the resource analyses in Section 3.

4.4.2 Land Use and Management

Land use impacts result from (1) land disturbance, (2) interruption, reduction, or impedance of livestock grazing and open wildlife areas, (3) land access, and (4) competition for mineral rights. The Proposed Action could disturb approximately 157 acres (50 acres for the salt pile and pond, five acres for new facilities, and 102 acres for solar arrays) of land. One-hundred and fifty-seven (157) acres represents 1.6 percent of the total WLWA. None of the projects identified in Table 4-1 would disturb land within the WLWA, and thus there would be no cumulative impacts within the WLWA. The cumulative impacts on land use were not assessed beyond six miles from the WLWA because, at that distance, land use would not be anticipated to influence or be influenced by the WIPP facility. Because of the low population density and the absence of any major land development in the area within six miles of the WLWA, there is very low potential for notable cumulative land impacts.

4.4.3 Visual Resources

Most of the land around the WIPP site is largely undeveloped and isolated, consistent with a VRM Class I or II rating. Implementation of the Proposed Action would have a minor impact on visual resources, would not change the existing VRM Classes, and would not introduce a wholly new visual feature. None of the projects identified in Table 4-1 would cause visual resource impacts within the WLWA, and thus there would be no cumulative impacts within the WLWA. Cumulative visual and scenic impacts outside of a six-mile radius of the WLWA were not evaluated because the WIPP facility would not influence visual and scenic resources. Within approximately six miles of the WLWA, the ongoing and reasonably foreseeable projects include oil and gas exploration and production, and potash mining. Expansion or development of future oil-, gas-, and potash-related projects would have an additional impact on the visual and scenic resources of the area because of increased vehicle traffic, land disturbances, landscape changes, heavy equipment use, and construction and maintenance of project facilities and infrastructure (e.g., roads, pipelines, electric lines, industrial sites, and associated ancillary facilities). Because of the low population density and the absence of any other major development within six miles of the WLWA, there is very low potential for notable cumulative visual resource impacts.

4.4.4 Geology and Soils

The Proposed Action could disturb approximately 157 acres (50 acres for the salt pile and pond, five acres for new facilities, and 102 acres for solar arrays) of soil. Potential impacts would be limited to soil disturbance, soil erosion, and potential soil contamination. Because of soil

disturbance, the potential for increased soil erosion due to stormwater runoff and wind would increase during construction. The DOE would implement mitigation measures to limit soil loss, avoid soil contamination, and minimize stormwater runoff impacts. None of the projects identified in Table 4-1 would disturb soils or geological resources within the WLWA, and thus there would be no cumulative impacts within the WLWA.

Outside of the WLWA, other reasonably foreseeable future actions include livestock grazing, oil and gas production, potash exploration and mining, and implementation pf solar projects. Surface-disturbing activities related to these actions, such as construction of new access roads and drill pads and overburden stripping, would have direct impacts on geological and soil resources. Direct effects on geology and soils from these activities would be limited to excavation and relocation of disturbed bedrock and unconsolidated surface materials associated with surface disturbances. Impacts from these activities include loss of soil productivity due primarily to wind erosion, changes to soil structure from soil handling, sediment delivery to surface water resources (i.e., runoff), and compaction from equipment and livestock pressure.

Sinkholes and karst fissures formed in evaporative bedrock are common features of the lower Pecos region of southeastern New Mexico. New sinkholes form almost annually, often associated with upward artesian flow of groundwater from regional karstic aquifers that underlie evaporitic rocks at the surface. A number of these sinkholes are of anthropogenic (man-made) origin and are associated with improperly cased abandoned oil and water wells or with solution mining of salt beds in the shallow subsurface. The potential for sinkhole development within and surrounding the WIPP facility project area is low because no thick sections of soluble rocks are present at or near the land surface.

Reclamation and restoration of soils disturbed by historic livestock grazing and non-DOE oil and gas exploration activities would mitigate loss of soil and soil productivity, and salvaged and replaced soil would become viable soon after vegetation is established. Impacts to geology and soils from solar energy projects include use of geologic resources (e.g., sand and gravel) and increased soil erosion. Sand and gravel and/or quarry stone would be needed for access roads. Concrete would be needed for buildings, substations, solar panel array pads and/or foundations, and other ancillary structures. These materials would be mined from commercial surface mines located as close to the potential solar energy site as possible, potentially near Hobbs or Carlsbad. Any impacts to geology and soils would be largely limited to the proposed project area. Erosion controls that comply with county, state, and federal standards would be applied. Implementation of BMPs would limit the impacts from earthmoving and construction activities.

4.4.5 Water Resources

Facility design for new buildings and solar arrays would incorporate stormwater controls to maintain stormwater flow rates, flow volumes, and durations that were present before development. The implementation of controls would minimize potential erosion, impacts to stormwater quality, and alteration of existing drainage patterns during construction and operations under the Proposed Action. To ensure that the WIPP facility operations are not impacting groundwater quality, Discharge Permit 831 (DP-831) requires monitoring of the sewage treatment facility, stormwater ponds, salt storage ponds, salt storage cells, and shallow/perched groundwater

wells. In addition, the HWFP requires annual monitoring of six deep detection monitoring wells located within the Culebra for contaminants related to WIPP operations (DOE 2025c).[16]

Impacts on surface water resources from the continued development of the oil and gas and potash industries in the surface water geographic scope would include runoff from disturbed areas and leaks or spills of fuels or lubricants from equipment or operations. Oil and gas development activities and potash mining is monitored and regulated by the State of New Mexico, U.S. Department of the Interior, and the BLM (NRC 2022). Also, industrial operations would be required to obtain an NPDES industrial stormwater permit, which may require a SWPPP, thus protecting surface water resources in the area.

Impacts on groundwater resources from the continued development of the oil and gas and potash industries would include the consumptive use of water and potential contamination because of improperly plugged or cased wells, which could impact groundwater quality through infiltration to near-surface aquifers. Eddy County is currently making improvements to the Double Eagle Water System in anticipation of the increased water demand for oil and gas production as well as potash mining and will provide water to Eddy County and the northwestern portion of Lea County (Onsurez 2018). Impacts from construction of these facilities would be subject to the same monitoring, mitigation, and response programs required to limit potential groundwater quality impacts. Construction and operation of the facilities would be monitored by the New Mexico Oil Conservation Commission, State of New Mexico, DOI, and the BLM (NRC 2022). The DOE anticipates that groundwater quality protections required during the operation of oil-, gas-, and potash-related facilities would be adequate to protect groundwater quality in the area near the WIPP facility.

4.4.6 Air Quality

The effects of past and present activities on the region's air quality are represented in the USEPA's NAAQS compliance status. Both Eddy County and Lea County are attainment areas for all six of the criteria pollutants under the NAAQS. Construction or modification of facilities under the Proposed Action would result in minor emissions of criteria air pollutants, of which particulate matter would be a primary concern. However, emissions would be less than *de minimis* values for all pollutants. Construction emissions would be minimized using water to control dust emissions from exposed areas, revegetation of exposed areas, watering of unpaved roadways, and minimizing construction activities under dry or windy conditions.

All of the projects identified in Table 4-1 would generate gaseous emissions at some level. In particular, the Permian Basin is one of the largest and most active oil basins in the U.S. Activities associated with oil and gas contribute to the air emissions generated within Eddy County and Lea County. The future pollutant levels generated within the region would be based on (1) the emission level trends for the existing sources and activities and (2) the new emissions from reasonably foreseeable future actions. The BLM conducted air dispersion modeling to support their update of the Carlsbad Regional Management Plan. To analyze future cumulative impacts, modeling was conducted by the BLM using an emission inventory based on the estimated emissions in the year

[16]Details regarding the requirements of DP-831 and measures taken by the DOE to protect groundwater quality can be found at: https://wipp.energy.gov/Library/EMP/99-2194_REV_16.pdf.

2028. The results predicted that the air quality for the geographic scope of the analysis for this EIS would continue to meet the NAAQS (NRC 2022). Therefore, the DOE expects the future air quality in the geographic scope of the analysis would remain good.

4.4.7 Noise

For the Proposed Action, operations would not increase noise levels over existing activities, although there could be some minor additional noise due to construction activities and additional worker traffic. Near the WIPP facility, only the ongoing and reasonably foreseeable actions related to oil and gas production and exploration and potash mining are considered because they occur within the geographic scope. Expansion or development of future oil-, gas-, and potash-related projects would have an impact on noise resources of the area because of increased vehicle traffic, heavy equipment use, and construction and maintenance of project facilities and infrastructure (e.g., roads, oil pump jacks, pipelines, electric lines, processing sites, and associated ancillary facilities). These projects have the potential to contribute to the ambient noise (i.e., background noise) of the area. The largest temporary impacts to noise would be associated with the construction of facilities. However, OSHA standards would limit the amount of noise generated from these sites. Administrative controls implemented by the New Mexico Oil Conservation Commission, DOI, State of New Mexico, and the BLM would also monitor and regulate oil and gas development activities and potash mining activities within the area, further reducing the likelihood of noise impacts from coinciding construction activities.

4.4.8 Biological Resources

Under the Proposed Action, potential impacts to biological resources could include erosion and sedimentation, human disturbance, and noise. Most projects under the Proposed Action would be on previously disturbed land and all are within the WLWA. Beyond removal of existing grasses in some construction areas, there would be no impacts to biological resources. In addition, the presence of human activity and associated construction noise can cause wildlife species to avoid habitats surrounding a construction site; however, no new impacts to wildlife species are expected from human presence and noise from construction.

There are no known species of plants or animals within the WLWA that are protected by the *Endangered Species Act* and no critical habitat designated for threatened or endangered species has been identified within the WLWA; therefore, there would be no impacts to special status species from construction or operation activities from the Proposed Action.

None of the projects identified in Table 4-1 would disturb biological resources within the WLWA, and thus there would be no cumulative impacts within the WLWA. The cumulative impacts on biological resources were not assessed beyond six miles from the WLWA because, at that distance, biological resource impacts would not be influenced by the WIPP facility. Because of the low population density and the absence of any major land development in the area within six miles of the WLWA, there is very low potential for cumulative impacts to biological resources.

4.4.9 Cultural Resources

Potential impacts to cultural resources from the Proposed Action could occur primarily as a result of construction activities and land disturbance. Measures for ensuring protection of known archaeological and historic resources, or others that may be inadvertently discovered during ground-disturbing activities, are discussed in the Waste Isolation Pilot Plant Land Management Plan (DOE 2026). These measures include identifying, inventorying, evaluating, and treating cultural resources under the *National Historic Preservation Act of 1966*. The DOE will avoid, to the maximum extent possible, sites found eligible for inclusion in the NRHP. Where avoidance is not possible, mitigation measures will be developed under the Joint Powers Agreement with the State of New Mexico.

None of the projects identified in Table 4-1 would disturb cultural resources within the WLWA, and thus there would be no cumulative impacts within the WLWA. The cumulative impacts on cultural resources were not assessed beyond six miles from the WLWA because, at that distance, cultural resource impacts would not be influenced by the WIPP facility.

4.4.10 Socioeconomics

The Proposed Action would have minor beneficial effects associated with temporary employment of construction personnel and transportation of goods and materials to the WIPP site. While no substantive changes in workforce staffing are anticipated, minor, temporary changes associated with construction activities may occur. Because the construction workforce (150 persons) would be negligible compared to the projected population in the ROI, socioeconomic impacts during construction, although beneficial, are expected to be negligible. The increase in economic activity would be temporary and would subside when construction is completed. Because the Proposed Action would have negligible beneficial socioeconomic impacts, no meaningful cumulative socioeconomic impacts are expected.

4.4.11 Infrastructure

During operations under the Proposed Action, annual electricity demand at the WIPP facility would be expected to increase to approximately 27 million kW-hr, consistent with past electrical demand growth. This increased demand would be met by the deployment of 102 acres of solar arrays.

On a state-wide level, New Mexico's electricity supply portfolio is dominated by coal (35.5 percent of supply), wind (30.2 percent), and natural gas (28.4 percent). In March 2019, Governor Michelle Lujan Grisham signed Senate Bill 489, which sets a zero-carbon resource standard for the state and increases the state's renewable portfolio standard to at least 80 percent renewable energy by 2050. New Mexico has substantial wind, solar, hydroelectric, biomass, and geothermal energy potential, and is expanding renewable energy supply. In the future, New Mexico's planned new electricity-generating capacity additions are expected to come from renewables or natural gas (Center for Strategic and International Studies [CSIS] 2023). New Mexico is experiencing some of the highest rates of solar irradiance (particularly on its southern border) and also has some of the best wind conditions (concentrated over the eastern plains) for energy production in the U.S. As such, due to continuous technological improvements and declining costs, renewables in New

Mexico are now cost competitive with traditional energy sources (CSIS 2023). Consequently, New Mexico is well-positioned to meet future energy demands expected in the region and across the state.

The Proposed Action is not expected to require any significant changes in water consumption related to either construction activities or operations. Water usage is expected to align with historical levels, which would be less than 7 million gallons per year (which equates to 21.5 acre-feet [AF] per year).[17] Table 4-2 provides information on water use in New Mexico. As shown in that table, withdrawals for all water use categories in New Mexico total approximately 3.1 million AF. Of this, surface water accounts for approximately 1.6 million AF (52 percent) of the total withdrawals, and groundwater accounts for 1.5 million AF (48 percent) of the total withdrawals. Most (76 percent) of the state-wide water withdrawals are used for irrigated agriculture (NM State Engineer 2020). The cumulative actions in this 2026 WIPP SA would not be expected to significantly change either the categories of water use or the percentage of water use, as water use for irrigated agriculture is expected to remain dominant.

Table 4-2. Water Use in New Mexico

Category of Use	Surface Water Withdrawals (million AF)	Groundwater Withdrawals (million AF)
Irrigated Agriculture	1.47	1.5
Public Water Supply	0.07	0.23
Self-Supplied Domestic	0	0.03
Livestock	0.003	0.04
Commercial Uses	0.03	0.03
Industrial Uses	0	0.009
Mining	0.0004	0.06
Power Production	0.03	0.03
Evaporation	0.28	0.0
Total	**1.9[a]**	**1.9[a]**

a. "Total" may not calculate exactly due to rounding.
Source: NM State Engineer 2020.

4.4.12 Transportation

The transportation analysis in Section 3.12 addresses all reasonably foreseeable TRU waste transportation activities to the WIPP facility. Transuranic waste-related shipments and impacts represent a negligible part of general radioactive waste shipments and would not add appreciably to those cumulative impacts in either normal transportation or accident conditions.

4.4.13 Waste Management

Under the Proposed Action, the DOE would continue the uninterrupted disposal of defense-related TRU waste up to the Congressionally authorized WIPP LWA total TRU waste volume capacity limit of 175,564 m^3 by additional panel excavation. The maximum TRU waste volume estimates in this document represent cumulative TRU waste volume estimates and not the cumulative volume of the overpack disposal container(s). In addition, other proposed actions since publication

[17] One gallon equals 3.07×10^{-6} AF. The 7 million gallons/year of water demand at the WIPP facility equals 21.5 AF.

of the current ATWIR could change the cumulative TRU waste inventory for potential disposal at the WIPP facility. These actions will be incorporated, as appropriate, into future ATWIR cumulative TRU waste inventory estimates. However, none of the projects/actions identified in Table 4-1 would generate TRU waste and thus would not add to the cumulative TRU waste impacts addressed in this 2026 WIPP SA.

Transuranic waste volume estimates such as those provided in NEPA documents cannot be used to determine compliance with the WIPP LWA total TRU waste disposal volume capacity limit. The TRU waste estimates in the ATWIR change annually. Compliance with the WIPP LWA total TRU waste volume capacity limit is determined by proven and audited procedures and processes implemented for the WIPP facility by the CBFO. The CBFO monitors and tracks the actual defense-related TRU waste volume emplaced at the WIPP facility to ensure compliance with the WIPP LWA and will take action as appropriate in a timely and appropriate manner to ensure needs of the DOE complex are met.

4.4.14 Human Health

For the Proposed Action analyzed in this 2026 WIPP SA, the DOE conservatively expects that the MEI dose would be no greater than 1×10^{-3} mrem/year as a conservative estimation.[18] Because the other nuclear facilities (e.g., NEF, and FED/DUP) are dispersed throughout the region, it would be unlikely for any individual to receive the full annual estimated dose from all of these facilities (which sums to 40 mrem/year), and therefore, actual public doses would be a fraction of this total dose. Based on this analysis, the cumulative public dose to an individual from potential exposures to all of the other regional facilities would be below the NRC 10 CFR Part 20 annual public dose limit of 100 mrem and have a negligible contribution to the natural background radiation dose of 310 mrem/year (NRC 2022).

4.4.15 Accidents and Intentional Destructive Acts

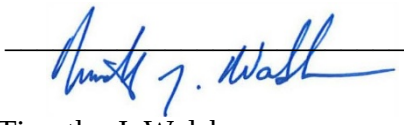
The DOE did not identify any reasonably foreseeable initiating events that could result in concurrent accident impacts from the WIPP facility and other nuclear-related facilities in southeastern New Mexico. Impacts from accidents and intentional destructive acts from each of the nuclear-related facilities in southeastern New Mexico would be independent of each other. As such, there would be no cumulative impacts associated with accidents and intentional destructive acts.

[18] As points of comparison, for NEF, the NRC estimates a maximum dose of 19 mrem/year to the MEI (NRC 2005); and for the FEP/DUP, the NRC estimates a maximum dose of 20.8 mrem/year to the MEI (NRC 2012).

5.0 CONCLUSION

The DOE has prepared this 2026 WIPP SA to evaluate the potential impacts of excavating and using additional TRU waste disposal panels to continue to dispose of defense-related TRU waste up to the WIPP LWA total TRU waste volume capacity limit in accordance with the preferred alternative decision in the 1998 ROD (DOE 1998). This 2026 WIPP SA considers any new circumstances or information relevant to environmental concerns in order for the DOE to determine whether the existing 1997 SEIS-II should be supplemented, a new SWEIS should be prepared, or no further NEPA analysis is required.

In accordance with the NEPA and DOE's NEPA Implementing Procedures, DOE prepared this supplement analysis to evaluate whether the changes to the proposed action require supplementing the existing environmental documents or preparing a new EIS. DOE has considered all relevant information included in the SA and project record and raised in the NEPA process. DOE concludes that the changes to the proposed action are not a substantial change relevant to environmental concerns, nor are there substantial new circumstances or information about the significance of the adverse effects. Consistent with DOE's NEPA implementing procedures Section 3.9, these changes do not require a new or supplemental EIS. No further NEPA documentation is required.



8/18/26

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