



Department of Energy
Carlsbad Field Office
P. O. Box 3090
Carlsbad, New Mexico 88221

JAN 21 2020

Mr. Kevin Pierard, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505

Subject: Response to the Referenced Technical Incompleteness Determination, Waste Isolation Pilot Plant Hazardous Waste Facility Permit Number: NM4890139088-TSDF

Reference: New Mexico Environment Department correspondence from Stephanie Stringer, Director, Resource Protection Division, to Kirk Lachman, Acting Manager, and Sean Dunagan, President and Project Manager, dated December 6, 2019; subject: Technical Incompleteness Determination of Class 3 Modification, Excavation of a New Shaft and Associated Connecting Drifts, Waste Isolation Pilot Plant, EPA I.D. Number NM4890139088

Dear Mr. Pierard:

Enclosed is the Permittees' response to the referenced Technical Incompleteness Determination.

We certify under penalty of law that this document and all attachments were prepared under our direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on our inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of our knowledge and belief, true, accurate, and complete. We are aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have any questions, please contact Mr. Michael R. Brown at (575) 234-7476.

Sincerely,

Signatures on File

Gregory Sosson, PE
Acting Manager
Carlsbad Field Office

Séan Dunagan
President and Project Manager
Nuclear Waste Partnership LLC

Enclosures (3)

cc: w/enclosures
R. Maestas, NMED * ED
D. Biswell, NMED ED
M. McLean, NMED ED
CBFO M&RC

*ED denotes electronic distribution

Enclosure 1
Response to Comments

Response to Comments

1. **Acronym List:** Please provide a list of the acronyms and their meanings for the various ventilation systems associated with the WIPP project (e.g., PVS, SVS, SSCVS) along with a short description for each and information on how they relate to one another including time periods of operation.

RESPONSE: The following provides descriptions and meanings of the acronyms used for underground ventilation systems associated with the WIPP facility. Definitions for cfm, acfm, and scfm are also provided below.

Definitions

- cfm: cubic feet per minute
- acfm: actual cubic feet per minute
 - This is the flow of the air at the density where the air reading is taken. The density of the air is dependent on the temperature, humidity, and barometric pressure.
- scfm: standard cubic feet per minute
 - This is the flow of the air at the standard density of 0.075 pounds/ft³

Acronym meanings, descriptions, and how the ventilation systems are related

- UVS – Underground Ventilation System
 - The Underground Ventilation System (UVS) is described in Permit Attachment A2, Section A2-2a(3) as follows:

The underground facilities ventilation system will provide a safe and suitable environment for underground operations during normal WIPP facility operations. The underground system is designed to provide control of potential airborne contaminants in the event of an accidental release or an underground fire.

The UVS is the system (equipment and procedures) that provides underground ventilation and includes the configurations of the system as described in the Permit.
- UVFS and IVS – Underground Ventilation Filtration System and Interim Ventilation System
 - The UVS consists of the Underground Ventilation Filtration System (UVFS) and the Interim Ventilation System (IVS). The UVFS, in conjunction with the IVS, provides high-efficiency particulate air (HEPA) filtration of the potentially contaminated exhaust airflow from the underground.
 - The UVFS is described in Permit Attachment A2, Section A2-2a(3) as follows:

The second group consists of three filtration fans, and each can provide 60,000 scfm of air flow. These fans, located at the Exhaust Filter Building, can be operated in the filtration mode, where exhaust is

diverted through HEPA filters, or in the reduced or minimum ventilation mode, where air is not drawn through the HEPA filters.

The Permit Figures A2-9a and A2-9b illustrate the UVS including the UVFS and IVS.

- The Permit Attachment A2, Section A2-2a(3) describes the IVS as follows:
The third group consists of two skid-mounted filtration fans and HEPA-filter assemblies, each of which can provide approximately 23,000 scfm of air flow. The skid-mounted filtration fan and HEPA-filter assemblies, referred to as the Interim Ventilation System (IVS) located south of the Exhaust Filter Building, are only operated in filtration mode, where exhaust is diverted through HEPA filters.

When the UVFS and/or the IVS are operating, the airflow in the shafts is configured as follows:

- Air Intake Shaft – not required for ventilation in this configuration
- Salt Handling Shaft – downcast
- Waste Handling Shaft – downcast
- Exhaust Shaft – upcast

- SVS – Supplemental Ventilation System

- The Supplemental Ventilation System (SVS) is described in Permit Attachment A2, Section A2-2a(3) as follows:

In addition to the surface fans, an underground fan has been installed to ventilate uncontaminated areas in the North and Construction Circuits. This system is referred to as the Supplemental Ventilation System (SVS) and will be used in conjunction with IVS (as shown in Figure A2-9b). When this fan is operating, the Salt Shaft will serve as an unfiltered exhaust shaft for the North and Construction Circuits. A portion of the airflow provide[d] by the SVS to the Construction Circuit can also be used to provide fresh air to the Disposal Circuit, if needed. In this case, the air from the Disposal Circuit will continue to be exhausted through the HEPA filtration system.

The unfiltered, uncontaminated exhaust air is exhausted through the Salt Handling Shaft, while 114,000 cfm of filtered air is exhausted through the Exhaust Shaft.

When the SVS is operating the airflow in the shafts is configured as follows:

- Air Intake Shaft – downcast
- Salt Handling Shaft – upcast
- Waste Handling Shaft – downcast
- Exhaust Shaft - upcast

- PVS – Permanent Ventilation System

- The Permanent Ventilation System (PVS) is the term used to describe the upgraded UVS. The DOE is currently funding two project line item upgrades to

the UVS, referred to as the Safety Significant Confinement Ventilation System (SSCVS) and Utility Shaft (US) projects. Initially, these projects were proposed as one project referred to as the PVS. As planning progressed, the PVS projects were separated into two project line items described below. Once the PVS upgrade to the UVS is complete, the term PVS will no longer be used as the SSCVS and US will become components of the UVS. Underground ventilation is ubiquitous in that it affects the entire underground facility regardless of facility configuration. Therefore, the ventilation uses for the SSCVS and the US will apply to both current and future facility configurations.

- SSCVS – Safety Significant Confinement Ventilation System
 - The SSCVS project consists of the construction and installation of the New Filter Building (NFB), the new exhaust fans, the Salt Reduction Building (SRB), and the associated appurtenances. While the SSCVS is now the DOE's preferred term for the upgraded UVFS, the Permit includes the acronyms/terms NFB or Building 416 and the SRB or Building 417 to describe the SSCVS project.
 - The upgraded UVFS is described in Permit Attachment A2, Section A2-2a(3) as follows:

Underground Ventilation Filtration System Description with Buildings 416 and 417

The Underground Ventilation Filtration System (UVFS) fans which are part of the New Filter Building (NFB) (Building 416) provide enhanced ventilation in the underground, sufficient to allow concurrent mining and waste emplacement while in filtration mode. The UVFS will provide filtered airflow through a surface mounted ventilation and filtration system. The intake duct to the surface ventilation and filtration facility is connected to the Exhaust Shaft. The exhaust from the underground will be directed to the salt reduction system located in the Salt Reduction Building (SRB) (Building 417).

Prior to passing through the NFB, air from the Exhaust Shaft may be directed through the SRB, which contains de-dusters, commonly used in the mining industry, and de-misters for salt dust and brine/water mist removal. The salt reduction system consists of multiple parallel de-dusting units. The exhaust from the de-dusting units is directed to the filter supply manifold and then to the filtration units. The de-duster and de-mister combination has a water wash down system that is connected to a water collection, treatment and sludge tank. The outlet of the water collection, treatment, and sludge tank is piped out of the SRB to an evaporative pond. Accumulated water and salt will be characterized and disposed of in accordance with WIPP facility standard operating procedures.

- US – Utility Shaft (S#5)
 - The Utility Shaft project is described in the Class 3 Permit Modification Request, *Excavation of a New Shaft and Associated Connecting Drifts, Overview of the Permit Modification Request* as follows:

The modification consists of a new shaft, designated as Shaft #5 (S#5), along with drifts to connect S#5 to the existing WIPP underground (UG) facility. The S#5 design is one of two projects referred to as the Permanent Ventilation System (PVS) upgrades. The PVS upgrades consist of S#5 with intake fans on the surface and a New Filter Building (NFB) with exhaust fans located on the surface of the facility. The NFB project was submitted as a separate PMR and was previously approved. The design of S#5 assumes that new exhaust fans and the NFB are operational and that the Exhaust Filter Building and associated ventilation fans, the Supplemental Ventilation System (SVS), and the Interim Ventilation System will no longer be operated. Shaft #5 will be located nominally 1,200 feet west of the Air Intake Shaft (AIS). Shaft #5 will be used as the primary air intake shaft for the underground repository.

The original DOE budget line item name of the project was “15-D-412 Exhaust Shaft.” The terms used to describe the project changed over time as engineering and design work matured. Engineering modeling and design work demonstrated that the best design for the PVS upgrades would be to use the new shaft as an intake shaft. Due to the change in design for S#5, the DOE budget line item name of the project was changed to “15-D-412 Utility Shaft.”

Time Periods of Operation

At present, the WIPP facility UVS operates the UVFS and the IVS in Filtration Mode.

The SVS may only be operated when the UVFS and IVS are operating. The SVS is operated when there is a need for the additional unfiltered exhaust air (i.e., mining the next panel).

The UVFS has been operating in filtration mode since February 2014. The IVS became operational in the fall of 2016, while the SVS became operational at the beginning of 2018. The anticipated date for the SSCVS to become operational is April 2022.

2. **Affected Permit Sections:** Please provide a tentative list of any additional sections of the Permit (e.g., in Attachments D, E, F, G) that will need to be updated later once the new shaft project has been completed.

RESPONSE: There may be some changes to Permit Attachment G2, *Waste Isolation Pilot Plant Shaft Sealing System Compliance Submittal Design Report*. Permit Attachment G2 specifically describes sealing the shafts as part of final facility closure. An examination of the geology of the S#5 location, based on the initial borehole, indicates that the current shaft sealing design can be

extended to S#5, however the specific design for sealing S#5 is dependent upon the geology of the shaft. The shaft must be excavated and mapped prior to being able to design the specific shaft closure in Permit Attachment G2 for S#5. Once a design evaluation has been completed, Permit Attachment G2 will be modified as appropriate via the regulatory process. No other changes to the Permit are anticipated once the S#5 project is completed.

3. **Construction Stages and Timeline:** Please provide a breakdown of the different stages of construction for the new shaft (e.g., pre-sinking activities, excavation, drift mining) along with a tentative timeline for these activities to include an estimate of when the associated drifts will be connected to the existing facility. How will operations be affected during this connection?

RESPONSE: The construction of S#5 will be performed in the stages with the respective approximate durations as shown in Table 1, Shaft Sinking Activities. The connection to the existing repository will not be made until approximately 34 months after the start of shaft pre-sinking activities. Prior to connecting S#5 and the new drifts to the existing repository, ventilation control structures (e.g., bulkheads) will be installed between the existing repository and the new connecting drifts. The purpose of the bulkheads is to maintain separation between Shaft #5 and the existing repository in order to minimize impacts to operations until start-up testing can be performed.

Table 1: Shaft Sinking Activities

Activity	Description	Approximate Duration (months)
Pre-sinking (0'-100')	This includes surface preparation and installation of the Galloway shaft-sinking platform.	6
Shaft Excavation (100'-2,275')	Sink S#5	12
Underground Station Development	This includes mining cut-outs for electrical equipment and vehicle turnarounds.	2
Drift Mining	This includes the two connecting drifts from S#5 to the existing repository.	12
Cold Testing	Testing of components such as fans and electrical gear prior to incorporation into the UVS.	2
Connection to Existing Repository	Ventilation isolation bulkheads will be installed between the new drifts and the existing repository prior to the connection so that there will be minimal impact on operations when the connection is made. The connection to the existing repository will be performed in accordance with a commissioning and start-up plan, which will be finalized in the future. This includes hot testing.	3

Typically, start-up testing is separated into cold testing and hot testing. Cold testing is performed with the new equipment and/or components isolated from the existing system. Hot testing is performed with the new equipment and/or components integrated into the existing

system. The new drifts will need to be connected to the existing repository in order to perform hot testing of the new components and the UVS as a whole. The hot testing will include a Test and Balance of the new UVS (i.e., SSCVS and US). Both cold and hot testing and startup work will include:

- Job hazards analysis to identify and mitigate hazards prior to performing the test.
- Development of prerequisites for the written work instructions to ensure that the WIPP facility, both surface and underground, is configured to perform the tests.
- Preparation of and adherence to written work instructions to ensure that testing is performed step by step in a controlled manner.
- Review of work instructions by a variety of work groups (i.e., Operations, Industrial Safety, Nuclear Safety, Engineering) to ensure that hazards are identified and mitigated.

4. **Integrating New Shaft into Ventilation System:** Please provide details of how the following ventilation changeover will occur: using the New Filter Building (NFB) for ventilation with the four existing shafts and current ventilation circuits and including the new shaft in the ventilation system. How will operations be affected during this changeover?

RESPONSE: As described in the PMR, a prerequisite of the US design is that the new exhaust fans and the NFB must be operational prior to being able to use S#5. The NFB and associated appurtenances will go through cold and hot testing as described in the response to Question #3. Those components that can be tested without being integrated into the UVS (e.g., new intake fan controls, electrical supply system, firewater loop) will be tested during cold testing. Once cold testing is complete and the connection to the underground is complete, hot testing will be performed by incorporating S#5 into the UVS with the NFB.

Ventilation flow control devices described in the Permit such as underground bulkheads, or bulkheads with doors or air regulators may be modified, removed, or installed prior to hot testing in order to accommodate S#5 and to maintain the ventilation circuits and differential pressure between the circuits as described in the Permit. Hot testing will include a Test and Balance of the UVS to verify the performance of the UVS (SSCVS and US) for anticipated ventilation configurations. A test matrix that includes multiple readiness acceptance and hot testing review plans and procedures will be developed in alignment with Facility Operations, Engineering, Environmental, and other impacted groups.

5. **Shaft Location:** Please provide an explanation for the chosen location of the new shaft relative to the present facility footprint.

RESPONSE: Locations to the north, south, east, and west of the existing WIPP underground repository were originally analyzed to determine the location of the new shaft. General criteria for the shaft location included the following:

- Geologic considerations,
- Physical plant configurations,
- Underground safety considerations, and
- Stability considerations around the new shaft.

It was determined that a shaft located to the west of the existing facility provides the least engineering challenges along with lower expected construction and long-term operational costs. A borehole confirmed the adequacy of the location.

6. **Ventilation Capacity:** Please provide an explanation for increasing the ventilation capacity from the previous 425,000 cubic feet per minute to 540,000 cubic feet per minute.

RESPONSE: The 425,000 cubic feet per minute referenced in the question as the previous ventilation capacity of the UVS is a nominal flow rate in units of standard cubic feet per minute. The 540,000 cubic feet per minute for the new UVS is a nominal flow rate in actual cubic feet per minute. Using the conversion factor of 1.2 described in Permit Attachment O:

$$425,000 \text{ scfm} \times 1.2 = 510,000 \text{ acfm}.$$

The PVS was designed for a nominal airflow of 510,000 acfm at the Exhaust Shaft collar, therefore the ventilation capacity for the underground repository is not increasing over the previous airflow design.

The SSCVS total designed airflow of 540,000 acfm includes several components as described below.

- 510,000 acfm at the Exhaust Shaft collar.
- 20,000 acfm to account for exhaust airflow from the SSCVS buildings (NFB and SRB) heating and air conditioning ventilation systems.
 - The NFB and the SRB must be ventilated for the safety of personnel performing work in those buildings. The design of the ventilation for the buildings creates a pressure differential that will allow air to flow from the outside of the buildings into the buildings. The air from the buildings is exhausted through the HEPA filter system along with the exhaust air from the underground, therefore the 20,000 acfm is included in the total flow capacity of the SSCVS.
- 10,000 acfm to account for air expansion.
 - As the air travels through the ductwork, buildings and fans, it expands. To account for the expansion of the air the design included 10,000 acfm for expansion through the system.

7. **Supplemental Analysis (SA) for the Permanent Ventilation System (PVS):** Please submit the November 2017 SA for the PVS in which the NFB and the new shaft were considered together for the record.

RESPONSE: The November 2017 SA for the PVS is included as Enclosure 2. Please note that at the time the SA was written, the name of the new shaft project in the DOE Congressional Budget Request was *Exhaust Shaft* (SA Section 1.2). Although the name of the project had not been changed, engineering and design work had determined that the shaft would be better used as an intake shaft. Therefore, the November 2017 SA uses the term *Exhaust Shaft*, however the use of the shaft is described in the SA as an intake shaft (SA Section 2.0) and the NEPA evaluation was performed on the new shaft as an intake shaft. The name of the new shaft project was subsequently changed to *Utility Shaft* in the DOE FY 2019 Congressional Budget Request dated March 2018.

8. **Surface Water Control System:** Please provide details demonstrating that control systems for surface water run-on/run-off at the surface location of the new shaft will provide adequate protection from flooding.

RESPONSE: Figures 1 and 2 are included as Enclosure 3. Figure 1 shows the concrete reinforcement plan for the collar/pre-sink. Figure 2 shows a cross section of the main plan view. For shaft sinking purposes, the top of the collar (top of the concrete) is considered to be the starting elevation of zero feet. The depth of the shaft is described in feet from the top of the collar (i.e., the 100-foot mark in the shaft is 100 feet down in the shaft, measured from the top of the collar). The actual surface elevation of the top of the collar is 3,401.5 feet as shown on the drawing. The drawing shows that the grade, or surface of the land that the collar is set on, is 3,400.0 feet. The collar is 1.5 feet higher than the ground surface at this location. The shaft collar slopes away from the shaft opening at a 2% grade. The 2% grade will cause water or rainfall near the shaft opening to flow away from the shaft opening.

Enclosure 2

**Supplement Analysis for the New Permanent
Ventilation System, DOE/EIS-026-SA-11**

**SUPPLEMENT ANALYSIS FOR THE
NEW PERMANENT VENTILATION SYSTEM**



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

NOVEMBER 2017

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ACRONYMS AND ABBREVIATIONS

acfm	actual cubic feet per minute
AGSC	Above Ground Storage Capability
AIS	Air Intake Shaft
CAM	continuous air monitor
CD	Critical Decision
CEQ	Council on Environmental Quality
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CH	contact-handled
DMP	Detection Monitoring Program
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
FEIS	Final Environmental Impact Statement
FR	Federal Register
HEPA	high-efficiency particulate air
IVS	Interim Ventilation System
LWA	<i>Waste Isolation Pilot Plant Land Withdrawal Act</i>
m ³	cubic meters
mrem	millirem
NEPA	National Environmental Policy Act
NFB	New Filter Building
NMED	New Mexico Environment Department
NWP	Nuclear Waste Partnership LLC
Permit	Hazardous Waste Facility Permit
PVS	Permanent Ventilation System
RH	remote-handled
ROD	record of decision
SA	Supplement Analysis
SEIS	Supplemental Environmental Impact Statement
SEIS-I	<i>Final Supplement Environmental Impact Statement for the Waste Isolation Pilot Plant</i>
SEIS-II	<i>Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement</i>
SRB	Salt Reduction Building
SVS	Supplemental Ventilation System
TRU	transuranic
UG	underground
UVS	Underground Ventilation System
VOC	volatile organic compound
WHB	Waste Handling Building
WIPP	Waste Isolation Pilot Plant

1.0 INTRODUCTION

1.1 Background

The U.S. Department of Energy (DOE) was authorized by the *U.S. Department of Energy National Security and Military Applications of Nuclear Energy Authorization Act of 1980* (Public Law 96-164) (U.S. Congress, 1979) to provide a research and development facility for demonstrating the safe, permanent disposal of transuranic (TRU) wastes from national defense activities and programs of the United States exempted from U.S. Nuclear Regulatory Commission regulations. This legislation resulted in the design of a centralized repository known as the Waste Isolation Pilot Plant (WIPP) facility for the disposal of TRU waste.

On October 30, 1992, the *Waste Isolation Pilot Plant Land Withdrawal Act* (LWA) (Public Law 102-579) as amended by Public Law 104-201 (U.S. Congress, 1992 and 1996) transferred administrative responsibility for 10,240 acres of land from the Secretary of the U.S. Department of the Interior to the Secretary of the DOE for the purpose of establishing the WIPP facility to demonstrate the safe disposal of radioactive waste materials generated by atomic energy defense activities. The WIPP facility is located 26 miles east of Carlsbad, New Mexico.

The WIPP facility is a deep geologic repository mined within a 2,000-foot-thick bedded-salt formation. The underground (UG) portion of the disposal facility, where waste is emplaced for disposal, is 2,150 feet beneath the ground surface. As of February 2014, the DOE had safely removed containers with approximately 90,800 cubic meters (m³) of TRU waste from 22 generator/storage sites throughout the country, disposing of the waste at the WIPP facility, and reducing the environmental risk continued long-term storage poses to site workers and the public near generator/storage sites (DOE, 2014a).

On February 5, 2014, a fire occurred in the UG involving a salt haul truck. The DOE and Nuclear Waste Partnership LLC (NWP), the WIPP management and operating contractor, investigated this event. The DOE issued an accident investigation report, *U.S. Department of Energy Accident Investigation Report, Underground Salt Haul Truck Fire at the Waste Isolation Pilot Plant*, on March 13, 2014 (DOE, 2014b).

On February 14, 2014, a radioactive release event occurred in the UG due to an exothermic chemical reaction in a waste drum. The event involved a small release of radioactive material to the environment. Unknown at the time of the event, the exothermic reaction was the result of the introduction of an organic desiccant material into the drum that was incompatible with the waste, making the drum noncompliant with the WIPP waste acceptance criteria. Because access to the UG was restricted following the radiological release and examination of the area and containers was not possible, the DOE conducted its investigation in two phases.

The DOE issued the Phase 1 accident investigation report, *U.S. Department of Energy Accident Investigation Report, Phase 1, Radiological Release Event at the Waste Isolation Pilot Plant on February 14, 2014*, on April 22, 2014 (DOE, 2014c).

The DOE and NWP implemented corrective action plans for both the UG fire and the radiological release events, and have completed corrective actions required for the resumption of waste emplacement operations. Since the February 14, 2014 incident, the ventilation system has been operated continuously in filtration mode, which reduces the overall ventilation flow rate in the UG when compared to the unfiltered capacity. Decontamination activities, such as encapsulation of radiological material into the salt matrix by applying a water spray, have also taken place to support future UG operations (NWP, 2016).

As a direct result of the February 14, 2014 radiological event at the WIPP facility, DOE has begun developing and implementing temporary and permanent ventilation system projects to enhance the ability of the DOE to return to pre-2014 ventilation capability that will again support simultaneous full-scale TRU waste disposal and associated mining. This Supplement Analysis (SA) addresses the environmental impacts to human health and the environment from the construction and operation of the proposed Underground Ventilation System (UVS), referred to as the Permanent Ventilation System (PVS). As required by the DOE National Environmental Policy Act (NEPA) implementing regulations at 10 Code of Federal Regulations (CFR) §1021, this SA contains sufficient information to support a DOE determination regarding the need for further NEPA documentation.

1.2 Proposed Action

The DOE is proposing to construct and operate a PVS that would support the DOE in continuing the WIPP mission which is to achieve full-scale, simultaneous, waste disposal and mining operations at the WIPP. In order to reach this goal, the DOE must upgrade the UVS. The upgrade consists of temporary ventilation changes which have been implemented and permanent changes to the UVS which are proposed. The temporary changes included the installation of the Interim Ventilation System (IVS) which provides an additional 54,000 cubic feet per minute (cfm) of filtered air to the UG (DOE, 2014d; DOE, 2016a)¹. In addition, the startup and operation of the Supplemental Ventilation System (SVS) provides sufficient additional ventilation air² to allow for resumption of mining on a limited scale (DOE, 2016a; DOE 2017a). The proposed PVS would provide an UG ventilation flowrate of up to 540,000 actual cubic feet per minute (acfm), which is approximately 15 percent higher than the ventilation flowrate prior to 2014.

The proposed PVS is the subject of this SA. It is a permanent change to the UVS and is designed to provide an additional air shaft and new filtration capability in order to return to full-scale operations at the WIPP facility (i.e., up to 500,000 cubic feet of waste per year based on the facility design with simultaneous mining and maintenance). The need for this change is the result of the radiological event because portions of the WIPP UG and the existing surface-mounted ventilation and exhaust systems have become radiologically contaminated. In order to protect public health and the environment, the DOE decided to operate the WIPP underground facility using continuous filtration of underground exhaust flow (filtration mode). Continuous filtration mitigates future radioactive releases. The filtration system, as originally designed, can only accommodate approximately 15 percent of the flow needed to support normal operations for mining, construction, and TRU waste emplacement. The PVS would represent an upgrade to the UVS, and would provide new, radiologically clean, surface exhaust system components capable of supporting full-scale operations.

Full-scale operations allow for simultaneous waste emplacement and mining activities in the WIPP UG. Full-scale operations represent the implementation of the mission as authorized by the WIPP LWA, Public Law 102-579 (U.S. Congress, 1992), as amended by Public Law 104-201 (U.S. Congress, 1996), and as evaluated in previous NEPA documents (DOE, 1997).

Safety, health, and protection of the public, the workers, and the environment are DOE's highest priorities. Every stage of the effort to resume full-scale operations at the WIPP facility has been supported

¹The temporary IVS consists of two skid-mounted centrifugal exhaust fans, two skid-mounted high-efficiency particulate air (HEPA) filter assemblies, isolation dampers, and associated ductwork located on the surface. The IVS, which exhausted UG air through the existing HEPA filtration system, has been operational.

² The temporary SVS consists of one skid-mounted vane axial fan located in the WIPP UG near the base of the Air Intake Shaft. The SVS exhausts salt-dust-laden air directly through the Salt Handling Shaft to minimize dust particulate loading on HEPA filters.

by rigorous regulatory compliance and robust attention to upgraded safety management programs, including nuclear safety, fire protection, radiological controls, and emergency management, and associated documentation, procedures, and training. These have been validated in accordance with DOE directives through the performance of operational readiness reviews by both NWP and DOE. In addition, the New Mexico Environment Department (NMED) (NMED, 2016) approved the resumption of normal operating status at the WIPP, indicating that resumption of normal operations can be performed in compliance with the NMED-issued Hazardous Waste Facility Permit (Permit).

Waste emplacement at the WIPP facility was resumed in January 2017. Efficiencies are being incorporated into current waste emplacement activities, and with the operation of a new ventilation system, it is anticipated that the WIPP emplacement capacity will be restored to pre-2014 operational levels, along with support for simultaneous full-scale salt mining and maintenance. To this end, on December 23, 2015, the Assistant Secretary for Environmental Management approved Critical Decision (CD)-1, *Waste Isolation Pilot Plant Underground Ventilation System (UVS) Project Implementing Line Items 15-D-411, Safety Significant Confinement Ventilation System, and 15-D-412, Exhaust Shaft*. The UVS will be a project composed of two budget line items:

- DOE EM 15 D-411, *Safety Significant Confinement Ventilation System*, provides for a new, unfiltered exhaust shaft for mining operations and the use of the existing exhaust shaft with additional filtration capacity for full waste disposal operations. This alternative also includes two access drifts to the new shaft. As a variation, the new exhaust system and HEPA filters may be placed on the new exhaust shaft. An emergency diesel generator will provide temporary power to the new filter building in the case of supplied electrical power disruption.
- DOE EM 15 D-412, *Exhaust Shaft*, provides for the existing exhaust shaft with HEPA-filtered ventilation sufficient for full mining and waste handling operations.

The Proposed Action would represent a combination of both budget line items:

(1) A new filter building complex would replace the existing filtration system at the location of the existing Exhaust Shaft. This complex satisfies the need for a safety significant confinement system and it would provide unfiltered ventilation if needed.

(2) A new ventilation shaft and access drifts would provide additional air to the UG to assure there is sufficient ventilation air for simultaneous full-scale waste emplacement and mining and maintenance operations.

Refer to Section 2.0 for more information about the Proposed Action, including the proposed design and construction methodology.

1.3 Purpose and Need for the Proposed Agency Action

The purpose and need for the WIPP Project generally, and the WIPP facility specifically, has not changed since documented in the *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement*, DOE/EIS-0026-S-2 (1997 SEIS-II) (DOE, 1997), or authorized by the WIPP LWA, Public Law 102-579 (U.S. Congress, 1992), as amended by Public Law 104-201 (U.S. Congress, 1996). The DOE needs to continue to safely dispose of the TRU waste that has resulted from atomic energy defense activities in a manner that protects the workers, the public health, and the environment. The Proposed Action specifically satisfies the purpose and need by upgrading the existing UVS to support full waste disposal and associated mining operations.

The *Conceptual Design Report for the Waste Isolation Pilot Plant Underground Ventilation System (UVS) Project Implementing Line Item, 15-D-411, Safety Significant Confinement Ventilation System, 15-D-412, Exhaust Shaft*, Revision 3.0 (NWP, 2015), reiterates this mission need for the UVS:

The existing WIPP infrastructure necessary to operate the facility for disposal of TRU waste and support the DOE's Office of Environmental Management (DOE-EM) mission has created a mission gap due to a radiological incident on February 14, 2014, which contaminated portions of the underground. The existing Underground Ventilation System (UVS) is inadequate to support operations of both "clean" and contaminated underground areas, and a new UVS is required to support full disposal operations.

1.4 Scope of this Supplement Analysis

The NEPA requires Federal agencies to consider the potential environmental consequences of their proposed actions and reasonable alternatives before making decisions. According to 10 CFR § 1021.314(c), if DOE has already prepared an environmental impact statement to analyze the impacts of a project, as with the *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement, Eddy County, near Carlsbad, New Mexico* (1997 SEIS-II) (DOE/EIS-0026-S2; DOE 1997), DOE shall prepare an SA when it is unclear whether or not a supplemental EIS is required. An SA is a comparative document that analyzes changes commensurate with their contribution to potential impacts, and evaluates changes absolutely and in comparison to the existing NEPA analyses (DOE, 2005a). Since issuance of the 1997 SEIS-II, the DOE has prepared 9 WIPP-related SAs. The most recent site-wide evaluation was prepared in 2016 (DOE, 2016a).

The DOE has prepared this SA in accordance with the Council on Environmental Quality (CEQ) NEPA regulations at 40 CFR §1502.9(c)(1) and DOE NEPA implementing regulations at 10 CFR §1021.314 (DOE, 2011). This SA evaluates whether the Proposed Action involves any substantial changes to the operation of the WIPP facility relevant to environmental concerns or presents any significant new circumstances or information relevant to environmental concerns and bearing on operation of the WIPP facility as evaluated in 1997 SEIS-II (DOE, 1997). Based on this evaluation, the DOE will determine whether to (1) supplement the 1997 SEIS-II, (2) prepare a new environmental impact statement (EIS), or (3) develop no additional NEPA documentation because the 1997 SEIS-II remains adequate.

Chapter 2 of this SA describes the proposed changes. Chapter 3 compares any environmental impacts that would result from construction and operation of the PVS with those identified and analyzed in the 1997 SEIS-II. Chapter 4 of this SA, the cumulative impact analysis, identifies and considers the potential impacts of reasonably foreseeable future actions. Chapter 5 of this SA is the determination regarding the need for further NEPA documentation.

1.5 Relevant National Environmental Policy Act Documents

The following NEPA documents are relevant to the Proposed Action described in section 1.2. This information provides a context for understanding the current status of NEPA analyses associated with activities at the WIPP facility and forms the foundation for preparing the comparative analysis in this SA.

- ***Waste Isolation Pilot Plant Final Environmental Impact Statement, DOE/EIS-0026 (1980 FEIS)*** (DOE, 1980). In October 1980, the DOE issued the 1980 FEIS, which analyzed the potential environmental impacts of initial construction and operation of the WIPP facility. The Record of Decision (ROD) (46 Federal Register [FR] 9162, January 28, 1981) documented 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 SEISs (1990 SEIS-I and 1997

SEIS-II), the 1980 FEIS is included here only for completeness; this SA does not analyze changes against the 1980 FEIS.

- ***Final Supplement Environmental Impact Statement for the Waste Isolation Pilot Plant, DOE/EIS-0026-FS (1990 SEIS-I)*** (DOE, 1990). In January 1990, the DOE issued the 1990 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 Test Phase, and changes in the understanding of the hydrogeological characteristics of the WIPP site. The 1990 SEIS-I ROD, which was issued in June 1990, continued the phased development of WIPP by instituting an experimental program to further examine the WIPP site suitability as a TRU waste repository (55 FR 25689, June 22, 1990).
- ***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 TRU waste at the WIPP facility, including polychlorinated biphenyl-commingled TRU waste in the DOE inventory at the time. The DOE's Proposed Action was to open the WIPP facility and dispose of up to 175,600 m³ of TRU waste generated from atomic energy defense activities.

In the 1997 SEIS-II, the DOE analyzed the potential environmental impacts associated with shipping contact-handled (CH) and remote-handled (RH) TRU wastes to the WIPP facility for disposal. Under the Proposed Action in the 1997 SEIS-II, most CH-TRU waste was assumed to move directly to the WIPP facility from the site where it was stored or generated. RH-TRU waste from some smaller sites was assumed to be moved to the Hanford Site in Washington or the Oak Ridge National Laboratory in Tennessee prior to shipment to the WIPP facility. The total volumes of waste analyzed for disposal at the WIPP facility in the 1997 SEIS-II were 168,500 m³ of CH-TRU waste and 7,080 m³ of RH-TRU waste.

On January 23, 1998, the DOE announced its decision to implement the Proposed Action in the ROD (63 FR 3624). The 1997 SEIS-II, as the most recent SEIS related to TRU waste disposal at the WIPP facility, is the foundational NEPA document against which the changes described in this SA are compared.

- ***Supplement Analysis for the Waste Isolation Pilot Plant Site-Wide Operations, DOE/EIS-0026-SA-05 (DOE, 2005b), Supplement Analysis for the Waste Isolation Pilot Plant Site-Wide Operations, DOE/EIS-0026-SA-07 (DOE, 2009), and Supplement Analysis for the Waste Isolation Pilot Plant Site-Wide Operations, DOE/EIS-0026-SA-10 (DOE, 2016a)***. The DOE prepared SAs in 2005, 2009, and 2016 related to TRU waste disposal at the WIPP facility. These SAs were prepared in accordance with 10 CFR §1021.330(d), and analyzed changes that had occurred since issuance of the 1997 SEIS-II. In these SAs, the DOE determined that there were no significant new circumstances or information relevant to environmental concerns and bearing on the Proposed Action or its impacts since the preparation of the 1997 SEIS-II. The DOE determined in each instance that the 1997 SEIS-II was adequate; therefore, no further NEPA documentation, such as a supplemental EIS or a new EIS, was needed.
- ***Categorical Exclusion: Installation of an Interim Ventilation System to Support Recovery Actions at the Waste Isolation Pilot Plant (DOE, 2014d)***. This categorical exclusion determination addressed a temporary upgrade to the existing WIPP UG ventilation exhaust

system to increase ventilation to the UG. This IVS added two fans and additional HEPA filters to the existing filtration system.

- ***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 UG ventilation exhaust system to operate an SVS. Supplemental ventilation was needed to facilitate some UG activities such as mining of Panel 8, and maintenance, drilling, bolting, and salt handling in some areas of the UG.

2.0 CHANGES CONSIDERED IN THIS SUPPLEMENT ANALYSIS

For the purposes of this SA, a New Filter Building (NFB) and a New Exhaust Shaft were evaluated together for potential cumulative impacts. The Proposed Action, the PVS, would involve the construction and operation of an NFB and a New Exhaust Shaft. The design would include a 55,000-square-foot NFB and a new shaft with access drifts. The anticipated timeline for construction would be approximately two years beginning in April 2018 and finishing in March 2020.

The new PVS would use the existing Exhaust Shaft and would provide a modern safety significant confinement ventilation system with the capacity to provide up to 540,000 acfm. The new filtration system would have separate HEPA filter banks to filter the exhaust air exiting the UG. The filter units, including the housings, nozzles, dampers and other components which form the pressure boundary, filter and pre-filter banks and frames, internal and external support structure(s), and attached piping and instrumentation, would be classified as Safety Significant for the normal operating condition. There would be 22 filter housings rated at 27,000 cfm each. This would allow any one of the 22 filters to be in standby or maintenance while still maintaining a nominal 540,000 acfm from the shaft and up to 20,000 acfm for filtered depressurization (controlled in-leakage) exhaust from filter and salt reduction equipment rooms. This would ensure that airborne contamination in these rooms would be treated in HEPA filters before air is released through the stack. The HEPA Filter Housing would be bag-in bag-out style with access from both sides and maximum of three cells high to allow maintenance access from ground level. Each filter housing would have 18 cells in each HEPA bank, rated at 27,000 acfm total. Twenty housings would be required to provide 540,000 acfm capacity for exhausting from the UG.

Two 3,000 kilowatt standby diesel generators would be available to provide power for the PVS if there was an electrical power loss. The diesel fuel storage tank capacity would provide 12 hours of uninterrupted power at 100 percent of rated power output. The generators would be in an enclosure that provides weatherproofing, sound attenuation, and wind resistance up to 100 mph.

The PVS facility would be constructed outside of the existing security fence east of the exhaust shaft currently connected to the IVS. The location of the NFB, shown in Figure 2-1 below, would occupy approximately 10 acres. There would be two main buildings on site, the NFB and the Salt Reduction Building (SRB). The potential site layout shows the New Exhaust Shaft duct that would replace the existing IVS exhaust duct. The exhaust would be routed to the NFB or the SRB and then to the stack on an elevated support system. Once constructed, the WIPP property protection area security fencing would be erected around the PVS.

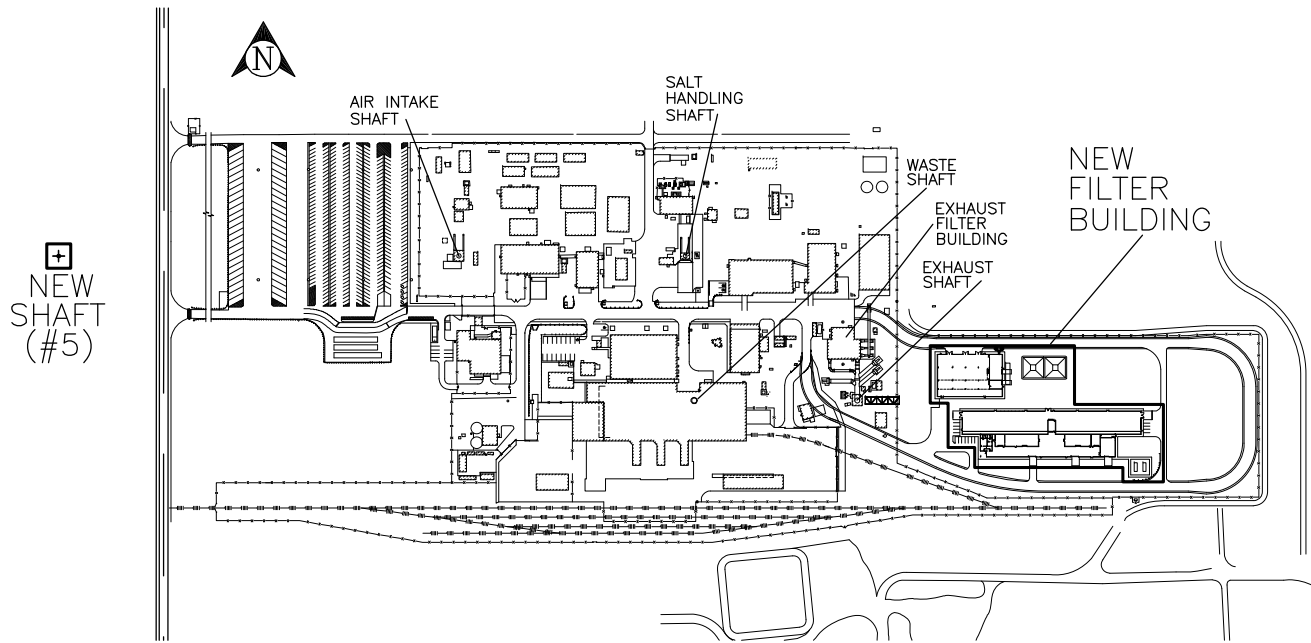


Figure 2-1 Generalized Plan View of the Conceptual Surface Locations of the Permanent Ventilation System

The NFB would be a single story precast and cast-in-place concrete building dedicated to the new WIPP filtration system. This facility would replace the original Exhaust Filter Building and IVS currently in place on the site and would be expected to be in operation for at least 40 years.

The SRB would house de-dusters and de-misters for the salt dust and brine/water mist removal. The de-misters would be upstream of the de-dusters. The SRB would have an inlet duct that is distributed to the de-mister and de-duster combinations with isolation dampers to allow performance of maintenance activities. The de-mister and de-duster combinations will be connected to an outlet duct. The de-mister and de-duster combination would have a water wash down system that would be connected to a water collection, treatment, and sludge tank. The outlet of the water collection, treatment, and sludge tank would be piped out of the SRB to a two-cell evaporation pond.

The SRB and NFB would be connected by ductwork to the existing Exhaust Shaft. This ductwork and the HEPA filter units would be a safety significant pressure boundary with safety significant isolation dampers that would close off the SRB from the exhaust pathway and close off the NFB bypass ductwork. The ductwork would be constructed such that the elbow connecting the ductwork to the Exhaust Shaft would be installed last. Once commissioning, startup, and testing has been completed, and an operational readiness review has been accomplished and given startup approval, the existing elbow to the Exhaust Shaft would be removed and the existing ductwork to the existing underground ventilation system and interim ventilation system would be isolated, then the new elbow would be installed to the Exhaust Shaft and the ductwork connecting to the SRB and NFB. Underground mine ventilation rebalancing would then occur. The existing ductwork, IVS, and Exhaust Filter Building would be removed in accordance with existing permits and DOE policy.

The new shaft portion of the Proposed Action would be located nominally 1,200 feet west of the Air Intake Shaft (AIS) (Figure 2-1). Drifts would be excavated to connect the new shaft to the existing WIPP UG facility for access and ventilation purposes. Surface-mounted fans would be used to blow air into the UG via the new shaft. The air from the new shaft would primarily be used to ventilate the Construction

and Disposal Circuits. The Salt Shaft would be used as a down-cast shaft providing the majority of the air for the North Circuit. Exhaust air from the North, Disposal, and Waste Shaft Station Circuits would be exhausted through the existing Exhaust Shaft and the upgraded HEPA filter system, while exhaust air from the Construction Circuit would be routed out through the unfiltered AIS. The additional flow capacity that would be provided by the new shaft along with the unfiltered exhaust path for the Construction Circuit air would be needed to facilitate concurrent mining, waste disposal, and maintenance activities in the UG. Once the upgrade to the ventilation system has been implemented, the SVS would no longer be needed.

The PVS Conceptual Design Report provides alternatives to meet the air handling capability need (*Waste Isolation Pilot Plant, New Filter Building, Permanent Ventilation System, Function and Requirements Document (500655-416-GN-DB-00002, Revision D, February 2017)*) (NWP, 2017). The alternative selected, Alternative 1-A, provides a new shaft and new construction supply fans. Alternative 1-A was re-engineered to reflect the new shaft as a 30-foot diameter air intake shaft with surface supply fans rather than an air exhaust shaft. The existing Air Intake Shaft would be an exhaust shaft for construction circuit. The normal disposal circuit and waste shaft station circuit airflows will be in the fully-filtered mode driven by the NFB, exhaust fans, and confinement HEPA filtration mode. The line item “New Exhaust Shaft” will be evaluated as an air intake shaft in this SA to better reflect the current function of the new shaft and any potential environmental impacts.

2.1 Changes to the Affected Environment since the 1997 SEIS-II

This section discusses the changes to the resource areas potentially affected by the Proposed Action since last evaluated in 1997 SEIS-II (DOE, 1997). The potential impacts of the Proposed Action to those resource areas will be addressed in Chapter 3. DOE has determined that the following resource areas merit detailed analysis in this SA:

- Air Quality
- Geology and Hydrology
- Noise
- Waste Management
- Water Resources and Infrastructure
- Human Health and Accidents

Please see Section 2.2 for a discussion of resource areas eliminated from detailed analysis.

2.1.1 Air Quality

This section describes the air quality at the WIPP site. The Clean Air Act requires the Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards for pollutants that are considered harmful to public health and the environment. The Act establishes two types of air quality standards: primary and secondary. Primary standards set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. Pursuant to the Clean Air Act, the EPA established National Ambient Air Quality Standards for six pollutants considered to be key indicators of air quality: carbon monoxide, nitrogen dioxide, ozone, lead, sulfur dioxide, and particulate matter (that is, airborne particles including dust, smoke, fumes, mist, sprays, and aerosols). These six air quality indicators are called criteria pollutants. The EPA also established separate National Ambient Air Quality Standards for two categories of particulate matter: (1) particles with an aerodynamic diameter less than 10 micrometers (PM₁₀), and (2) particles with an aerodynamic diameter less than 2.5 micrometers (PM_{2.5}).

Areas that meet the National Ambient Air Quality Standards are said to be in “attainment.” The air quality in attainment areas is managed under the Prevention of Significant Deterioration Program of the Clean Air Act. The goal of this program is to maintain a level of air quality that continues to meet the standards. Areas that do not meet one or more of the standards are designated as “nonattainment” areas. For regulatory purposes, remote or sparsely populated areas that have not been monitored for air quality are listed as “unclassified” and are considered to be in attainment.

The State of New Mexico has also established ambient air quality standards for carbon monoxide, sulfur dioxide, nitrogen dioxide, total suspended particulates (not PM₁₀), hydrogen sulfide, and total reduced sulfur. The State also has established guidelines for toxic air pollutants in the New Mexico Air Quality Regulations, Title 20 (Environmental Protection), Chapter 2 (Air Quality Standards-Statewide), Part 72 (Construction), Subpart 400 (Permits for Toxic Air Pollutant Emissions-Preamble) (NMED 2002).

The 1997 SEIS-II documented that the EPA has classified Eddy County (where WIPP is located) as an attainment area for all six criteria pollutants under the National Ambient Air Quality Standards. The WIPP facility is also in a Class II Prevention of Significant Deterioration 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 WIPP site environmental reports. On October 30, 1994, DOE, after notifying the EPA, ceased to monitor criteria air pollutants at the WIPP facility because there was no longer a regulatory requirement to do so. The DOE has completed inventories of potential pollutants and emissions in accordance with EPA requirements and New Mexico Air Quality Control Regulations. Based on these inventories, DOE has no air quality permitting or reporting requirements at this time for the operation of the WIPP facility, except for those applying to two backup diesel generators. An operating permit was issued under the New Mexico Air Quality Control Regulations for the two diesel generators in 1993 (DOE 1995). These diesel generators are assumed to emit four pollutants (nitrogen dioxide, sulfur dioxide, carbon monoxide, and PM₁₀) and there are strict limits on emissions for these pollutants.

The Class I Prevention of Significant Deterioration areas nearest to the WIPP site are Carlsbad Caverns National Park, which is approximately 61 kilometers (38 miles) southwest of the WIPP site, and Guadalupe Mountains National Park, which is approximately 100 kilometers (62 miles) southwest of the WIPP site. DOE is not aware of changes in this information since publication of the 2016 SA.

2.1.2 Geology and Hydrology

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. Due to the seasonal nature of the rainfall, most surface drainage is intermittent. The Pecos River, 20 kilometers (12 miles) southwest of the WIPP site boundary, is a perennial river and the master drainage for the region. Prominent local physiographic features include Nash Draw (a shallow, 8-kilometer- [5-mile-] wide valley open to the southwest and located west of the WIPP site) and the San Simon Swale (a broad depression about 24 kilometers [15 miles] east of the WIPP site) (DOE 1997).

No surface displacement or faulting younger than early Permian has been reported, indicating that tectonic movement since then, if any, has not been noteworthy.

The Pecos River is the main surface water resource in the WIPP area. The WIPP site has a few small intermittent creeks, the only westward-flowing tributaries of the Pecos River within 32 kilometers (20 miles) north or south of the site (DOE 1997).

Although the geology and seismology in the area surrounding the WIPP site has not changed since publication of 1997 SEIS-II, more recent seismic activity data are available. Seismic activity within 300 kilometers (186 miles) of the WIPP site is currently monitored by seismographs installed and operated by the New Mexico Institute of Mining and Technology. From January 1 through December 31, 2016, locations for 328 seismic events were recorded within 300 kilometers (186 miles) of the WIPP site. Recorded data included origin times, epicenter coordinates, and magnitudes. The strongest recorded events (magnitude 2.9) occurred on January 10 and May 29, 2016; both of these events happened approximately 208 kilometers (122 miles) east-northeast of the site. The closest earthquake to the site happened approximately 27 kilometers (16 miles) north-northeast and had a magnitude of -1.8 (DOE, 2017b).

In June 2009, a reassessment of natural phenomena hazard was performed on the Waste Handling Building (WHB) in accordance with the applicable revision of DOE Order 420.1. The assessment verified no changes to natural phenomena hazard intensities and no significant changes in the WHB structures, systems, and components (NWP, 2016).

With regard to hydrology, there are no major surface water bodies located within 10 miles of the WIPP site. The Pecos River is about 12 miles west of the WIPP site at its closest point. In the vicinity of the WIPP site, there are limited occurrences of potable water, and several water-bearing zones produce poor-quality water. In the immediate vicinity of the WIPP site, groundwater above the Salado Formation is commonly of such poor quality that it is not usable for most purposes. There is shallow groundwater at the WIPP site.

A Groundwater Detection Monitoring Program (DMP) is required by the WIPP Permit. In 2015, groundwater samples were collected from six different detection monitoring wells on the WIPP site. The concentrations of the compounds measured in the DMP wells have not varied significantly over the past 20 years (DOE, 2016c).

2.1.3 Noise

The DOE requires its facilities to comply with Occupational Safety and Health Administration 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. Chapter 9 of the 1980 FEIS contains the most recent thorough noise evaluation for construction activities.

2.1.4 Waste Management

The handling of 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 59-day 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 will release the transporters for processing. Only then do site personnel remove the transportation packages from the trailer and move them into the WHB.

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 UG.

In the cases of unavailability of the Waste Hoist or the inability to otherwise emplace the waste in the UG, the waste is currently stored on facility pallets within the floor space of the WHB.

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 containers (a shielded container holds a 30-gallon inner drum containing RH TRU waste shielded so that it can be managed as a CH TRU container.)

2.1.5 Water Resources and Infrastructure

The WIPP facility has a New Mexico Environment Department Discharge Permit for a wastewater lagoon facility. The daily discharge limit to the lagoon is 87,000 liters (23,000 gallons) per day of domestic wastewater, 7,570 liters (2,000 gallons) per day of miscellaneous non-hazardous water, and 30,283 liters (8,000 gallons) per day of miscellaneous non-hazardous brine and water. The DOE currently does not require a National Pollutant Discharge Elimination System permit for the WIPP facility. There is no point source discharge to waters of the United States.

When used as a fire suppressant, water is the largest potential source of liquid radioactive waste. Another source would be liquid used for decontamination. Following a fire event, liquids would be collected, sampled, and tested for radioactivity and dispositioned in accordance with DOE policy including possible disposal at the WIPP facility. Non-fire water radioactive waste is collected in portable tanks or drums and handled in accordance with procedure in WP 05-WH1036, *Site-Derived Mixed Waste Handling* (DOE 2001).

The solid radioactive waste system provides for the collection and packaging of site-derived radioactive waste. It is anticipated that site-derived waste would be CH-TRU waste. An estimate of the volume of solid radioactive waste generated at the WIPP facility annually is 12 cubic meters (424 cubic feet) (DOE 2001).

2.1.6 Human Health and Accidents

2.1.6.1 Human Health

Human health is protected from the impacts of airborne radioactivity by the design and operation of the UVS. Likewise, the health of underground workers is protected from the adverse effects of combustion products from underground equipment, from dust created by mining operations, and from volatile organic compounds (VOCs) emissions by the design and operation of the UVS. The UVS has four circuits by which air is routed in the WIPP UG. The Construction Circuit routes the air through areas of the UG where maintenance and construction activities occur. These areas include ventilation and access drifts, utility rooms such as shops, and alcoves. The Construction Circuit does not include disposal panels or rooms where TRU mixed waste is present. The Construction Circuit mainly deals with combustion products and dust.

The Waste Shaft Circuit routes air down the Waste Shaft and directly into the Disposal Circuit. This circuit protects from the possibility of releases migrating back up the Waste Shaft during waste hoisting

activities. The Disposal Circuit routes the air to, over, and through disposal panels and rooms. As areas of the mine accept TRU mixed waste for transport and emplacement, the ventilation air is routed to the appropriate areas through a system of bulkheads and ventilation overcasts. The Disposal Circuit also directs VOCs away from underground workers.

Continuous air monitors (CAMs) are placed at strategic locations to detect any airborne radiation in the ventilation system. The CAMs alert the Central Monitoring Room to take appropriate action with regard to ventilation and protection of the worker and public. The Exhaust Shaft has HEPA filters to prevent airborne radioactive particles (e.g., alpha and beta particles) from reaching the accessible environment.

Volatile organic compounds are monitored in the UG to protect waste-handling personnel and on the surface to protect the non-waste surface worker. Standard operating procedures specify the amount of air needed when operating specific pieces of fueled equipment to assure adequate dilution of combustion products.

High-efficiency particulate air filters are used to mitigate any radiological releases from the WIPP PVS. Prior to the February 2014 radiological event, the UVS was normally operated in the unfiltered mode. In the immediate future, the DOE intends to operate the HEPA filters continuously for air that passes through the UG disposal areas. Under the proposal, air leaving the UG through the Exhaust Shaft will normally be filtered.

2.1.6.2 Accidents

The Documented Safety Analysis (DSA) for the WIPP provides an assessment of hazards associated with normal, abnormal, and accident conditions involving CH-TRU and RH-TRU waste handling and disposal operations at the WIPP facility. The assessment also includes Natural Phenomena Hazards and man-made external events, including the identification of energy sources or processes that might contribute to the generation or uncontrolled release of radioactive and other hazardous materials. In addition, hazardous events that may be beyond the design basis of the WIPP facility were assessed.

2.2 Resource Areas Eliminated from Detailed Analysis

Resource areas that would be unaffected by the Proposed Action evaluated in this SA or any impacts that would be so minimal as to be clearly not significantly different than those analyzed in 1997 SEIS-II were eliminated from detailed analysis in this SA. Consequently, the environmental conditions for the following resource areas are not further discussed:

- **Biological Resources:** The Proposed Action would not disturb biological resources because no plants or animals protected by the Endangered Species Act have been identified in the WIPP land withdrawal area.
- **Cultural Resources:** The Proposed Action would involve ground disturbance; however, the proposed locations of the NFB and New Exhaust Shaft have previously been evaluated in archeological surveys. Those investigations did not identify cultural resources or historic properties (i.e., cultural resources listed on or eligible for listing on the National Register of Historic Places).
- **Greenhouse Gases:** Where appropriate, DOE NEPA documents consider the potential impacts associated with GHG emissions. Pursuant to DOE guidance, projects should quantify a proposed action's projected emissions unless "tools, methodologies, or data inputs are not reasonably available." Because the proposed action replaces existing buildings and processes, the result will

likely be a negligible to small increase in the total GHG inventory at the WIPP project. Furthermore, emissions associated with construction will be temporary. The results of the GHG analysis in the 2016 SA remain bounding.

- **Land Use and Management:** The land required for the Proposed Action lies within the WIPP land withdrawal area and is adjacent to the existing disturbed or developed area of the WIPP facility. The Proposed Action presents no new impacts beyond those examined in the 1997 SEIS-II.
- **Socioeconomics:** The Proposed Action would not change workforce requirements and would not notably impact socioeconomic resources in the region.
- **Environmental Justice:** *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, Executive Order (EO) 12898 (POTUS, 1994) requires that “each Federal Agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health effects of its programs, policies, and activities on minority populations and low-income populations.” Due to the remote location of the WIPP facility and the large land withdrawal area, there are no minority or low-income populations adjacent to the project area that would be impacted by the Proposed Action. Therefore, impacts related to EO 12898 would not occur.

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

- **Transportation:** The Proposed Action would not result in any long-term changes to transportation. The only impact would be temporary and minor increases in transportation associated with construction activities.
- **Climate:** As discussed in 1997 SEIS-II, the regional climate is semiarid, with low precipitation and humidity and a high rate of evaporation. The DOE is unaware of any change in this information. Climate-related impacts such as increased heat, drought, and insect outbreaks, declining water supplies, reduced agricultural yields, health impacts in cities due to heat, and flooding and erosion are not anticipated to affect the WIPP facility or the Proposed Action as described in 1997 SEIS-II.

3.0 **ENVIRONMENTAL IMPACTS**

3.1 **Introduction**

This section presents an analysis of the potential environmental impacts resulting from the Proposed Action and new circumstances that are relevant to impacted resource areas since the DOE issued the 2016 SA, and compares the impacts to those analyzed in the 1997 SEIS-II to determine if any of the changes are substantial or new circumstances are significant and relevant to environmental concerns and bearing on the Proposed Action or its impacts. The resource areas of air quality, geology and hydrology, noise, waste management, water resources and infrastructure, and human health and accidents do require further analysis in this SA with respect to potential impacts. Biological resources, cultural resources, greenhouse

gases, land use and management, socioeconomics and environmental justice, and transportation are resource areas that do not require further analysis.

3.2 Radiological Releases from the Underground Ventilation System

Similar to the UVS, the PVS will continue to provide four separate and distinct ventilation circuits and HEPA-filtered ventilation. As a result, it is very unlikely that radioactive particulates will reach the accessible environment. The PVS will not affect the amount or type of radiological waste and does not introduce radiological accidents or hazards beyond those already considered in the DSA and 1997 SEIS-II for WIPP facility operations. Waste emplacement rates should return to pre-accident levels, and are not expected to increase. The total combined volume of air that would be exhausted from the facility would be comparable to what was analyzed in the 1997 SEIS-II using similar equipment processes and procedures; therefore, no significant difference in radiological releases, accidents, and industrial operations would be expected from implementation of the Proposed Action.

There will be significantly more filters to be changed periodically by facility personnel. The additional occupational radiation dose to a worker would be expected to be less than 100 millirem (mrem) per year. The probability of a latent cancer fatality from a 100 mrem dose would be about 0.00004 per year. The current average dose to workers at the WIPP facility is estimated at about 10 mrem per year. Total radiation dose to the work force would be about 0.3 person-rem per year, with the estimated number of occupational latent cancer fatalities about 0.00015 per year. Over a hypothetical 30-year facility lifetime, no latent cancer fatality (less than 0.004) would be expected. The Proposed Action would be included under the DOE existing radiation dosimetry program to monitor potential internal and external worker exposures to radioactive material to help keep such exposures as low as reasonably achievable and below applicable regulatory and administrative limits.

The Proposed Action would be designed with the best available radionuclide control technology to minimize the potential release of radionuclides to the atmosphere. Atmospheric dispersion was estimated using meteorological data from 1997 SEIS-II. Radiation doses were estimated using dose-screening factors from National Council of Radiation Protection (NCRP) Report No. 123 (NCRP 1996). The maximally exposed individual was assumed to reside continuously at a location 3,000 meters (1.9 miles) northeast of the WIPP site, the same location as described in 1997 SEIS-II. This individual would receive an estimated dose of about 0.00001 mrem per year, with the probability of a latent cancer fatality being less than 1×10^{-11} per year. The dose to the population within 80 kilometers (50 miles) of the WIPP site would be less than 0.00001 person-rem, with no (4×10^{-9}) latent cancer fatality expected. Over a hypothetical 30-year facility lifetime, no latent cancer fatality (about 0.0000001) would be expected. The Proposed Action would not affect quantities of radioactive or hazardous materials managed at the WIPP facility, and would therefore not affect the impacts of intentional destructive acts. Thus, there are no additional radiological impacts from the Proposed Action.

3.3 Impacts from the Construction and Operation of an Additional Shaft, Drifts, and a Confinement Ventilation System

3.3.1 Air Quality

Construction and operation of an additional shaft, drifts, and confinement ventilation system include the following potential impacts: fugitive dust from grading, drilling, and mining; diesel emissions from heavy equipment, emergency diesel generators, and drilling. These impacts to human health and the environment are typical of industrial mining sites in general and to the WIPP facility in particular. The 1997 SEIS-II considers the impacts of effluents from the operations and mining of drifts:

For SEIS-II, air quality impacts from operation of WIPP under the Proposed Action have been updated from those contained in Section 9.4.5 of the Final Environmental Impact Statement for the Waste Isolation Pilot Plant (FEIS) (DOE 1980) and referenced in SEIS-I (DOE 1990). SEIS-II air quality analyses also include information on the salt pile fugitive dust emissions (Tillman 1988b), emissions of particulates from the ventilation system (Tillman 1988a) not included in SEIS-I, and reflect fewer salt pile releases from bulldozer activity and fewer emissions from mining and support equipment because they would be smaller, electric, or would be used less often (Hollen 1996) than reported in the FEIS or SEIS-I (1997 SEIS-II, Section 5.1.2, Air Quality).

Section 3.1.3 of the 1997 SEIS-II points out that:

At the time of SEIS-I (DOE 1990), all surface facilities, shafts, and hoist facilities had been constructed. Underground, an initial waste disposal panel (Panel 1) had been excavated and was ready to accommodate the Test Phase activities (see Section 2.1.4). These physical facilities, which are described in SEIS-I, are essentially unchanged.

Therefore, the air quality impacts associated with the mining of a new shaft and access drifts is comparable to the impacts evaluated in the 1980 FEIS in Section 8.7.5, *Airborne Effluents*, and Section 9.3.1, *Biophysical Environment*, which speak to effluent emissions such as sulfur dioxide, carbon monoxide, hydrocarbons, nitrogen oxides, and particulates (i.e., combustion products, salt, and fugitive dust). Table 9-7, *Summary of Air-Quality Impacts During Construction*, in the 1980 FEIS lists these items and their expected source and concentration. The 1980 FEIS considers the equipment inventory for construction and emission factors. These estimates were derived from previous large excavation and mining projects as guides. For the Proposed Action, the scale of the construction activity is significantly less than what was evaluated in the 1980 FEIS and the period of construction activity is relatively short, on the order of months as opposed to years.

Table 9-20, *Summary of Air-Quality Impacts During Operation*, in the 1980 FEIS addresses the operational release of emissions. In addition to the pollutants identified during the construction of the facility, operational emissions include gases resulting from the experiments. The effects of emissions on local air quality were derived from meteorological data collected at the WIPP facility and by establishing the meteorological conditions that would produce the maximum 24-hour concentrations of pollutants. Mitigative action for fugitive dust may be found in the 1991 *Mitigation Action Plan for the Records of Decision for the Waste Isolation Pilot Plant*. There are no known additional impacts from VOC emissions due to the new shaft as the relevant waste inventory assumptions have not changed nor have the number and locations of receptors. Air modeling for the NFB exhaust vent predicts about an order of magnitude decrease in exposure to VOCs; therefore, the impacts are bounded by the existing NEPA analysis.

3.3.2 Noise

The DOE requires its facilities to comply with Occupational Safety and Health Administration 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 such as the PVS 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 region of interest (DOE, 2016b). Chapter 9 of the 1980 FEIS contains a thorough noise evaluation for construction activities similar to those in the proposal.

3.3.3 Geology and Hydrology

The implementation of the Proposed Action will result in changes in the flow of surface water and will require the construction and operation of lined evaporation ponds. Storm water runoff and other discharges from the operation of the PVS would be managed in accordance with the requirements and conditions in the existing WIPP Discharge Permit-831. The WIPP Discharge Permit-831 requisites will control the potential discharge of water contaminants from the PVS into ground and surface water and therefore will be protective of the environment and public health. The proposed projects, which include berms to divert water away from critical operational facilities and which provide for the construction of lined evaporation ponds to control infiltration, do not pose new operational or significant environmental impacts on the hydrologic characteristics at the WIPP site beyond those already analyzed in 1997 SEIS-II.

Drilling the new shaft will penetrate geological and hydrological features at the WIPP site. There are minimal impacts due to the penetration of water bearing strata (i.e., Magenta Member or Culebra Member of the Rustler Formation) in the proposed shaft during construction and operation. This is because water infiltration into the shafts is managed by standard means such as grouting, shaft lining, and water collection. Like the existing WIPP facility shafts, the new shaft would be sealed upon facility closure in accordance with a shaft sealing program. There are no adverse impacts to human health and the environment from the construction, operation, or sealing of the new air intake shaft that would not be controlled by contractor standard operating procedures, Conduct of Operations, and the DOE's Integrated Safety Management System. Impacts to geology and hydrology are insignificant.

3.3.4 Water Resources and Infrastructure

There are two proposed activities that may increase the amount of water that is used at the WIPP facility and which could produce wastewater. Drilling (sinking the shaft) will likely be performed with compressed air as opposed to drilling fluid. However, drilling fluid may be used for drilling the shaft and water may be used to reduce salt dust from the ventilation air stream prior to filtration.

No waterborne discharges are planned during the construction of the new shaft. The drilling option being considered for the new shaft does not propose to use drilling fluids (i.e., drilling process is dry). Rock cuttings from the drilling process will be accumulated on the surface into piles. The rock cuttings that require accumulation in a lined storage cell pile will be accumulated in compliance with existing regulatory guidelines. Any solid waste from drilling would be disposed of off-site. There are no significant environmental impacts associated with this drilling option beyond those already analyzed in the 1980 FEIS.

The Salt Reduction Building water usage is within the capacity of the existing water infrastructure. However, it is possible the Salt Reduction Building water usage may result in exceeding the obligation of the City of Carlsbad to supply six million gallons of water per year at no cost, in which case, the project will purchase the necessary water. Excess water is removed by evaporation. Salt that is removed will be managed as waste and its deposition depends on its radiological and chemical nature. The operational impacts are insignificant since the WIPP facility already has the infrastructure and processes in place to manage the waste.

Negligible annual infrastructure impacts would be expected under the Proposed Action. Existing water supply, waste management, and sewer capabilities and existing and planned power and roadway resources will be able to accommodate proposed shaft sinking, mining, construction, and ventilation system operation.

3.3.5 Filter Waste

The 1980 FEIS identified HEPA filter waste as the largest source of radioactive site-generated waste resulting from operations of the WIPP facility. The 1980 FEIS estimated an annual production of 620 cubic feet of compacted filters consisting of eight DOT-7A boxes (6 by 5 by 4 feet) annually. The 1980 FEIS considered compaction and packaging in steel boxes and disposal in the repository if the waste meets the WIPP waste acceptance criteria. Because filter waste routinely meets the conditions for disposal as low-level radioactive waste, the current practice is to package filters into appropriate shipping containers and to ship them to either a DOE or commercial low-level disposal site. In one instance, following the events of February 2014, a portion of the filters were determined to be TRU and were disposed in the WIPP repository. Filters are not compacted because the volume being placed in the repository is not significant.

The PVS NFB will contain significantly more filtration units. This will result in disposal of around 4,500 filters per year. This equates to 18,000 cubic feet of uncompacted filter waste, annually. Few, if any, of these are anticipated to be TRU. Even though the number of filters is significantly more than considered in the 1980 FEIS, the operational impacts are insignificant since the facility already has the infrastructure, processes, and equipment in place to handle the filters and to ship them to an off-site low-level waste disposal facility.

4.0 CUMULATIVE IMPACTS

This section presents an analysis of the potential cumulative impacts resulting from changes and new circumstances that are relevant to environmental concerns since issuance of the 2016 SA, and compares the potential impacts to those analyzed in the 1997 SEIS-II to determine if any of the changes are substantial or new circumstances are significant. Council on Environmental Quality regulations at 40 CFR §1508.7 define cumulative impacts as “the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”

Past and present actions at the WIPP facility are represented in the description of the Proposed Action discussed in this document in the preceding chapters and in the numerous NEPA analyses referenced herein. This chapter accordingly focuses on reasonably foreseeable future actions that could contribute to cumulative impacts within the same geographic and temporal space as the Proposed Action.

Cumulative impacts are documented in Section 4 of the 2016 SA, and key sections summarizing the impacts are included below:

The construction activities related to PVS would occur within the LWA [land withdrawal area] on land that is already controlled by DOE. The surface disturbing activities are expected to result in fugitive dust from grading, drilling, and mining; diesel emissions from heavy equipment, emergency diesel generators, and drilling. These impacts are typical of industrial mining sites in general and to the WIPP facility in particular and would not represent a significant contribution to the existing impacts at the WIPP site.

The construction of the upgraded ventilation systems and AGSC would temporarily increase the construction workforce at WIPP. Considering that these projects would be unlikely to increase the workforce over the long term beyond the assumptions in the SEIS-II, there would be no additional non-radiological impacts to workers that were not already identified and considered in SEIS-II.

Because of the way the underground ventilation system is segregated and operated, construction and operation of the upgraded ventilation system would not contribute to worker or offsite radiological consequences. Rather, it would enhance protection of the workforce, members of the public, and the environment from potential accidental radiological releases.

This section includes potential impacts to resource areas for the PVS and the Above Ground Storage Capability (AGSC). The PVS is discussed in an overview fashion in this document. These impacts are incorporated by reference and are not repeated here since the information is unchanged. An environmental assessment for the AGSC is in preparation.

5.0 DETERMINATION

The DOE prepared this SA in accordance with 40 CFR 1502.9(c) and 10 CFR 1021.314 to evaluate the Proposed Action to construct and operate the PVS, specifically including the NFB and the New Exhaust Shaft and access drifts. The PVS would provide the DOE the capability to return to full-scale UG operations, thereby continuing to implement the WIPP mission as defined and directed in the WIPP LWA, Public Law 102-579 (U.S. Congress, 1992). Based on the analysis presented in this SA, the DOE's Proposed Action does not represent substantial changes to the 1997 SEIS-II and to portions of the 1980 FEIS not considered in 1997 SEIS-II that are relevant to environmental concerns, and there are no new circumstances nor information relevant to environmental concerns that bear on the Proposed Action or its potential environmental impacts that would warrant additional NEPA analysis. The DOE has therefore determined that no further NEPA documentation is required.

Approved: November 7, 2017

//Signature on File//

Todd Shrader, Manager
U.S. Department of Energy Carlsbad Field Office

Concurrence: November 2, 2017

//Signature on File//

Myles Hall, Legal Counsel
U.S. Department of Energy Carlsbad Field Office

REFERENCES

- DOE, 1980. *Final Environmental Impact Statement, Waste Isolation Pilot Plant*, DOE/EIS-0026, U.S. Department of Energy, October.
- DOE, 1990. *Final Supplement Environmental Impact Statement, Waste Isolation Pilot Plant*, DOE/EIS-0026-FS, U.S. Department of Energy, 1990.
- DOE, 1995. *Air Quality Permit No. 310-M-2*, New Mexico Environment Department Air Quality Bureau, December 8, 1993.
- DOE, 1997. *Waste Isolation Pilot Plant Disposal Phase Final Supplemental Environmental Impact Statement*, DOE/EIS-0026-S-2, U.S. Department of Energy, September 1997.
- DOE, 2001. *Site-Derived Mixed Waste Handling*, WP 05-WH1036 (current version is Revision 15, 2017).
- DOE, 2005a. *Recommendations for the Supplement Analysis Process*. Office of NEPA Policy and Compliance, U.S. Department of Energy, July.
- DOE, 2005b. *Supplement Analysis for the Waste Isolation Pilot Plant Site-Wide Operations* (DOE/EIS-0026-SA-05), U.S. Department of Energy.
- DOE, 2009. *Supplement Analysis for the Waste Isolation Pilot Plant Site-Wide Operations* (DOE/EIS-0026-SA-07), U.S. Department of Energy.
- DOE, 2011. 10 CFR Part 1021, *National Environmental Policy Act Implementing Procedures*, U.S. Department Energy.
- DOE, 2014a. *Waste Isolation Pilot Plant Recovery Plan*, Revision 0, U.S. Department of Energy, September 30.
- DOE, 2014b. *U.S. Department of Energy Accident Investigation Report, Underground Salt Haul Truck Fire at the Waste Isolation Pilot Plant*, U.S. Department of Energy, March 13.
- DOE, 2014c. *U.S. Department of Energy Accident Investigation Report, Phase 1, Radiological Release Event at the Waste Isolation Pilot Plant on February 14, 2014*, U.S. Department of Energy, April 22.
- DOE, 2014d. *Categorical Exclusion: Installation of an Interim Ventilation System to Support Recovery Actions at the Waste Isolation Pilot Plant*, U.S. Department of Energy, November 17.
- DOE, 2016a. DOE/EIS-0026-SA-10, *Supplement Analysis for the Waste Isolation Pilot Plant Site-Wide Operations*, U.S. Department of Energy, December 21.
- DOE, 2016b. *Data Call to Support the Supplement Analysis for the Waste Isolation Pilot Plant Site-Wide Operations*, U.S. Department of Energy, December 12.
- DOE, 2016c. *Waste Isolation Pilot Plant Annual Site Environmental Report for 2015*, DOE/WIPP-16-3572, U.S. Department of Energy, September.
- DOE, 2017a. *Categorical Exclusion: Installation of Supplemental Ventilation System to Support Underground Activities at the Waste Isolation Pilot Plant*, U.S. Department of Energy, April 17.

DOE, 2017b. *Waste Isolation Pilot Plant Annual Site Environmental Report for 2016*, Publication Pending, U.S. Department of Energy, September.

NCRP, 1996. *Screening Models for Releases of Radionuclides to the Atmosphere, Surface Water, and Ground*, Report 123, National Council of Radiation Protection, 1996.

NMED, 2002. *New Mexico Air Quality Regulations, Title 20 (Environmental Protection), Chapter 2 (Air Quality Standards-Statewide), Part 72 (Construction), Subpart 400 (Permits for Toxic Air Pollutant Emissions-Preamble)*, New Mexico Environment Department, 2002.

NMED, 2016. *NMED Inspection Waste Isolation Pilot Plant EPA ID# NM4890139088*. Letter from K. Roberts, Director of Resource Protection Division, to T.A. Shrader, Manager, Carlsbad Field Office Department of Energy, New Mexico Environment Department, December 16.

NWP, 2015. *Conceptual Design Report for the Waste Isolation Pilot Plant Underground Ventilation System (UVS) Project Implementing Line Items 15-D-411, Safety Significant Confinement & Ventilation System 15-D-412, Exhaust Shaft*, Revision 3.0, Nuclear Waste Partnership LLC, December 23, 2015.

NWP, 2016. *Waste Isolation Pilot Plant Documented Safety Analysis*, Nuclear Waste Partnership LLC, April 2016.

NWP, 2017. *Waste Isolation Pilot Plant, New Filter Building, Permanent Ventilation System, Function and Requirements Document*, 500655-416-GN-DB-00002, Revision D, Nuclear Waste Partnership LLC, February 2017

POTUS, 1994. *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, Executive Order 12898, 59 Fed. Reg., Office of the President, February 11.

U.S. Congress, 1979. *U.S. Department of Energy National Security and Military Applications of Nuclear Energy Authorization Act of 1980*, Public Law 96-164, December 29.

U.S. Congress, 1992. *Waste Isolation Pilot Plant Land Withdrawal Act of 1992*, Public Law 102-579.

U.S. Congress, 1996. *Waste Isolation Pilot Plant Land Withdrawal Act Amendments*, Public Law 104-201.

Enclosure 3

Figure 1, Shaft Collar Plan View

Figure 2, Shaft Collar Section

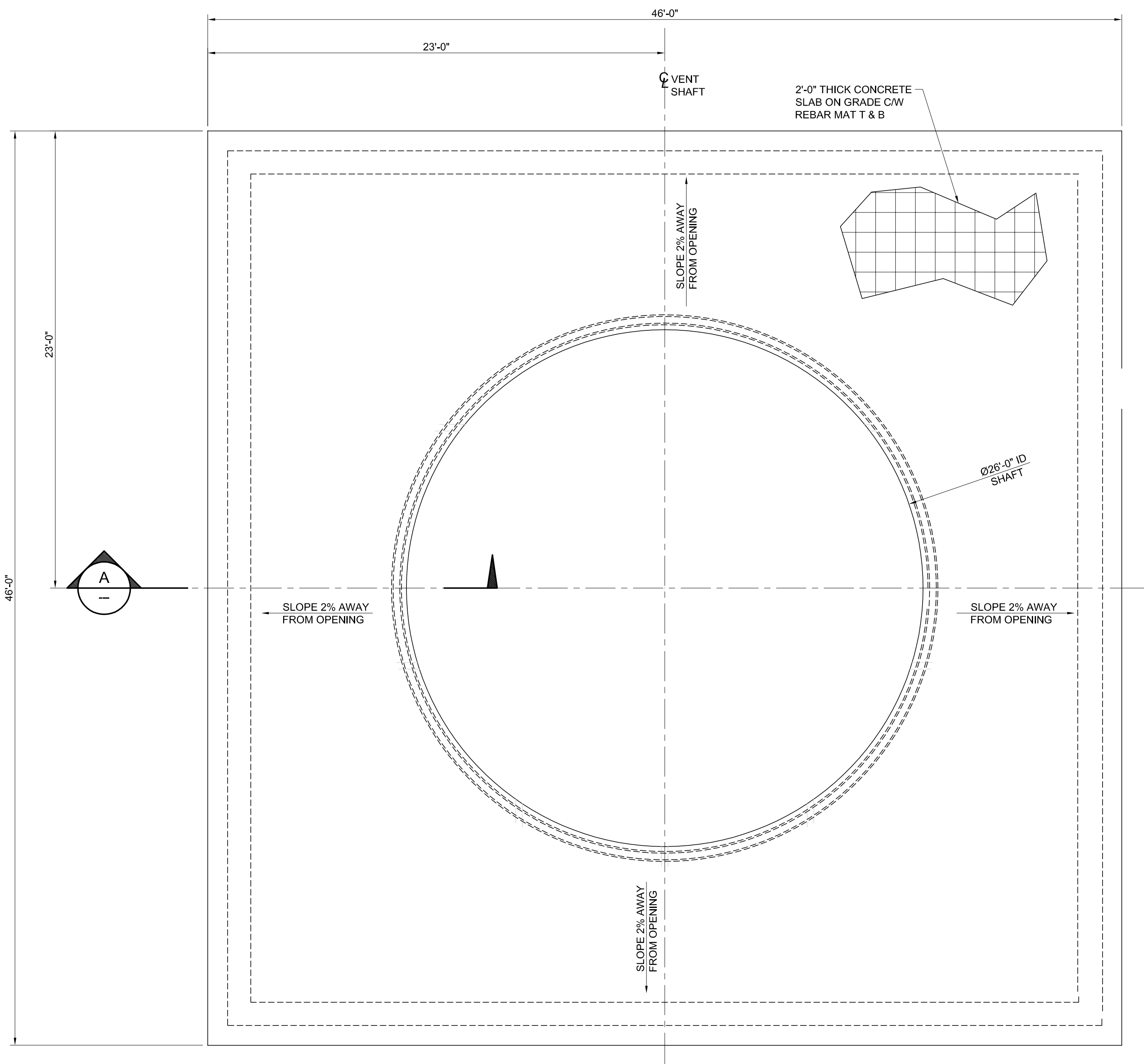
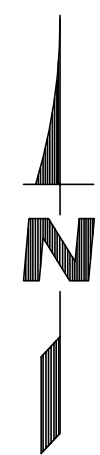


Figure 1: Shaft Collar Plan View

PLAN
COLLAR CONCRETE
SCALE 1/4"=1'-0"

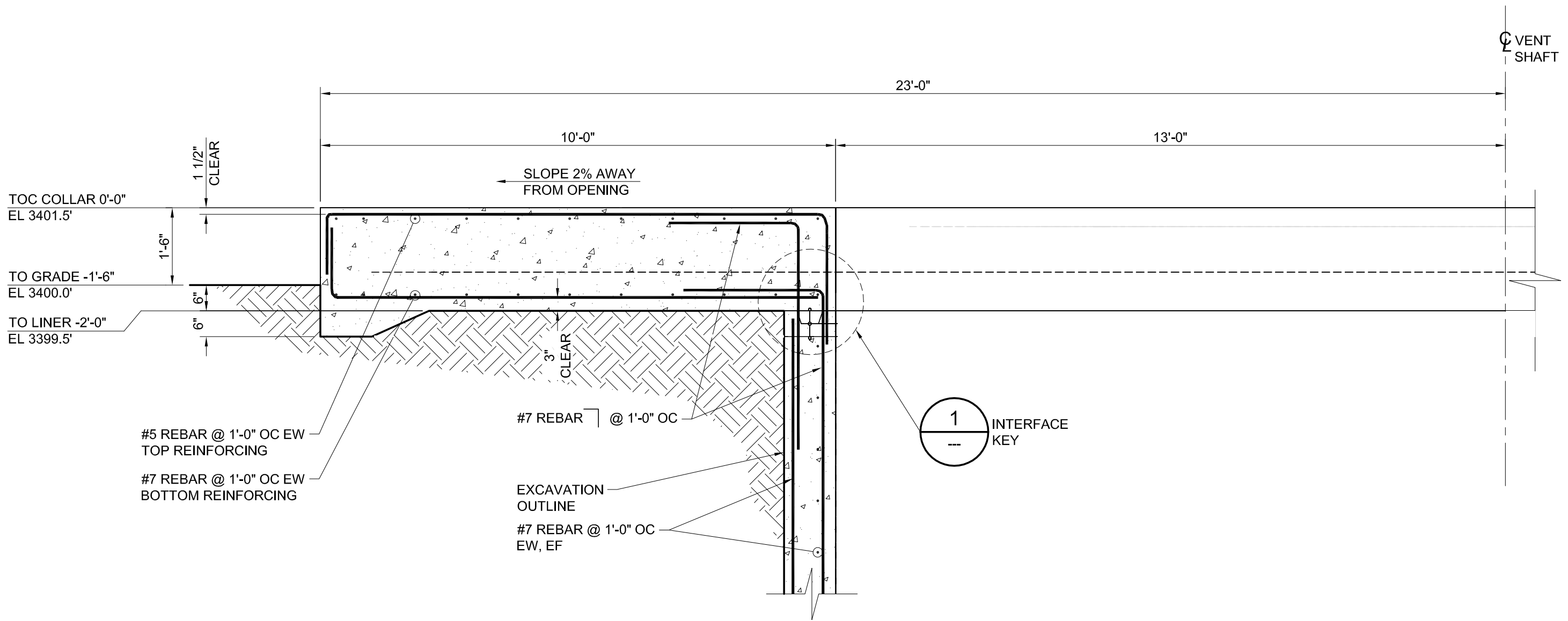


Figure 2: Cross Section of Shaft #5 Collar

A SECTION
COLLAR CONCRETE
 SCALE 1/2"=1'-0"
 SYM ABOUT CENTER OF SHAFT