OFFICE OF RADIATION AND INDOOR AIR
WASHINGTON, D.C. 20460

November 6, 2023

Mr. Mark Bollinger, Manager
Carlsbad Field Office
U.S. Department of Energy
P.O. Box 3090
Carlsbad, New Mexico 88221-3090

Dear Mr. Bollinger:

The U.S. Environmental Protection Agency conducted inspections at the Waste Isolation Pilot Plant (WIPP) on May 16 to 18, 2023, as part of the EPA's continuing oversight of the facility. These inspections were performed in accordance with 40 CFR 194.21 and 40 CFR part 191, Subpart A. The EPA team inspected both the WIPP surface and underground facilities, using established inspection checklists. This letter transmits the EPA's inspection reports.

Based on the activities documented in the enclosed reports, the EPA inspection team found that the U.S. Department of Energy (DOE) Carlsbad Field Office (CBFO) and its contract staff at WIPP continue to meet commitments and regulatory requirements to track waste, monitor the disposal system, measure any radioactive releases, calculate potential dose to the public, and document the results of these activities. WIPP site personnel were attentive and accommodating.

Additionally, the EPA inspectors followed up on the Waste Data System (WDS) concern identified in the 2022 emplacement inspection[1] and have found that WIPP personnel are correcting the issue. WDS administrators provided the EPA inspectors with a preview of the updated Version 3.5 of the WDS (which is currently at Version 3.4) that corrects the magnesium oxide excess factor calculation. Version 3.5 is expected to be released in late 2023. The Agency will verify the correction when the updated WDS version has been released to fully close out this issue.

The EPA believes there is an opportunity to use the existing data to enhance the long-term understanding of repository behavior. The agency will discuss with DOE appropriate approaches to incorporating monitoring data into the WIPP performance assessment process so that pre-closure monitoring effectively contributes to "the ability to verify predictions about the future performance of the disposal system" as described in 40 CFR 194.42(c).

[1] See E-Docket EPA-HQ-OAR-2001-0012-0767.

Copies of the enclosed reports will be placed in the EPA public dockets at http://www.regulations.gov. If you have any questions regarding the enclosed reports, please contact Jonathan Walsh at (202) 343-9238 or walsh.jonathan@epa.gov.

Sincerely,

Lee Ann B. Veal
Director
Radiation Protection Division

ENCLOSURES
1. 2023 – Emplacement Inspection Report
2. 2023 – Monitoring Inspection Report
3. 2023 – Subpart A Inspection Report

cc: George Basabilvazo, DOE/CBFO
Ed Garza, DOE/CBFO
Michael Gerle, DOE/CBFO
Martin Navarrete, DOE/CBFO
Anderson Ward, DOE/CBFO
Ken Harrawood, SIMCO
Greg Roselle, SNL Carlsbad
Justin Marble, DOE/EM
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Megan McLean, NMED
Kevin Pierard, NMED
Alan Romero, NMED
George Brozowski, EPA Region 6
Erik Christianson, EPA Region 6
Harry Shah, EPA Region 6
Winifred Okoye, EPA OGC
EPA Docket
EPA WIPP Team

E-DOCKET: EPA-HQ-OAR-2001-0012-0782

2023 – Monitoring Inspection Report

INSPECTION OF THE
WASTE ISOLATION PILOT PLANT
May 16–18, 2023

U. S. ENVIRONMENTAL PROTECTION AGENCY
Office of Radiation and Indoor Air
Center for Waste Management and Regulations
1200 Pennsylvania Avenue, NW
Washington, DC 20460

November 2023

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List of Abbreviations

Am	americium
AP	analysis plan
API	American Petroleum Institute
BLM	Bureau of Land Management
CBFO	U.S. Department of Energy Carlsbad Field Office
CCA	Compliance Certification Application
CFR	*Code of Federal Regulations*
Ci	curie(s)
CMR	Central Monitoring Room
COMP	Compliance Monitoring Parameter
CRA	Compliance Recertification Application
Cs	cesium
DBDSP	Delaware Basin Drilling Surveillance Program
DBMAR	Delaware Basin Monitoring Annual Report
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
LATA	Los Alamos Technical Associates
OCD	Oil Conservation Division
ORIA	Office of Radiation and Indoor Air
PA	performance assessment
Pu	plutonium
SAGR	Semi-Annual Groundwater Surface Elevation Report
SIMCO	Salado Isolation Mining Contractors
SNL	Sandia National Laboratories
SP	specific procedure
Sr	strontium
TV	trigger value
U	uranium
WDS	Waste Data System
WIPP	Waste Isolation Pilot Plant

WQSP	Water Quality Surveillance Program

1.0 Executive Summary

The U.S. Environmental Protection Agency (EPA or the Agency) conducted an inspection of the U.S. Department of Energy (DOE or the Department) Waste Isolation Pilot Plant (WIPP), southeast of Carlsbad, New Mexico, from May 16 to 18, 2023, as part of the Agency's continuing WIPP oversight program. The purpose of this inspection was to verify that DOE continues to adequately monitor 10 parameters listed in the 1996 Compliance Certification Application (CCA), Volume 1, Section 7.0, in particular Table 7-7. The monitoring inspection examines the monitoring of geomechanical, hydrological, waste activity, drilling-related, and subsidence parameters. Appendices A and B contain the inspection plan and the checklist used by EPA inspectors, respectively. Appendix C lists documents reviewed by EPA. EPA conducted its most recent prior inspection from May 24 to 26, 2022 (EPA-HQ-OAR-2001-0012-0767).

EPA inspectors toured locations where measurements are taken and were given demonstrations on how personnel conduct measurements. EPA also examined data and reviewed documents and procedures that direct these monitoring activities. The inspection checklist in Appendix B: 2023 Monitoring Inspection Checklist provides details of these inspection activities. EPA found that the site has continued to effectively implement the monitoring programs at the WIPP for all areas reviewed. The inspectors also confirmed that the results of DOE monitoring programs are included in annual reports. The inspection team did not identify any findings or concerns related to the parameter monitoring program; however, EPA believes that there is an opportunity to use the existing data to enhance the long-term understanding of repository behavior. The Agency will discuss with DOE appropriate approaches to incorporating monitoring data into the WIPP performance assessment (PA) to make sure that pre-closure monitoring effectively contributes to "the ability to verify predictions about the future performance of the disposal system" as described in §194.42(c).

2.0 Scope

The EPA WIPP Compliance Criteria require DOE to "conduct an analysis of the effects of disposal system parameters on the containment of waste in the disposal system" (Title 40 of the *Code of Federal Regulations* Part 194, Section 42(a) [40 CFR 194.42(a)]) and use the results of the analysis to develop pre- and post-closure monitoring requirements. The results of this analysis were included in the 1996 CCA and confirmed most recently in the 2019 Compliance Recertification Application (CRA).

DOE documents the analysis of monitoring parameters in Volume 1, Section 7.0 of the CCA. Table 7-7 of the CCA lists the 10 parameters that the Department determined may affect the disposal system. These parameters are grouped into major categories and listed in Table 1. EPA accepted these 10 monitoring parameters in the 1998 certification decision and confirmed them in the 2022 recertification decision for the CRA-2019.

This inspection was performed in accordance with regulation 40 CFR 194.21, which authorizes EPA to verify the continued effectiveness of the parameter monitoring program at the WIPP. Inspection activities included an examination of monitoring and sampling equipment on site, off

site, and underground. The Agency also reviewed sampling procedures and measurement techniques and verified that monitoring data are collected using defined procedures with quality assurance oversight (see the document list in Appendix C: Documents Reviewed).

Table 1. Monitored Parameters (taken from Vol. 1, Section 7.0, of the CCA)

Parameter Category	Parameters
Geomechanical*	Creep closure Extent of deformation Initiation of brittle deformation Displacement of deformation features
Hydrological	Culebra groundwater composition Change in Culebra groundwater flow direction
Subsidence	Surface subsidence
Drilling-Related[+]	Drilling rate Probability of encountering a Castile brine reservoir
Waste Activity	Waste activity

*These monitored geomechanical parameters are related to various properties of the Salado Formation that DOE has determined could affect the performance of the repository.

[+]The drilling rate here references the deep drilling rate for resources in the Delaware Basin.

3.0 Inspection Team, Observers and Participants

The inspection team consisted of seven EPA staff physically present for the inspection. Table 2 lists the EPA inspection team. Numerous DOE staff and contractors participated in the inspection and noted their attendance in sign in sheets before the opening and closing meetings and before inspection activities. Table 3 includes a list of some of these participants based on these sign in sheets. Note that in February 2023, the management and operations contract for the WIPP transitioned from Nuclear Waste Partnership to Salado Isolation Mining Contractors (SIMCO), with teaming contractor Los Alamos Technical Associates (LATA) replacing Regulatory and Environmental Services). Personnel are largely the same from previous inspections, though affiliations have changed accordingly.

Table 2. Inspection Team

Inspection Team Member	Position	Affiliation
Tom Peake	Director, Center for Waste Management and Regulations	EPA Office of Radiation and Indoor Air (ORIA)
Jonathan Walsh	Lead Inspector	EPA ORIA
Joe Rustick	Inspector	EPA ORIA
Xinyue Tong	Inspector	EPA ORIA
Erik Christiansen	Inspector	EPA Region 6

Inspection Team Member	Position	Affiliation
Jon Major	Inspector	EPA ORIA
Jay Santillan	Inspector	EPA ORIA

Table 3. Inspection Participants

Participant	Affiliation
Anderson Ward	DOE- Carlsbad Field Office (CBFO)
Ed Garza	DOE-CBFO
Michael Gerle	DOE-CBFO
Justin Marble	DOE-Environmental Management (EM) (remote)
Russ Patterson	Contractor supporting DOE-EM (remote)
Ashley Urquidez	Los Alamos Technical Associates (LATA)
Cassie Marrs	LATA
Ginny Jones	LATA
Karen Day	LATA
Lisa Ramos	LATA
Natalie LaClair	LATA
Richard Jimenez	LATA
Rick Salness	LATA
Rosendo Borjas Nevarez	LATA
Sidney Harper	LATA
Ricardo Hernandez	LATA
Shawn Otto	Los Alamos National Laboratory-Carlsbad Office Transportation Certification Official
Alan Romero	New Mexico Environment Department (NMED) (Inspection Observer)
Amber Gellis	NMED (Inspection Observer)
Ben (Ty) Zimmerly	SIMCO
Ch Lvomy	SIMCO
Christina Grigg	SIMCO
David Riphy	SIMCO
Dorothy Thomas	SIMCO

Participant	Affiliation
Heather Patterson	SIMCO
Hector Jimenez	SIMCO
Jared Sorensen	SIMCO
Mansour Asabarzadeh	SIMCO
Michael Marksberry	SIMCO
Mike Prookr	SIMCO
Neal Appell	SIMCO
Rey Carrasco	SIMCO
Roy Neese	SIMCO
Ryan Flynn	SIMCO
Steve Offner	SIMCO
Terry Batchelder	SIMCO
Shelly Nielsen	Sandia National Laboratories (SNL)/Edgewater–Carlsbad
Orlando Reyna	SNL/INTERA–Carlsbad
Cody Franco	SNL/RESPEC–Carlsbad
Akara Mahawa	SNL–Carlsbad
Chammi Miller	SNL–Carlsbad
Jennifer Long	SNL–Carlsbad
Owen Loften	SNL–Carlsbad
Rodney Keith	SNL–Carlsbad
Dale Bowman	SNL–Carlsbad
Dwayne Kicker	SNL–Carlsbad
Leslie Kirkes	SNL–Carlsbad
Ryan Jackson	SNL–Carlsbad
Brent Blunt	UDR Consulting, Inc.
George Wrangle	WIPP Communications
Caleb Subia	WIPP Central Monitoring Room (CMR)
Eric Galindo	WIPP–CMR
JD Mcolland	WIPP–CMR
Jacob Galindo	WIPP–CMR

The inspection began on the morning of Tuesday, May 16. Prior to entering the controlled areas of the WIPP site, the inspection team first observed a demonstration of groundwater level

measurements made in the field. The opening meeting took place at the WIPP site in the late morning, during which program managers briefly summarized the changes made to their programs since the most recent prior inspection in 2022. Later that afternoon, the inspection team went underground to observe the emplacement of waste in the repository at Panel 8 of Room 7. This was the first time since the 2014 fire and radionuclide release incidents at the WIPP that EPA inspectors were able to directly observe waste emplacement operations because Panel 7 in the contaminated area has now been filled and closed. During the underground inspection, EPA observed waste being transported from the waste shaft and placed at the active waste face, and the radiological sampling that accompanies that activity. These processes were explained to EPA inspectors. EPA inspectors observed the collection of convergence measurements by members of the geotechnical monitoring program. EPA inspectors also visited experimental areas and held a short discussion on current and future planned experiments.

On Wednesday, May 17, inspectors met with the engineering staff responsible for monitoring surface subsidence by conducting topographic surveys at the WIPP site. Later that afternoon, geotechnical staff briefed inspectors on how data collected from convergence measurements are processed.

On the morning of May 18, the inspection team met with the Waste Data System (WDS) team at the Skeen-Whitlock Building in Carlsbad to discuss the monitoring of waste parameters. This was followed by a discussion on the Delaware Basin Surveillance Program, which monitors well drilling to calculate drilling rates and the incidence of brine encounters. LATA staff explained the steps used in the collection of drilling data for the Delaware Basin Drilling Database, how data are added, and updates to the database. EPA staff asked questions on the Delaware Basin Drilling Database, the identification of orphaned wells abandoned without plugging in the area around WIPP, and future upgrades and automation to the program.

On the afternoon of May 18, EPA inspectors went to SNL–Carlsbad for an overview of the Culebra well monitoring network, a demonstration of water quality sampling equipment, and a presentation on the 2021 COMP analysis. The inspection closeout meeting was held later that afternoon at the Skeen-Whitlock Building.

EPA inspectors reviewed three fundamental areas to verify continued implementation of the monitoring program during the preclosure phase: (1) written plans and procedures, (2) quality assurance procedures and records, and (3) results of the monitoring program in the form of raw data and final reports.

4.0 Monitoring of Geomechanical Parameters

In the CCA, DOE committed to measuring four geomechanical parameters of the mined areas in the Salado: creep closure, extent of deformation, initiation of brittle deformation, and displacement of deformation features. These parameters are monitored through convergence monitoring, deformation monitoring, and stratigraphic and fracture mapping, respectively.

The 2023 geomechanical inspection occurred in two parts: a demonstration of how measurements are taken during the WIPP underground tour and a discussion of the data entry

and analysis. Geotechnical measurements are carried out under *WIPP Geotechnical Engineering Program Plan* (WP 07-01, Rev. 8). Results from geotechnical measurements are reported annually. The most recent report presenting these results is the *Geotechnical Analysis Report* (DOE/WIPP-22-3610). Under typical conditions, WIPP staff complete manual geotechnical measurements of underground convergence for all accessible areas of the repository every six weeks, and they review automated extensometer data weekly. However, if WIPP geotechnical staff observe an acceleration in convergence based on their examination of the collected data, they will increase the frequency of measurement.

Geotechnical measurement demonstrations occurred the afternoon of May 16. SIMCO geotechnical staff collected convergence measurements in Panel 8 of Room 5 (W920-S1775, Figure 1A) using a tape extensometer (see Figure 2B and C) and discussed the use of an automated extensometer, referred to as a "wex" (51X-GE-00456, Figure 2D). An extension pole of a known length is attached to an anchor in the ceiling, and then the extensometer is connected between the extension pole and the anchor point in the floor. A manual read is taken of the length values and recorded on a data sheet (Figure 2), and later entered into a database. WIPP staff generally conduct monthly readings for Panel 8 but can differ in frequency in Panel 8 and other panels depending on the configuration of the drift or the rate of deformation being observed when data are analyzed.

SIMCO geotechnical staff showed the location of the automated extensometer in the same room (51X-GE-00456, Figure 1D). This instrument allows staff to measure linear displacement remotely, even when rooms have been sealed and in parts of the repository where ground control is no longer active, so that measurements can be taken for as long as a signal is available.

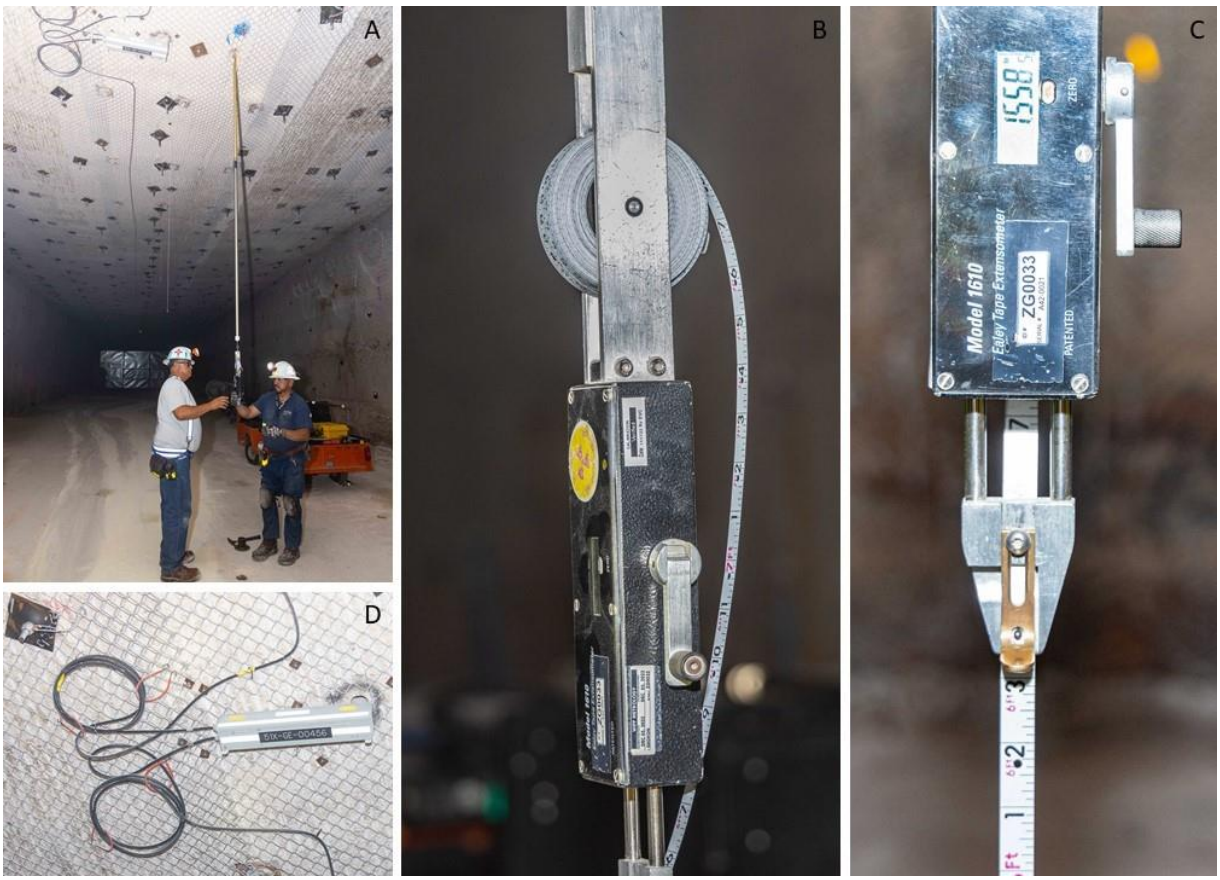
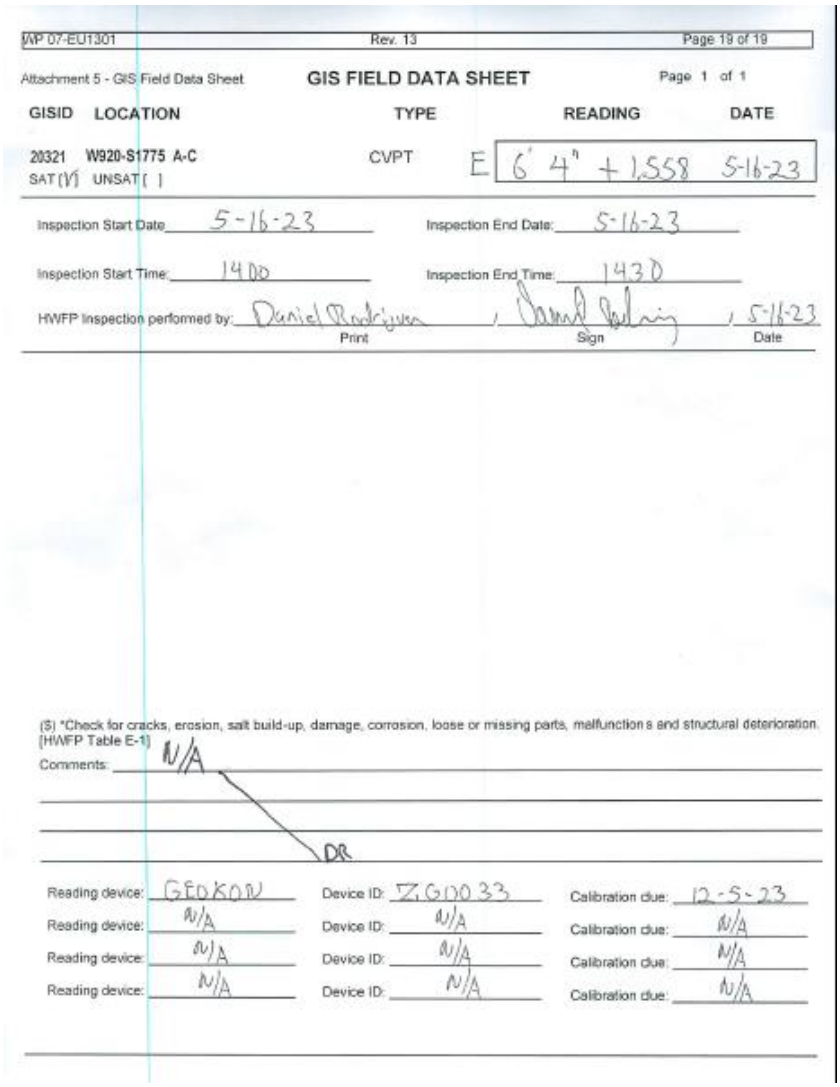


Figure 1. (A) LATA personnel demonstrating measurements; (B) and (C) extensometer readings at W-920, S-1775; (D) automated wire extensometer 51X-GE-00456. Activities took place the afternoon of May 16. Photos provided by DOE.

The inspection team met with geotechnical staff later in the afternoons of May 16 and 17 and discussed how WIPP staff analyze data from measurements collected in the underground. One important application of the geotechnical measurements is for ground control; that is, to monitor convergence and determine when bolt installation is warranted to prevent roof falls and ensure safety in the underground. Staff demonstrated how data are entered into the system and emphasized the numerous quality control checks performed. Inspectors observed as WIPP staff members input extensometer data collected earlier in the underground into their data spreadsheets and conducted the procedure for quality control checks on the same data. Inspectors observed the recorded data collected from the demonstration performed in the underground (see Figure 2). Further, WIPP staff provided EPA inspectors with an overview on how data are analyzed using Junior GIS, a program developed by site contractor staff in-house. The staff provided a visualization of the data collected by looking at total convergence and displacement rates (Figure 3). The staff noted that if the rate of convergence increases exponentially, action is taken to verify convergence is accelerating (e.g., by double-checking data entry and then performing a replicate measurement). If the WIPP staff confirm that convergence rates have increased, immediate action is taken to perform ground control. EPA inspectors observed that although the geotechnical staff measure and collect data on geomechanical features such as

deformation and strain for the purposes of ground control, much of these data remain with the geotechnical staff, except when the data are reported in the COMP analysis (see Section 9.0). Data are primarily used for operational safety. Currently, geomechanical data are not considered for incorporation into the WIPP PA. EPA believes there is an opportunity to use the geotechnical data to increase the understanding of WIPP repository behavior and will discuss with DOE how this specific monitoring information could benefit the WIPP PA.



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Attachment 5 - GIS Field Data Sheet

GIS FIELD DATA SHEET

Page 1 of 1

GISID	LOCATION	TYPE	READING	DATE
20321	W920-S1775 A-C SAT (Y) UNSAT ( )	CVPT	E 6' 4" + 1.558	5-16-23

Inspection Start Date: 5-16-23 Inspection End Date: 5-16-23

Inspection Start Time: 1400 Inspection End Time: 1430

HWFP Inspection performed by: Daniel Rodriguez (Print), [signature] (Sign), 5-16-23 (Date)

(S) *Check for cracks, erosion, salt build-up, damage, corrosion, loose or missing parts, malfunctions and structural deterioration. [HWFP Table E-1]

Comments: N/A

DR

Reading device:	GEOKON	Device ID:	IZ.GDO33	Calibration due:	12-5-23
Reading device:	N/A	Device ID:	N/A	Calibration due:	N/A
Reading device:	N/A	Device ID:	N/A	Calibration due:	N/A
Reading device:	N/A	Device ID:	N/A	Calibration due:	N/A

Figure 2. Data sheets observed by inspectors on the afternoon of May 16 showing the input of the previous observed geotechnical measurements, along with quality control checks and DOE staff signatures. Document reproduced and provided by DOE.

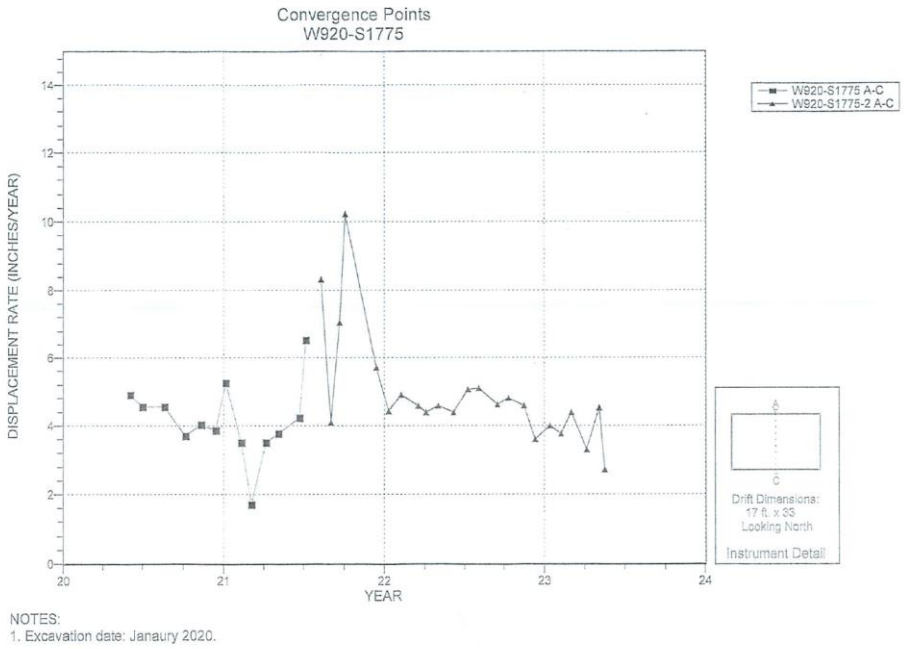


Figure 3. Displacement rate data from W-920, S-1775. Chart observed by the inspection team on the afternoon of May 17. Reproduction provided by DOE.

5.0 Monitoring of Hydrological Parameters

In the CCA, DOE committed to measuring two hydrological parameters: (1) Culebra groundwater composition and (2) changes in the Culebra groundwater flow direction. The 2022 WIPP site inspection focused on the first, whereas the current inspection focused more on the second. Culebra flow direction is determined by using annual measurements of Culebra freshwater heads as inputs to a calibrated potentiometric map. Programmatic functions and responsibilities are outlined in the *WIPP Groundwater Monitoring Program Plan* (WP 02-1, Rev. 17), which includes several components, such as the Water Quality Sampling Program's (WQSP) Water Level Monitoring Program. These functions have not changed since the last inspection. The results of this program are published in the *Waste Isolation Pilot Plant Annual Site Environmental Report* (DOE-WIPP-22-3591).

This monitoring inspection also included an informational review and verification of the WIPP monitoring well network as well as associated analysis plans (APs) and standard operating procedures for the Culebra and other hydrogeologic units important to the WIPP. EPA inspectors were interested in the acquisition, collection, verification, and use of groundwater data, particularly groundwater levels, and how those data were stored, analyzed, and utilized in the WIPP PA parameters, such as the transmissivity fields or the calibrated model parameters used for the Culebra flow model.

On the morning of May 16, LATA staff, led by Cody Franco and Orlando Reyna of the WIPP groundwater surveillance program, met with EPA inspectors in the field at well WQSP-5 for a discussion and demonstration of groundwater data collection, primarily water levels (Figure 4). Staff members demonstrated their methods at two monitoring wells: WQSP-5, a central, downgradient well from the WIPP, and C-2737, located above the waste panels and modeled as the release point in the PA. The staff demonstrated methods according to *Field Parameter Measurements and Final Sample Collection* (WP 02-EM1010, Rev. 4) and *Groundwater Level Measurement* (WP 02-EM1014).



Figure 4. Left photo: Contractor at monitoring well WQSP-5 on the morning of May 16. Note the equipment box, solar panel, and telemetry antenna installed on a pole. Right photo: Contractor at monitoring well C-2737, with EPA inspectors to the left. Photos provided by DOE.

EPA inspectors were informed that, with the exception of redundant wells, all 36 actively monitored Culebra compliance monitoring wells in the WIPP monitoring well network now have transducers and telemetry equipment installed. Additionally, 13 Magenta and 2 Bell Canyon monitoring wells also had transducers and telemetry equipment. The groundwater surveillance program's goal is for all of the monitoring wells to have transducers and telemetry installed in the future (see map in Figure 5). Transducers are set up mid-formation and measurements are recorded at 15-minute intervals. Wells are locked and covered but not sealed to the atmosphere, so a centrally located barometer is part of the network (one of two total barometric pressure transducers) and used for barometric corrections. Four rain gauges are also incorporated into the monitoring network, and more may be added to increase the spatial resolution, as high rainfall events are often very localized in the region. Data is uploaded overnight daily, with uploads staggered to avoid potential interference with nearby oil field telemetry equipment. Groundwater

monitoring staff also visit each well on at least a monthly basis to manually download data from transducers (Figure 6) and take verification measurements. Water levels are calibrated annually. Wells have alarms set up to alert of possible anomalous data and trigger a visit by field staff. Two different models of transducer are used (In-Situ Level Troll and Seametrics PT2X). Transducers are serviced and calibrated annually according to manufacturer's specifications and replaced as needed. Maps were provided to EPA inspectors with the locations of monitoring wells. EPA inspectors were also shown field notebooks, along with the checklists and inspection stickers used by the field staff (Figure 7 and Figure 8). Procedures are found in the *WIPP Groundwater Monitoring Program Plan* (WP 02-1, Rev. 17).

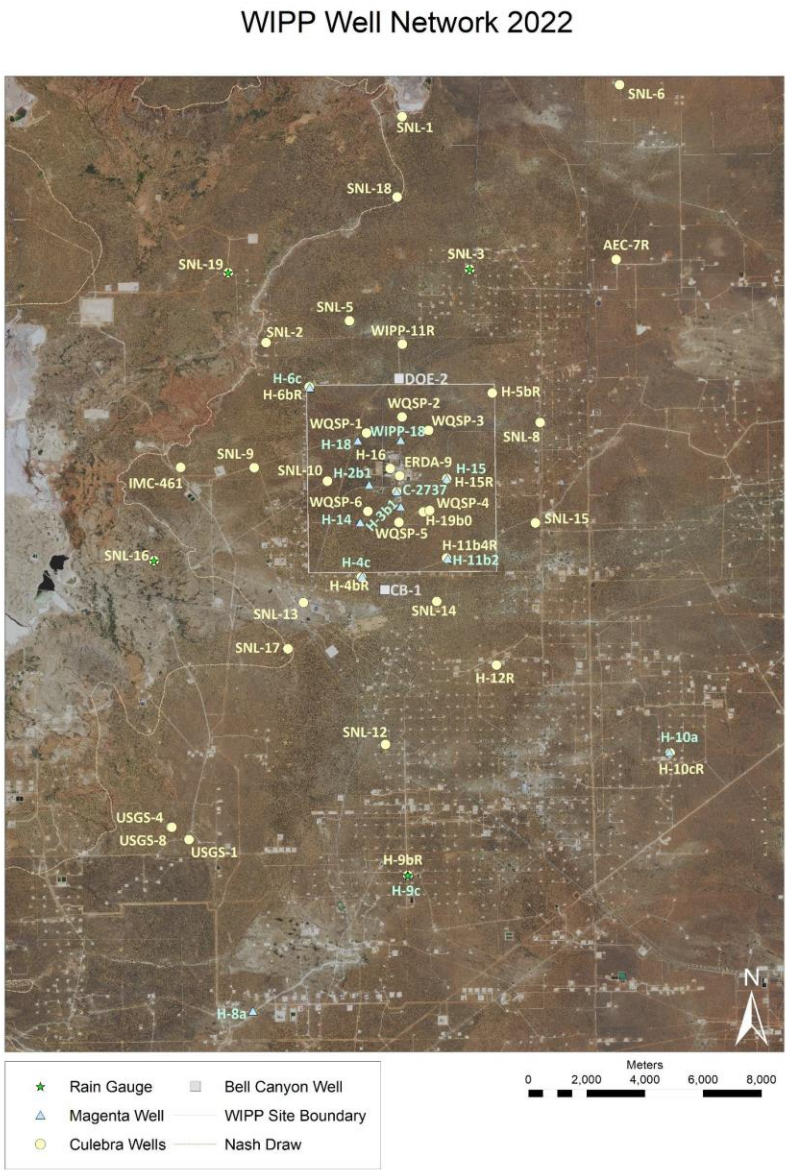


Figure 5. Map of the WIPP monitoring well network provided to inspectors during site inception. Map provided by DOE



Figure 6 Photo of WIPP monitoring well WQSP-5 equipment and demonstration of data download. Photo provided by DOE.

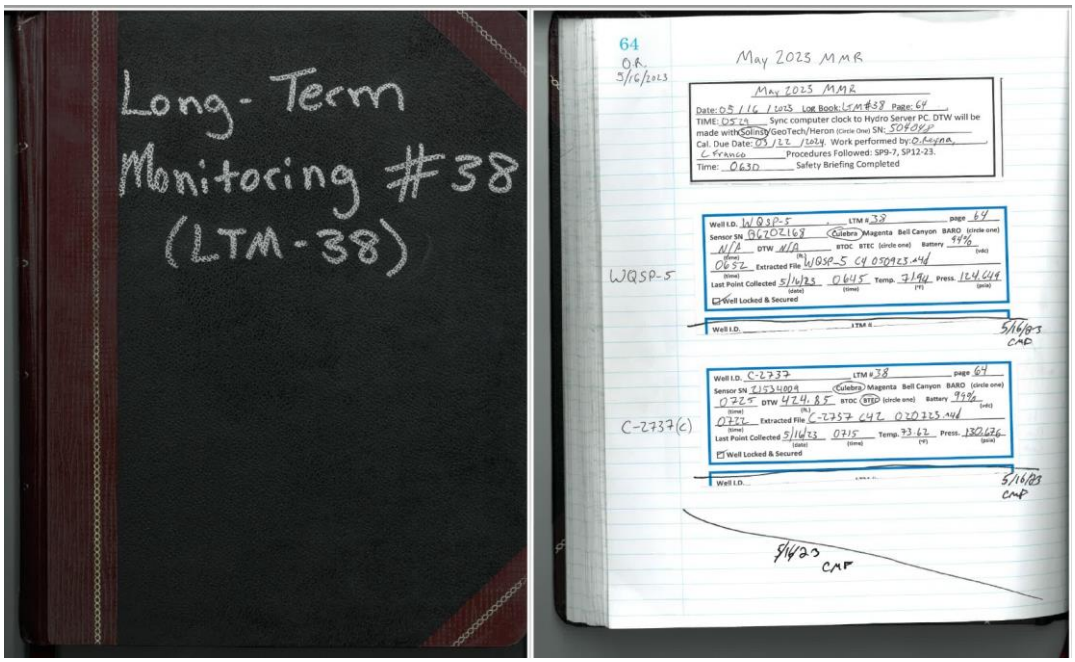


Figure 7. Cover and sample page of field notebook used by contractors responsible for the WIPP monitoring well network.

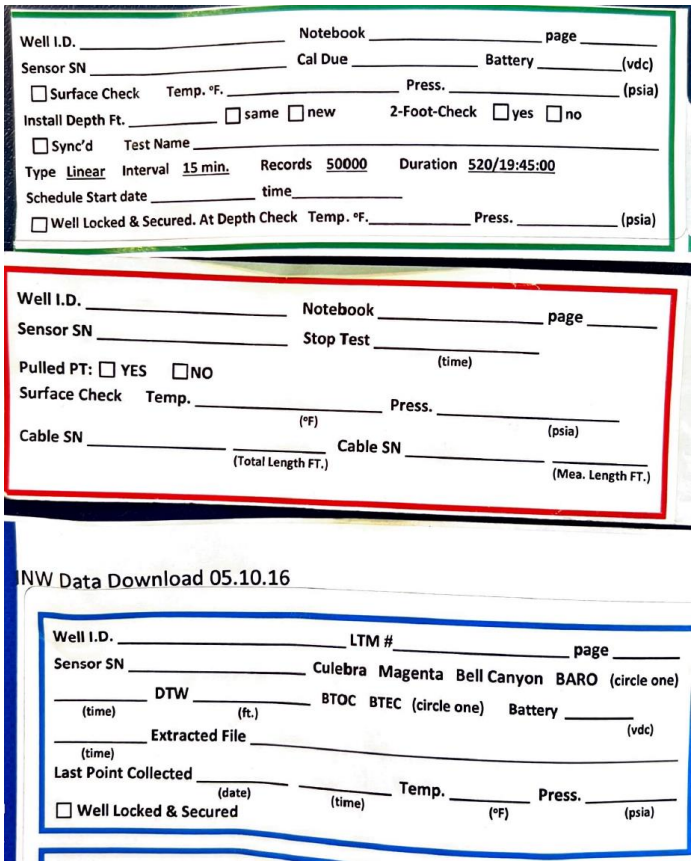


Figure 8. Copy of different blank inspection data stickers used by WIPP groundwater monitoring staff for regular visits. Documents provided by DOE.

On the afternoon of May 18, EPA inspectors went to SNL's facility in Carlsbad for an overview of the Culebra well monitoring network and a demonstration of water quality sampling equipment. Assisted by Ryan Jackson of the SNL hydrology group, Dale Bowman gave an overview on processing the field and remote data. Topics of discussion included field checks and calibration, advantages of continuous remote water level measurements, data corrections and calculations, and long- and short-term data trends. These activities were done according to several different APs, test plans, and specific procedures (SPs), including *Analysis Plan for the Analysis of Observed Water Level Fluctuations* (AP-150, Rev. 1), *WIPP Well Water-Level Monitoring* (SP 9-7, Rev. 10), *Preparation of Culebra Potentiometric Surface Contour Maps* (SP 9-9, Rev. 0), *Calculation of Densities for Groundwater in WIPP Wells* (SP 9-11, Rev. 3), *Data Thinning and Removal of Barometric and Earth Tide Effects From Water-Level Data* (SP 9-13, Rev. 1), and *Monitoring Water Levels in WIPP Wells* (Test Plan 06-01, Rev. 3). SNL contractors demonstrated in-depth knowledge of SNL's sampling procedures and practices during EPA's interviews with SNL staff and its contractors.

One point of clarification made during the inspection was that the wells in the WIPP monitoring well network are utilized by multiple groups (e.g., DOE, LATA, and SNL staff or their various

subcontractors) for several different purposes (e.g., state and federal regulatory requirements), some data are shared, and not all wells are used by all groups. As one example, the WQSP wells' primary purpose is obtaining water quality samples to monitor for releases of contaminants, including radionuclides, but water level measurements of these wells are also used to calibrate and calculate transmissivity fields. Each organization (e.g., SIMCO/LATA or SNL) may have its own plans, procedures, and schedule, though all use the same quality assessment/quality control elements per the WIPP *Quality Assurance Program Document* (DOE/CBFO-94-1012, Revision 14). SNL typically takes its water level measurements at the middle of the month, whereas LATA takes measurements early in the month, resulting in a roughly two-week data resolution.

The SNL hydrology group's presentation on the WIPP network also provided examples of short- and long-term data trends for discussion. The high temporal resolution of data obtained by the WIPP monitoring network has captured many short-term groundwater fluctuations due to nearby anthropogenic activities. These have included short pressure transients related to the drilling of oil wells near the site boundary (Figure 9), drawdowns due to pumping for livestock wells, leakage through a failed piezometer into the salt handling shaft (Figure 10), and construction of the new Shaft #5. Large precipitation events may be recorded in aquifer trends, especially in wells by Nash Draw east of the WIPP site. Further discussion and data can be found in the *Annual Culebra Groundwater Report* (November 2022).

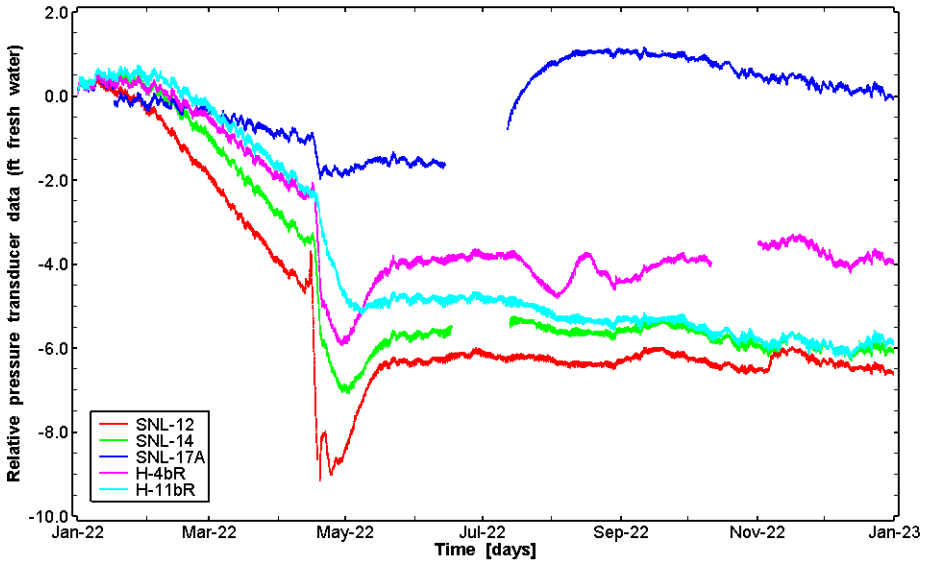


Figure 9. Example of interferences in Culebra water levels due to nearby Devon Energy Well C-02258. Chart from SNL hydrology staff overview presentation provided as part of the EPA inspection. Figure provided by DOE.

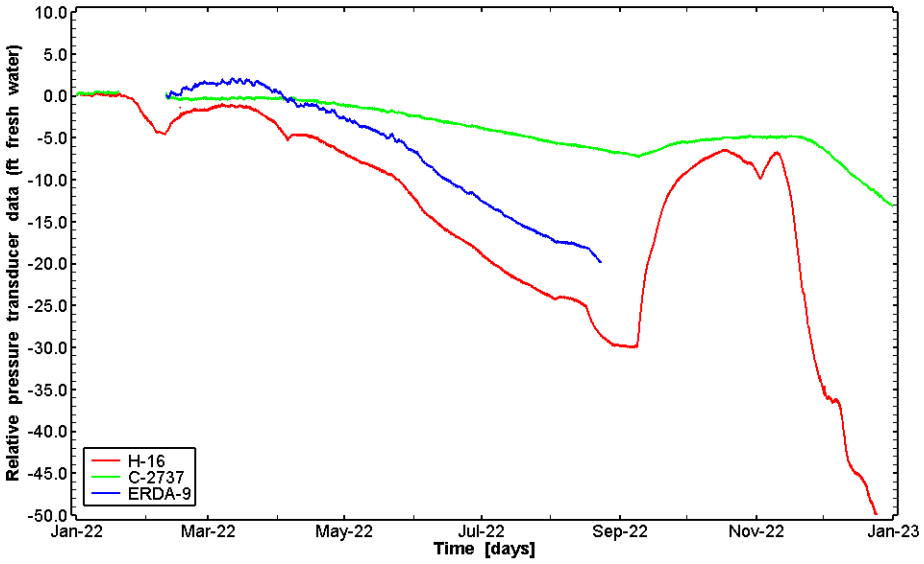


Figure 10. Culebra water level trends attributed to leakage into the salt handling shaft in 2022. Chart from SNL hydrology staff overview presentation provided as part of the EPA inspection. Figure provided by DOE.

Water quality measurements are routinely taken at the WQSP compliance wells, according to *WIPP Groundwater Monitoring Program Plan* (WP 02-1, Rev 17). There have been no major changes to DOE's groundwater sampling methods since the previous inspection. A more detailed discussion of DOE's water quality sampling is available in EPA Docket No. EPA-HQ-OAR-2001-0012-0767.

6.0 Monitoring of Waste Activity Parameters

In the CCA, DOE committed to monitoring the total radioactivity of waste emplaced at the WIPP. Waste activity is recorded for each container shipped to and stored in the facility. A database tracks total radioactivity as well as other components in waste emplaced (e.g., ferrous and nonferrous metals, organic materials, and magnesium oxide). Requirements for the WDS are discussed in the *WIPP Waste Data System Program and Data Management Plan* (WP 08-NT.01, Rev. 35).

On the morning of May 18, inspectors met with WDS staff, who answered questions and generated reports, including the current total activities of the 10 tracked radionuclides (identified in Appendix WCL of the CCA). Following the meeting, inspectors were provided with a Summary of Waste Emplacement Inventory Report, which provided data for emplaced waste materials, including total activities of the 10 radionuclides as of May 18, 2023. The waste activities are included in Table 4, adapted from Table WCL-1 from Appendix WCL of the CCA.

EPA inspectors did not identify any concerns or findings related to the monitoring of waste activity.

Table 4. Waste Data System Nuclide Report for All Rooms and Panels (as of May 18, 2023)

Radionuclide	Repository Contact-Handled Activity (Ci)	Repository Remote-Handled Activity (Ci)	Total Repository Activity (Ci)
Am-241 Americium-241	2.822E+05	6.229E+02	2.828E+05
Cs-137 Cesium-137	2.463E+01	1.448E+04	1.450E+04
Pu-238 Plutonium-238	5.356E+05	7.313E+02	5.364E+05
Pu-239 Plutonium-239	3.578E+05	3.858E+02	3.582E+05
Pu-240 Plutonium-240	8.844E+04	2.813E+02	8.872E+04
Pu-242 Plutonium-242	2.979E+01	3.833E-01	3.017E+01
Sr-90 Strontium-90	1.295E+02	7.622E+03	7.752E+03
U-233 Uranium-233	2.213E+01	3.848E-01	2.252E+01
U-234 Uranium-234	9.586E+01	1.148E+00	9.701E+01
U-238 Uranium-238	1.980E+01	3.926E-02	1.984E+01
Totals:	**1.264E+06**	**2.412E+04**	**1.289E+06**

7.0 Monitoring of Drilling-Related Parameters

In the CCA, DOE committed to tracking two parameters related to commercial drilling in the Delaware Basin: the drilling rate and the probability of encountering a Castile brine reservoir. Data are collected through the program described in the *Delaware Basin Drilling Surveillance Plan* (WP 02-PC.02, Rev. 10). The results of the surveillance program are documented quarterly and reported annually. The most recent *Delaware Basin Monitoring Annual Report* (DBMAR 2022; DOE/WIPP-22-2308) was provided in the inspection document request.

On the morning of May 18, inspection staff met with CBFO staff and contractors of the Delaware Basin Surveillance Program in the Skeen-Whitlock Building. Karen Day, Natalie LaClair, and Lisa Ramos of LATA presented slides and maps summarizing information from the Delaware Basin Drilling Surveillance Program (DBDSP) and its database tracking drilling activities over the past 100 years. EPA inspectors asked for updates following up on questions asked during the CRA-2019 review, recent inspections, and technical exchanges. The first topic discussed was how New Mexico's Oil Conservation Division (OCD) tracks oil and gas activities in the state, the various status codes used for wells, and how and when that information is pulled into the database. Ms. LaClair explained that the OCD, the primary data source used for the DBDSP, puts out a list of oil and gas activity on a weekly basis with two spreadsheets, one for well activities and a second for well completions. OCD tracks all wells drilled in New Mexico, including those on Federal (Bureau of Land Management [BLM] or otherwise), state, and private land. From these lists, the locations are checked to see whether they fall in the Delaware Basin, and the American Petroleum Institute (API) number is noted. Using the API number, relevant information is copied from the OCD Permitting website

(https://wwwapps.emnrd.nm.gov/OCD/OCDPermitting/Data/Wells.aspx) to the DBDSP, including the name, well number, status, and operator. Ms. LaClair demonstrated the process of reviewing OCD reports to copying information into the DBDSP database, and how she can query that database.

For new drilling, it may take months to a few years from the initial notification until full information is available from OCD. Ms. LaClair explained that some wells that are decades old, spudded (started drilling) in the 1960s through the 1980s, may be missing information such as completion dates. In recent years, OCD has been slowly catching up, updating and digitizing drilling records and uploading them to the OCD Permitting website. Not only are newly drilled wells in the weekly OCD report, but some of these older wells are included in the weekly reports when additional information becomes available. In some cases, data on the OCD data page for a well may be missing but can be found by looking at the attached well records. If needed, DBDSP staff members call OCD for questions relating to these records, such as potential typographical errors. Incomplete records are not used in calculations until all the needed data points are available. Data availability from Texas is more limited.

Inspectors followed up on a discussion from the 2022 inspection on how multiple boreholes (typically horizontal) drilled from the same well pad are reported by OCD and how they are counted by the DBDSP. The DBDSP staff looked into the issue and shared the information it found during a short side discussion at a technical exchange in October 2022 held in Albuquerque, New Mexico. DOE contractors confirmed that each borehole from the same well pad is currently counted individually for tracking and calculations in the DBDSP database. The staff also mentioned to inspectors that an emerging practice by oil and gas operators in the Delaware Basin is to drill even more boreholes from the same well pad, and that the staff is considering how to calculate the number of boreholes for the deep drilling rate PA parameter from this emergent practice, especially if boreholes are closely spaced. The staff has committed to making no changes without EPA discussion and agreement.

Another topic EPA discussed with the staff was the plugging of wells, including the status of plugged and abandoned wells near the WIPP site and any orphaned wells (i.e., those left by an operator without plugs installed and/or surface equipment removed). A map was shown giving the locations of wells plugged and abandoned in the past year (Figure 11) along with a provided list. OCD also includes in its regular data releases information on any wells that operators have applied for funding assistance to plug. DBDSP was unaware of any orphaned oil and gas wells in the area around the WIPP and suggested that any new findings would be shared by OCD. Borehole plugging patterns, which refers to the depths, configuration, and number of plugs installed in abandoned boreholes, are an important parameter in the WIPP PA, and the methods used in calculating these were the subject of proposed changes and discussion between DOE and EPA since the receipt of CRA-2019. For DBMAR 2022, DOE reverted to the previously approved method for calculating borehole plugging probabilities. However, in subsequent years, the method will include only wells plugged in the area of nine townships surrounding the WIPP, instead of the entire New Mexico portion of Delaware Basin, as was done historically, or the more geographically limited approach using only those wells plugged in the Known Potash Leasing Area that borders and surrounds most of the WIPP site to the north, west, and south, as DOE had previously proposed. Ms. LaClair explained that most of the information needed to

make a determination of the configuration of borehole plugs is not included in the OCD webpage for each well. DBDSP staff must look at descriptions, text and diagrams attached to the well. This data is collected in a spreadsheet currently maintained separately but alongside the larger boreholes database; in the future, IT staff will help add plugging data directly into the database.

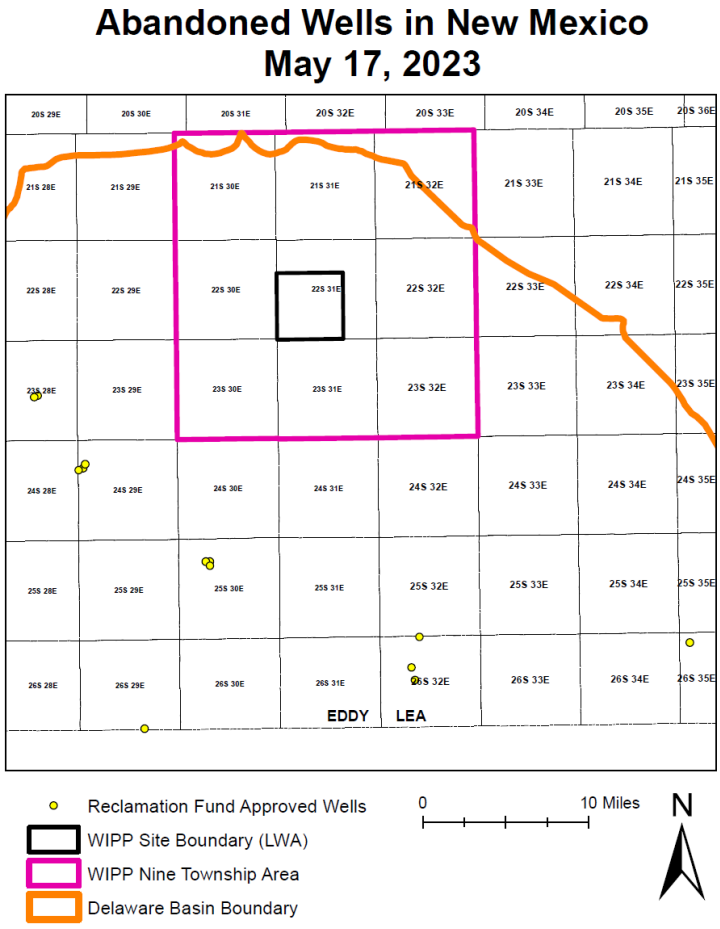


Figure 11. Map of WIPP region provided by DBDSP staff showing wells recently plugged and abandoned and reported to OCD. Figure provided by DOE.

For drilling adjacent to the WIPP site, staff members from the Delaware Basin Surveillance Program go out to the field to visit drill sites and send monthly reports to DBDSP. BLM also notifies DOE of any new wells being drilled. DOE intends to enter a memorandum of understanding with OCD and BLM to help facilitate more rapid and complete information sharing of oil and gas activities near the WIPP site. Surveys sent by DBDSP to local well operators annually had previously been on a voluntary basis, and the most recent responses were from 2016.

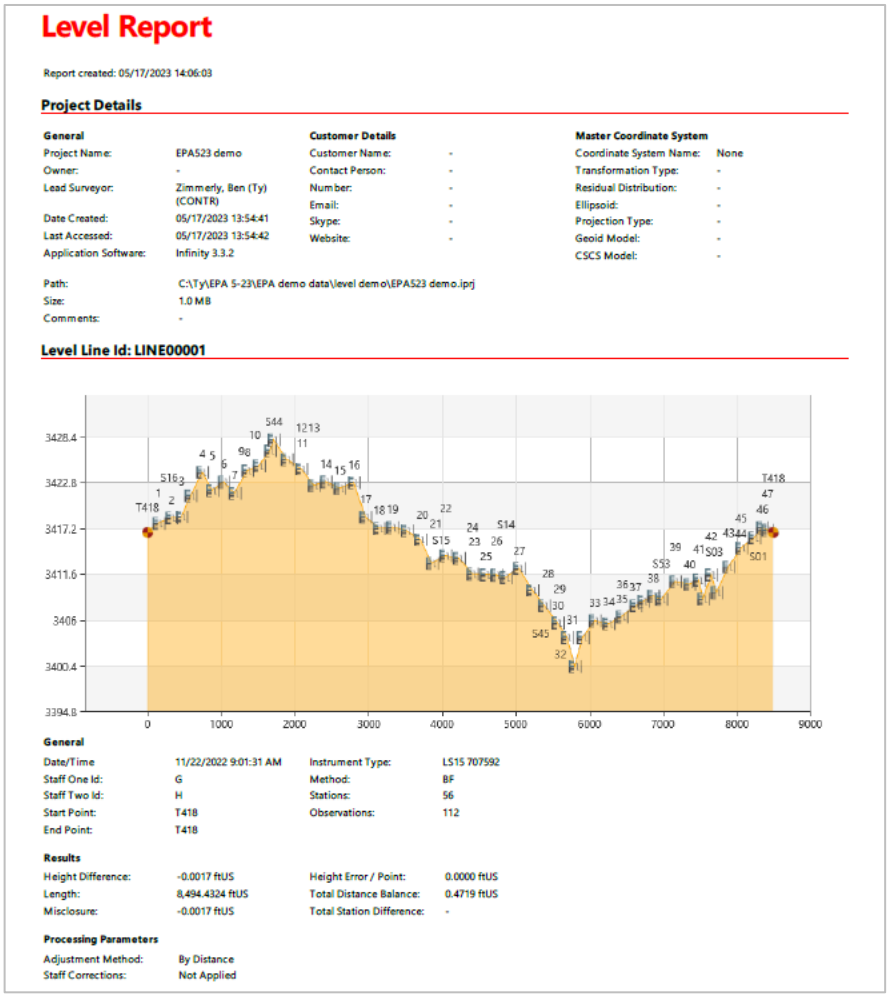
Several other updates have been made for 2022. The deep drilling rate calculated for 2022 is 138.9 boreholes per square kilometer over 10,000 years, a significant increase from the 99 boreholes used in CRA-2019 PA calculations. The increase in the drilling rate is attributed to

increased drilling activities in the Delaware Basin, an update to the deep drilling rate methodology suggested by EPA as part of its CRA-2019 review to include boreholes of unknown depth being counted as deep rather than shallow by default, and "catching up" of records for wells drilled to be included in the database. Also, recognizing that the mine level for Panel 8 is shallower than for the rest of the mine, the definition of what constitutes a "deep" borehole has changed from 2,150 feet to 2,104 feet for the purposes of categorization. DBMAR 2022 also includes updated data on disposal wells and pressurized Castile brine encounters, and a new summary table of plugged wells by type.

8.0 Monitoring of Subsidence Parameters

In the CCA, DOE committed to measuring the subsidence of the ground surface at the WIPP site. This parameter is measured using procedures documented as part of the *WIPP Underground and Surface Surveying Program* (WP 09-ES.01, Rev. 8). No significant updates have been made in these procedures since EPA's previous inspection. DOE performs subsidence surveys at the site annually during pre-closure operations. The most recent survey results are provided in the *WIPP Subsidence Monument Leveling Survey, 2022* (DOE/WIPP-22-3697). The report shows that survey loop vertical closures and accuracies meet the standards set by the National Geodetic Survey for Second Order Class II surveys and fulfill the requirement that the subsidence parameter be measured and reported on a yearly basis.

On the afternoon of May 17, the inspection team met with Ty Zimmerly, engineer for surface and underground surveying. Mr. Zimmerly explained field procedures to the EPA inspection team, including the use of surveying equipment to collect data in the field. Mr. Zimmerly also demonstrated the processing of field data using a survey loop completed earlier in the year and the use of procedure WP 09-ES4001, Revision 7. Mr. Zimmerly explained the procedure will likely be updated to Revision 8 in October 2023 to include minor streamlining of the office processes (i.e., the data processing from the survey equipment). Mr. Zimmerly downloaded and processed data that had been collected for loop 6, which was performed in 2022. He provided an example of a level report generated from processing the data (presented in Figure 12).



Level Report

Report created: 05/17/2023 14:06:03

Project Details

General		Customer Details		Master Coordinate System	
Project Name:	EPA523 demo	Customer Name:	-	Coordinate System Name:	None
Owner:	-	Contact Person:	-	Transformation Type:	-
Lead Surveyor:	Zimmerly, Ben (Ty) (CONTR)	Number:	-	Residual Distribution:	-
		Email:	-	Ellipsoid:	-
Date Created:	05/17/2023 13:54:41	Skype:	-	Projection Type:	-
Last Accessed:	05/17/2023 13:54:42	Website:	-	Geoid Model:	-
Application Software:	Infinity 3.3.2			CSCS Model:	-

Path:	C:\Ty\EPA 5-23\EPA demo data\level demo\EPA523 demo.iprj
Size:	1.0 MB
Comments:	-

Level Line Id: LINE00001

General			
Date/Time	11/22/2022 9:01:31 AM	Instrument Type:	LS15 707592
Staff One Id:	G	Method:	BF
Staff Two Id:	H	Stations:	56
Start Point:	T418	Observations:	112
End Point:	T418		

Results			
Height Difference:	-0.0017 ftUS	Height Error / Point:	0.0000 ftUS
Length:	8,494.4324 ftUS	Total Distance Balance:	0.4719 ftUS
Misclosure:	-0.0017 ftUS	Total Station Difference:	-

Processing Parameters	
Adjustment Method:	By Distance
Staff Corrections:	Not Applied

Figure 12. Excerpt of a level report from a subsidence survey. Document provided by DOE.

Subsidence monitoring for the calendar year 2023 will begin in fall 2023. In addition to surveying the existing loops, personnel are expected to perform a survey of new loops that will cover upcoming Panels 11 and 12 and the potential additional waste panels to the west of the existing repository. Mr. Zimmerly provided EPA with the putative locations of the new monuments (Figure 13). The EPA staff plans to return to the WIPP in the fall to observe this survey and provide additional documentation on this observation.

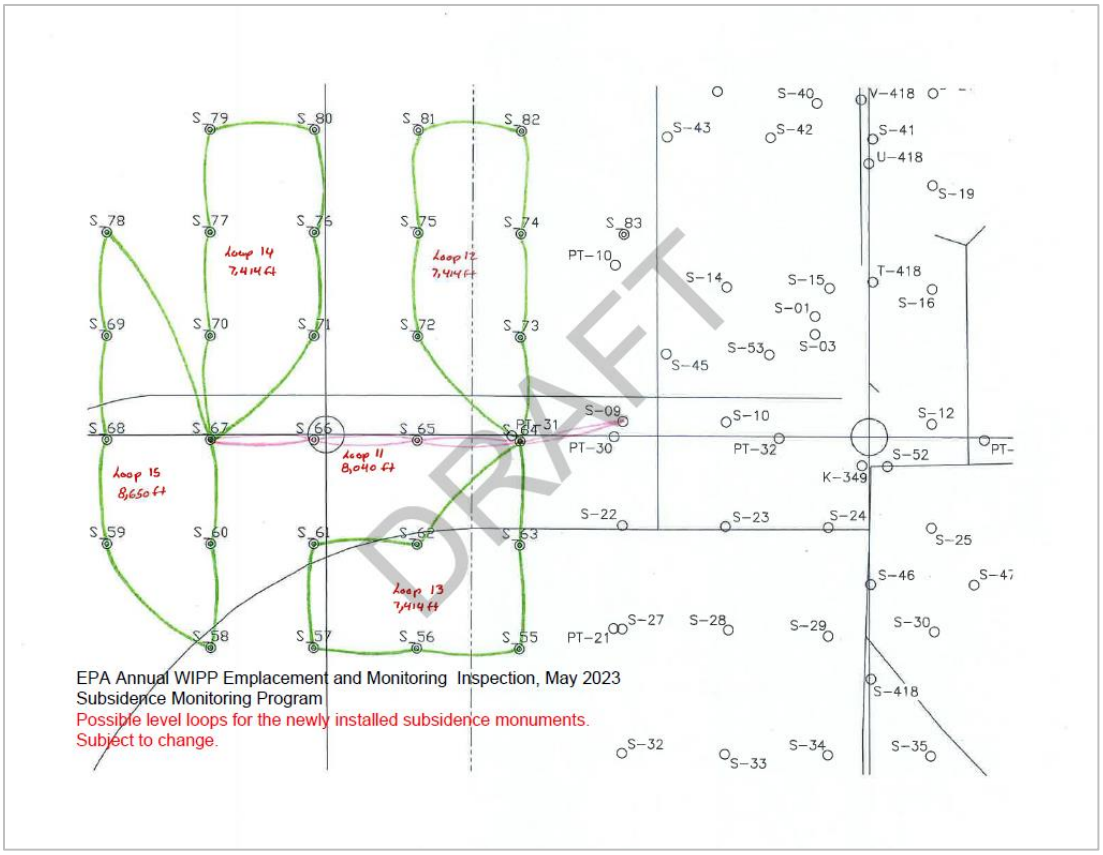


Figure 13. Draft of the potential new locations for monuments covering Panels 11 and 12. Figure provided by DOE.

9.0 SNL Compliance Monitoring Parameter Analysis

EPA inspectors engaged in a discussion of the most recent COMP analysis on the afternoon of May 18 with staff from SNL. The COMP analysis is a report that compiles all the different monitoring results reported throughout the calendar year as outlined in DOE's *Compliance Monitoring Implementation Plan for 40 CFR§191.14(b), Assurance Requirement* (DOE/WIPP-99-3119). The purpose of this effort is to identify any deviations of monitored parameters from the results that are expected based on the site conceptual models or PAs. SNL establishes numerical "trigger values" (TVs) for each monitored parameter, which identifies conditions that may be beyond PA expectations and may require further investigation, though values that reach TVs may not necessarily represent out-of-compliance values. The SNL staff presented several values that triggered investigation by deviating from expected TVs. For example, charge balance errors for magnesium concentrations in Well WQSP-5 exceeded the 5 percent TV in a replicate sample. SNL investigated this TV violation by performing a visual examination using Piper diagrams and showed that water quality in the well has not changed in comparison to historical data, and therefore no additional actions were needed. Similarly, SNL noted that some subsidence rates for 2022 exceeded TVs. However, in the context of all the WIPP subsidence

data since 2001, SNL has determined that subsidence rates remain well below TVs for all monuments and these few anomalies do not indicate unexpected behavior. SNL staff told EPA inspectors that they did not know the details of SIMCO's plans to add additional monuments (see Section 8.0 and Figure 13 on SIMCO's discussion with EPA on the details of the putative locations of the new monuments).

Since the start of WIPP's operation in 1999, DOE has collected and analyzed a significant amount of data using the monitoring parameters and COMPs analysis. EPA believes that the data collected from this program presents an opportunity to enhance the current understanding of the WIPP system. The Agency will discuss with DOE about approaches to incorporate these data and analyses into the WIPP PA.

10.0 Conclusions

Based on program documents, interviews, and field demonstrations during the inspection, EPA concludes that the monitoring program adequately covers the 10 monitoring parameters required by the Agency's 1998 certification decision. This inspection determined that monitoring sample collection and sample/data analysis procedures were complete and appropriate, staff were adequately trained and implemented the procedures effectively, and appropriate quality assurance measures are applied. EPA continues to find that DOE has maintained sufficient parameter monitoring during the past year and has the procedures and requirements in place to sustain the program into the next year. EPA believes that many of the existing monitoring parameters and analyses have the potential to enhance the understanding of WIPP repository behavior for the PA, such as geotechnical measurements and COMPs analysis. The Agency will discuss with DOE about an appropriate path forward to make sure that these parameters are monitored, analyzed, and used to strengthen predictions about the future performance of the disposal system.

Appendix A: EPA WIPP Monitoring Inspection Plan for 2023

Purpose:
The purpose of this inspection is to verify that the Waste Isolation Pilot Plant (WIPP) is collecting monitoring data in accordance with commitments made in the Compliance Certification Application (EPA Air Docket A-93-02, Item II-G-01), in particular Volume 1, Section 7.2, Table 7.7 and Appendix MON. The U.S. Environmental Protection Agency (EPA) is performing this inspection under the authority of Title 40 of the *Code of Federal Regulations* Section 194.21 (40 CFR 194.21), Inspections, and Section 194.42, Monitoring.

Scope:
This scope of this inspection includes the activities that DOE undertakes to monitor the performance of the disposal system. Inspection activities will include an examination of monitoring and sampling equipment and activities both on and off site, and in the underground. A review of sampling procedures and measurement techniques may be conducted. Quality assurance procedures and documentation for each of these activities will also be reviewed.

EPA will meet with staff from the WIPP Geotechnical Engineering Program, the WIPP Groundwater Monitoring Program, the WIPP Underground and Surface Surveying Program, the Delaware Basin Drilling Surveillance Program, and WDS administrators. EPA will review procedures used and data and reports produced by each group as they relate to monitored parameters at WIPP.

Focal Areas of This Year's Inspection:
EPA is interested in any changes made to the monitoring program since the most recent site inspection held in May 2022. EPA will perform a detailed review of groundwater parameter monitoring, particularly for the Culebra aquifer.

Location:
This inspection will be held at DOE's WIPP facility location twenty-six miles southeast of Carlsbad, New Mexico and at office locations in Carlsbad, as needed.

Duration:
EPA expects to complete the on-site portion of its inspection in three days. An opening meeting will be held on the first morning of the inspection, and a closing meeting held after the conclusion of site inspection activities.

Expected Dates:
May 16–18, 2023.

Documents for Review:
DOE has electronically provided EPA inspection staff with the latest versions of procedures and reports related to parameter monitoring. The inspection team will identify and request additional records during the inspection.

Appendix B: 2023 Monitoring Inspection Checklist

Table B-1. 2022 Monitoring Inspection Checklist

Question No.	Question Category	Question	Comments and Objective Evidence	Results
1	Geomechanical	Does the U.S. Department of Energy (DOE) demonstrate that it has implemented plans, programs, and/or procedures to measure the following aspects during the preclosure phase of operations as specified in the Compliance Certification Application (CCA, Vol. 1, Table 7-7; Appendix MON, Table MON-1) (40 CFR 194.42(c) and (e))? (a) Creep closure, (b) Extent of deformation, (c) Initiation of brittle deformation, and (d) Displacement of deformation features.	*WIPP Geotechnical Engineering Program Plan* (WP 07-01, Rev. 8) documents plans to measure and report and adhere to the quality assurance requirements related to these activities. Section 3.0 of WP 07-01 documents the geomechanical monitoring program and records the activities associated with this program. Section 4.0 of WP 07-01 documents the quality assurance requirements for these activities. Geotechnical staff demonstrated the adequacy of the program. Inspectors reviewed their methods and data and verified that the geomechanical parameters continued to be appropriately monitored by DOE. Results of this program are documented annually in the *Geotechnical Analysis Report* for each reporting period (DOE/WIPP-22-3610). The draft for the next annual report (July 2021 to June 2022) is in preparation.	Satisfactory
2	Geomechanical	Does DOE demonstrate that it has implemented an effective quality assurance program for item 1 above? (40 CFR 194.22)	Yes. Details of the program are found in the Nuclear Waste Partnership, LLC, *Quality Assurance Program Description* (WP 13-1, Rev. 42).	Satisfactory

Question No.	Question Category	Question	Comments and Objective Evidence	Results
3	Geomechanical	Does DOE demonstrate that the results of the geotechnical investigations are reported annually? (CCA, App. MON, p. MON-10)	WP 07-01, Revision 8, Section 3.2 requires that analysis be performed each year and the results be published in the annual *Geotechnical Analysis Report*. The report for calendar year 2020 (July 2020 to June 2021) was provided and reviewed by inspectors (DOE/WIPP-22-3610). The draft for the next annual report (July 2021 to June 2022) is in preparation.	Satisfactory
4	Hydrologic	Does DOE demonstrate it has implemented plans, programs, and/or procedures to measure— (a) Culebra groundwater composition; (CCA, Vol. 1, Table 7-7; App. MON, Table MON-1) (40 CFR 194.42(c) and (e)) (b) Change in Culebra groundwater flow direction during the preclosure phase of operations, as specified in the CCA? (CCA, Vol. 1, Table 7-7; App. MON, Table MON-1) (40 CFR 194.42(c) and (e))	Yes. See *WIPP Groundwater Monitoring Program Plan* (WP 02-1, Rev. 17). Yes. See WP 02-1, Revision 17; *Waste Isolation Pilot Plant Annual Site Environmental Report* for 2021 (DOE/WIPP-22-3591); and the *Annual Culebra Groundwater Report* (November 2022).	Satisfactory
5	Hydrologic	Does DOE demonstrate that it has implemented an effective quality assurance program for item 1 above? (CCA, App. MON, page MON-17) (40 CFR 194.22)	Yes. See WP 02-1, Revision 17, Sections 5 and 9.	Satisfactory

Question No.	Question Category	Question	Comments and Objective Evidence	Results
6	Hydrologic	Does DOE demonstrate that the results of the groundwater monitoring program are reported annually? (CCA, App. MON, p. MON-18)	Yes. See *Waste Isolation Pilot Plant Annual Site Environmental Report* for 2021 (DOE/WIPP-22-3591).	Satisfactory
7	Waste Activity	Does DOE demonstrate that it has implemented plans, programs, and/or procedures to measure waste activity? (CCA, Vol. 1, Table 7-7; App. MON, Table MON-1) (40 CFR 194.42(c) and (e))	*WIPP Waste Data System Program and Data Management Plan* (WP 08-NT.01, Rev. 35) describes the programmatic plan used to monitor and store waste activity information.	Satisfactory
8	Waste Activity	Does DOE demonstrate it has an effective quality assurance program for item 7? (CCA, App. WAP, p. C-30) (40 CFR 194.22)	Yes. See WP 13-1, Revision 42, and *Waste Data System Software Quality Assurance Plan* (WP 08-NT.04, Rev. 28).	Satisfactory
9	Waste Activity	Does DOE demonstrate that the results of the waste activity parameters are reported annually? (CCA Vol. 1, Section 7.2.4, "Reporting")	Results have not changed since the last inspection. The most recent version of this is found in the *Annual Transuranic Waste Inventory Report – 2022* (DOE/TRU-22-3425, Rev. 0) and the *Annual Change Report – 2021/2022*.	Satisfactory

Question No.	Question Category	Question	Comments and Objective Evidence	Results
10	Drilling-Related	Does DOE demonstrate that it has implemented plans, programs, and/or procedures to measure— (a) Drilling rate; and (b) Probability of encountering a Castile brine reservoir? (CCA, Vol. 1, Table 7-7; App. MON, Table MON-1) (40 CFR 194.42(c) and (e))	The *Delaware Basin Drilling Surveillance Plan* (WP 02-PC.02, Rev. 10) documents the program to measure, record and report, as well as the quality assurance requirements for these activities. The *Delaware Basin Drilling Database Upgrade Process* (WP 02-EC3002, Rev. 11) documents the process used to update databases with information from various commercial and state sources.	Satisfactory
11	Drilling-Related	Does DOE demonstrate that it has implemented an effective quality assurance program for item 7 above? (CCA, App. DMP, page DMP-9) (40 CFR 194.22)	Quality assurance requirements are documented in Section 7.0 of WP 02-PC.02, Revision 10.	Satisfactory
12	Drilling-Related	Does DOE demonstrate that the results of the drilling-related parameters are reported annually? (CCA Vol. 1, Section 7.2.4; App. DMP, p. DMP-9)	Yes. Parameter updates are reported, most recently in the *Delaware Basin Monitoring Annual Report* (DOE/WIPP-22-2308).	Satisfactory
13	Subsidence	Does DOE demonstrate that it has implemented plans/programs/procedures to measure subsidence? (CCA, Vol. 1, Table 7-7; App. MON, Table MON-1) (40 CFR 194.42(c) and (e))	Yes. See *WIPP Underground and Surface Surveying Program* (WP 09-ES.01, Rev. 8).	Satisfactory

Question No.	Question Category	Question	Comments and Objective Evidence	Results
14	Subsidence	Does DOE demonstrate that it has implemented an effective quality assurance program for item 13 above? (CCA, App. DMP, p. DMP-9) (40 CFR 194.22)	Yes. See WP 09-ES.01, Revision 8, Section 4; and WP 13-1, Revision 42.	Satisfactory
15	Subsidence	Does DOE demonstrate that the results of the subsidence measurements are reported annually? (CCA Vol. 1, Section 7.2.4)	The results of this program are reported annually in the *WIPP Subsidence Monument Leveling Survey* (DOE/WIPP-22-3697).	Satisfactory

Appendix C: Documents Reviewed

Table C-1. Documents Reviewed: Geomechanical Parameters

Document	ID	Source
Geotechnical Analysis Report for July 2020–June 2021, Volumes 1–2, October 2022	DOE/WIPP-22-3610 (October 2022)	DOE/WIPP
WIPP Geotechnical Engineering Program Plan	WP 07-1, Revision 8 (April 12, 2017)	DOE/WIPP
Nuclear Waste Partnership, LLC *Quality Assurance Program Description*	WP 13-1, Revision 42 (November 21, 2022)	DOE/WIPP

Table C-2. Documents Reviewed: Hydrological Parameters

Document	ID	Source
WIPP Annual Site Environmental Report for 2021	DOE-WIPP-22-3591 (September 29, 2022)	DOE/WIPP
WIPP Groundwater Monitoring Program Plan	WP 02-1, Revision 17 (July 19, 2021)	DOE/WIPP
Waste Isolation Pilot Plant Environmental Monitoring Plan	DOE/WIPP-99-2194, Revision 13 (December 20, 2022)	DOE/WIPP
Data Review for the Annual Culebra Groundwater Report	WP 02-EM1025, Revision 6 (June 24, 2013)	DOE/WIPP
DP-831 Shallow Subsurface Water Potentiometric Surface Map Construction	WP 02-EM1027, Revision 5 (April 12, 2023)	DOE/WIPP
Annual Culebra Groundwater Report Water Level Monitoring Program Data Collection, March to August 2022	November 2022	DOE/WIPP
Semi-Annual Groundwater Surface Elevation Report (SAGR) Water Level Monitoring Program Data Collection, September 2022 – February 2023	May 8, 2023	DOE/WIPP
Sandia National Laboratories Compliance Monitoring Parameter Assessment for 2022	WBS 4.3.1 (January 2023); ERMS 578677	SNL
Analysis Plan for the Analysis of Observed Water Level Fluctuations	AP-150, Revision 1 (August 31, 2021)	SNL
WIPP Well Water-Level Monitoring	SP 9-7, Revision 10 (August 8, 2022)	SNL
Preparation of Culebra Potentiometric Surface Contour Maps	SP 9-9, Revision 0 (October 26, 2009)	SNL

Document	ID	Source
Calculation of Densities for Groundwater in WIPP Wells	SP 9-11, Rev. 3 (December 10, 2015)	SNL
Data Thinning and Removal of Barometric and Earth Tide Effects from Water-Level Data	SP 9-13, Revision 1 (March 30, 2021)	SNL
Monitoring Water Levels in WIPP Wells	Test Plan 06-01, Revision 3 (July 13, 2010)	SNL

Table C-3. Documents Reviewed: Drilling-Related Parameters

Document	ID	Source
Delaware Basin Drilling Surveillance Plan	WP 02-PC.02, Revision 10 (June 21, 2021)	DOE/WIPP
Delaware Basin Monitoring Annual Report 2022	DOE-WIPP-22-2308 (December 14, 2022)	DOE/CBFO

Table C-4. Documents Reviewed: Subsidence Parameters

Document	ID	Source
WIPP Underground and Surface Surveying Program	WP 09-ES.01, Rev. 8 (February 11, 2019)	DOE/WIPP
WIPP Panel Closure Survey Plan	WP 09-ES.02, Rev. 4 (December 17, 2014)	DOE/WIPP
WIPP Subsidence Monument Leveling Survey 2022	DOE/WIPP-22-3697 (April 5, 2023)	DOE/WIPP

Table C-5. Documents Reviewed: Waste Activities

Document	ID	Source
WIPP Waste Data System Program and Data Management Plan	WP 08-NT.01, Rev. 35 (February 21, 2019)	DOE/WIPP
Waste Stream Profile Form Review and Approval Program	WP 08-NT.03, Rev. 20 (August 25, 2020)	DOE/WIPP
Waste Data System User's Manual	DOE/WIPP-09-3427, Rev. 21 (June 22, 2021)	DOE/WIPP
Waste Data System Software Quality Assurance Plan	WP 08-NT.04, Rev. 29 (January 19, 2023)	DOE/WIPP
Nuclear Waste Partnership, LLC *Quality Assurance Program Description*	WP 13-1, Rev. 42 (November 21, 2022)	DOE/WIPP
Annual Transuranic Waste Inventory Report – 2022	DOE/TRU-22-3425, (December 2022)	DOE/WIPP
WIPP Annual Change Report – 2021–2022	October 31, 2022)	DOE/WIPP

E-DOCKET: EPA-HQ-OAR-2001-0012-0782

2023 – Emplacement Inspection Report

INSPECTION OF THE
WASTE ISOLATION PILOT PLANT
May 16–18, 2023

U. S. ENVIRONMENTAL PROTECTION AGENCY
Office of Radiation and Indoor Air
Center for Waste Management and Regulations
1200 Pennsylvania Avenue, NW
Washington, DC 20460

November 2023

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List of Abbreviations

Am	americium
ANL-E	Argonne National Lab – East
BRT	"Big Red Thing" magnesium oxide supersack stand
CBFO	U.S. Department of Energy Carlsbad Field Office
CCA	Compliance Certification Application
CFR	*Code of Federal Regulations*
CH	contact handled
CMR	Central Monitoring Room
CPR	cellulosic, plastic, and rubber material
Cs	cesium
CY	calendar year
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
gal	gallon(s)
kg	kilogram(s)
LATA	Los Alamos Technical Associates
LWA	Land Withdrawal Act
MgO	magnesium oxide
NMED	New Mexico Environment Department
NWP	Nuclear Waste Partnership
ORIA	Office of Radiation and Indoor Air
PCN	planned change notice
Pu	plutonium
RH	remote handled

SCA	shielded container assembly
SIMCO	Salado Isolation Mining Contractors
SLB2	standard large box
SNL	Sandia National Laboratories
Sr	strontium
SWB	standard waste box
TDOP	10-drum overpack
TMW	transuranic mixed waste
TRU	transuranic
U	uranium
WDS	Waste Data System
WHB	Waste Handling Building
WIPP	Waste Isolation Pilot Plant

1.0 Executive Summary

The U.S. Environmental Protection Agency (EPA or the Agency) conducted an inspection of the U.S. Department of Energy (DOE or the Department) Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico, from May 16 to May 18, 2023, in accordance with Title 40 of the *Code of Federal Regulations* (CFR) 194.21. The WIPP is a disposal facility for defense-related transuranic (TRU) waste, as defined by the WIPP Land Withdrawal Act of 1992 (LWA). EPA first certified that the WIPP complies with the Agency's radioactive waste disposal regulations (Subparts B and C of 40 CFR Part 191) on May 18, 1998. Appendix A: includes the waste emplacement inspection plan. This inspection was performed in parallel with the monitoring and Subpart A inspections, which are documented in separate reports.

The WIPP has continued to emplace waste since the last inspection in May 2022. The inspection began with an opening meeting, which included presentations that gave overviews and updates on waste emplacement and underground experiment activities at the WIPP. The EPA inspection team observed the waste emplacement of the active waste face in Room 7 of Panel 8. This is the first time EPA inspectors have been able to observe waste emplacement since the 2014 release incident that caused contamination in the underground. EPA also reviewed the experiments area in the WIPP underground and found that there are multiple test activities currently taking place. Additionally, EPA inspectors visited the WIPP Waste Handling Building (WHB) to understand the WIPP's approach to loading waste into the various rooms, observed magnesium oxide (MgO) storage to verify the correct use of the MgO excess factor, and discussed the use of the Waste Data System (WDS) to track inventory.

EPA concluded that DOE's waste emplacement activities are adequate based on observations of the WIPP personnel, interviews with the contractors, and documentation provided by the DOE Carlsbad Field Office (CBFO). EPA confirmed that cellulosic, plastic, and rubber material (CPR) is appropriately tracked and recorded, and MgO balances are calculated properly. During the 2022 inspection, the EPA inspection team noted a discrepancy between the reported MgO excess factor in the WDS and the *Summary of Waste Emplacement Inventory Reports* generated in the WDS as a finding. EPA followed up with WIPP personnel during this inspection and were informed that this discrepancy will be corrected in WDS version 3.5 (the current WDS version is 3.4). During the 2023 inspection, the WDS administrator provided a report generated from the preview version 3.5 in which the discrepancy issue has been resolved. EPA will verify when version 3.5 of WDS is officially released.

2.0 Scope

The purpose of this annual inspection is to verify that contact-handled (CH) and remote-handled (RH) TRU waste sent to the WIPP since May 2022 has been emplaced in the underground facility in the manner specified in DOE's Compliance Certification Application (CCA) (EPA Air Docket A-93-02, Item II-G-01) and other approvals. EPA performed this inspection in accordance with regulation in 40 CFR 194.21, which states that the Agency will inspect the WIPP during its operational period to verify continued compliance with EPA's WIPP compliance criteria and the certification decision of May 18, 1998. Emplacement of waste and MgO backfill are relevant to compliance because the amounts of emplaced waste (e.g., the TRU waste, cellulosics, plastics, and rubber) and MgO are important inputs to the WIPP performance

assessment that demonstrate that the WIPP is in compliance over its 10,000-year regulatory timeframe.

Activities within the scope of this inspection included reviewing the WIPP site's ability to receive, process, and emplace CH and RH TRU wastes within the repository. The inspection also involved confirming that the WIPP can emplace the MgO backfill to fulfill certification requirements and other approvals. Finally, EPA verified that the WIPP can maintain relevant waste handling records, including the electronic WDS. The review and examination of documents and procedures related to these activities is an important part of the inspection process. Since February 2023, the WIPP site has been operated by Salado Isolation Mining Contractors (SIMCO) under contract to DOE, and waste handling and tracking activities are described by or controlled through SIMCO procedures.

3.0 Inspection Team, Observers, and Participants

The EPA inspection team is listed in Table 1. Figure 1 is a photo of the underground inspection participants. Numerous DOE staff and contractors participated in the inspection, either in person or remotely;

Table 2 includes a partial list of participants taken from a sign-in sheet generated during the opening meeting, subsequent meetings, and inspection activities. Note that in February 2023, the management and operations contract for the WIPP was transferred from Nuclear Waste Partnership (NWP) to SIMCO, with teaming contractor Los Alamos Technical Associates (LATA) replacing Regulatory and Environmental Services. Personnel are largely the same from previous inspections, though affiliations have changed accordingly.

Table 1. Inspection Team

Inspection Team Member	Position	Affiliation
Tom Peake	Director, Center for Waste Management and Regulations	EPA Office of Radiation and Indoor Air (ORIA)
Jonathan Walsh	Lead Inspector	EPA ORIA
Joe Rustick	Inspector	EPA ORIA
Xinyue Tong	Inspector	EPA ORIA
Erik Christianson	Inspector	EPA Region 6
Jon Major	Inspector	EPA ORIA
Jay Santillan	Inspector	EPA ORIA

Table 2. Inspection Participants

Participant	Affiliation
Anderson Ward	DOE- Carlsbad Field Office (CBFO)
Ed Garza	DOE-CBFO
Michael Gerle	DOE-CBFO
Justin Marble	DOE-Environmental Management (EM) (remote)
Russ Patterson	Contractor supporting DOE-EM (remote)
Ashley Urquidez	Los Alamos Technical Associates (LATA)
Cassie Marrs	LATA
Ginny Jones	LATA
Karen Day	LATA
Lisa Ramos	LATA
Natalie LaClair	LATA
Richard Jimenez	LATA
Rick Salness	LATA
Rosendo Borjas Nevarez	LATA
Sidney Harper	LATA
Ricardo Hernandez	LATA
Shawn Otto	Los Alamos National Laboratory-Carlsbad Office Transportation Certification Official
Alan Romero	New Mexico Environment Department (NMED) (Inspection Observer)
Amber Gellis	NMED (Inspection Observer)
Ben (Ty) Zimmerly	SIMCO
Ch Lvomy	SIMCO
Christina Grigg	SIMCO
David Riphy	SIMCO
Dorothy Thomas	SIMCO
Heather Patterson	SIMCO
Hector Jimenez	SIMCO
Jared Sorensen	SIMCO
Mansour Asabarzadeh	SIMCO
Michael Marksberry	SIMCO
Mike Prookr	SIMCO
Neal Appell	SIMCO

Participant	Affiliation
Rey Carrasco	SIMCO
Roy Neese	SIMCO
Ryan Flynn	SIMCO
Steve Offner	SIMCO
Terry Batchelder	SIMCO
Shelly Nielsen	Sandia National Laboratories (SNL)/Edgewater–Carlsbad
Orlando Reyna	SNL/INTERA–Carlsbad
Cody Franco	SNL/RESPEC–Carlsbad
Akara Mahawa	SNL–Carlsbad
Chammi Miller	SNL–Carlsbad
Jennifer Long	SNL–Carlsbad
Owen Loften	SNL–Carlsbad
Rodney Keith	SNL–Carlsbad
Dale Bowman	SNL–Carlsbad
Dwayne Kicker	SNL–Carlsbad
Leslie Kirkes	SNL–Carlsbad
Ryan Jackson	SNL–Carlsbad
Brent Blunt	UDR Consulting, Inc.
George Wrangle	WIPP Communications
Caleb Subia	WIPP Central Monitoring Room (CMR)
Eric Galindo	WIPP–CMR
JD Mcolland	WIPP–CMR
Jacob Galindo	WIPP–CMR



Figure 1. Photo of the WIPP inspection participants in the underground on May 16, 2023 DOE-provided photo.

The inspection took place from May 16 to May 18, 2023, at CBFO's facilities in Carlsbad, New Mexico, and the WIPP site, which is located approximately 26 miles southeast of the city. The primary focus of the emplacement inspection was to document the nature and extent of changes in emplacement activities and documentation since the last inspection in May 2022. The opening meeting with CBFO, LATA, and SIMCO personnel was held on the morning of May 16, 2023, and included an overview of updates to waste emplacement programs since EPA's last inspection.

On the afternoon of May 16, EPA inspectors visited the underground repository. EPA inspectors viewed the areas where waste is being emplaced, specifically in Room 7 of Panel 8, as well as the northern experimental area. The EPA inspection team did not enter any areas where access is restricted because of either potential radiological contamination or lack of ground control to prevent rock falls. On May 17, the EPA inspectors viewed the WHB and associated areas, including the storage of MgO backfill.

Inspectors reviewed records documenting that waste emplacement and MgO tracking were conducted in accordance with procedures. LATA personnel answered questions from the inspection team about how waste is handled and emplaced. Inspectors selected multiple containers (Table 3), and both paper and electronic records for those containers were examined for complete waste tracking and emplacement information. The inspection team presented preliminary observations at a closeout meeting on the afternoon of May 18, 2023.

Table 3. Waste Container Information Reviewed During Inspection

Container Number	Emplacement Location	Container Type
NFSS9457235	Panel 7, Room 1, Row 89, Column 5, Height T	55 gal
X10C9311322A	Assay Date August 15, 2022, not shipped	55 gal

Container Number	Emplacement Location	Container Type
10581693	Panel 8, Room 7, Row 115, Column 3, Height M	55 gal
SRSB01372	Panel 8, Room 7, Row 113, Column 5, Height M	SWB
10565462	Panel 8, Room 7, Row 116, Column 6, Height M	55 gal
AE1409SC	Panel 8, Room 7, Row 106, Column 1i, Height B	SCA
IN230108[1]	Shipment received but not emplaced	SWB, 55 gal

4.0 Waste Emplacement/Waste Data System

WIPP personnel queried the WDS to demonstrate to EPA the adequate tracking of wastes received by the repository since the most recent inspection. These include CH and RH TRU wastes certified from Argonne National Laboratory – East (ANL-E), Advanced Mixed Waste Treatment Project at Idaho National Laboratory, Los Alamos National Laboratory, Lawrence Livermore National Laboratory, the Savannah River Site, and Oak Ridge National Laboratory. The COVID-19 pandemic again slowed shipment and emplacement activities in calendar years 2020-2022. DOE's waste shipment and emplacement activities in CY 2023 (see Table 4) increased to 3,399 emplacements between January 1, 2023, and May 18, 2023. Wastes are received and emplaced in several configurations: standard waste boxes (SWBs), 55-gallon (gal) drums assembled in groups of seven called a "seven-pack," 100-gal drums for super-compacted waste, 10-drum overpacks (TDOPs), and standard large boxes (SLB2s). Since 2014, RH wastes from ANL-E and SNL have been placed in shielded container assemblies (SCAs) and emplaced on the repository floor as though they were CH waste, though the waste is tracked as RH. On April 25, 2023, DOE sent a planned change notice (PCN) to EPA that four additional shielded container variants from the original SCA will be used.[2] EPA found no issues with the PCN.[3]

Table 4. Shipment and Emplacement Activities

Calendar Year	Shipments Received at the WIPP	Emplacements
1999	44	827
2000	84	2,737
2001	368	10,421
2002	939	23,451
2003	805	12,834

[1] IN230108 is a shipment number. It includes 1 SWB (Container # 10630101) and 28 55-gal containers. The shipment is in the WHB but had not been emplaced during the inspection.
[2] Bollinger, M. 2023. Addition of Four New Shielded Containers. Letter from Mark Bollinger, DOE CBFO, to Lee Ann Veal, EPA. April 25, 2023.
[3] Letter from Lee Veal, Director, Radiation Protection Division, EPA, to Mark Bollinger, Manager, DOE/CBFO (September 15, 2023).

Calendar Year	Shipments Received at the WIPP	Emplacements
2004	998	13,808
2005	967	9,644
2006	1,142	11,808
2007	993	11,359
2008	723	11,299
2009	1,016	17,669
2010	1,128	13,688
2011	1,037	16,326
2012	839	8,840
2013	724	5,871
2014	87	482
2015	0	0
2016	0	0
2017	133	1,041
2018	311	2,992
2019	292	6,034
2020	192	3,779
2021	210	3,182
2022	272	3,642
2023[4]	164	3,399

CH waste containers are stacked in columns (waste stacks) combining SWBs, drum packs, TDOPs, and SLB2s (as seen in Figure 2). TDOPs and SLB2s are only emplaced on the bottom position, with another assembly stacked on top. SWBs and drums may be emplaced in any order, with most wastes emplaced as received. SCAs consist of an assembly of three shielded containers: two assemblies may be stacked on top of one another, with a total configuration of six containers. SCAs may not be stacked together with CH waste packages. The waste columns

[4] WDS search with a time window from January 1, 2023, to May 18, 2023.

are in a series of staggered rows, with a row consisting of three columns that span the width of a disposal room, with emplacement taking place from left to right (Figure 3).

The repository is subdivided into panels, with each panel consisting of seven rooms (see Figure 4). At the time of the 2023 inspection, waste emplacement was being conducted in Room 7 of Panel 8. Panel 7 last received waste on October 20, 2022, based on the WDS Emplacement History Overview Report for Panel 7.

EPA inspectors visited the WHB on the afternoon of May 17. No waste containers were being unloaded from TRUPACTs for downloading and emplacement during the visit. Based on the May 16 inspection record of the active waste emplacement face in Room 7 of Panel 8, the inspection team collected and examined the records created during waste emplacement (Figure 3). Table 3 lists the selected containers. The containers were selected from the underground emplacement map provided by the site (Figure 3), the shipment inside the WHB waiting for downloading and emplacement, and the record from the recent Oak Ridge National Lab Waste Characterization Inspection[5] (May 1, 2023, to May 4, 2023). On the morning of May 18 at CBFO, inspectors met with administrators of the WDS, where the WDS administrators produced container reports. All electronic records were found to contain the required information, including waste stream, container contents, and emplacement status.



Figure 2. Photo of the active waste face during the week of the inspection, dated May 16, 2023. DOE-provided photo. Sacks with "4200" labels on them are MgO supersacks (4,200-pound sacks). The first column to the left of this photo shows loads packed with seven waste containers (55-gal drum). The second column to the right of this photo shows SWBs. There are six columns shown in this photo: from left to right, Row 115 Column 1, Row 114 Column 2, Row 115 Column 3, Row 114 Column 4, Row 113 Column 5, and Row 114 Column 6. The emplacement locations of those containers can also be verified in Figure 3 and the WDS.

[5] See EPA-HQ-OAR-2001-0012-0783

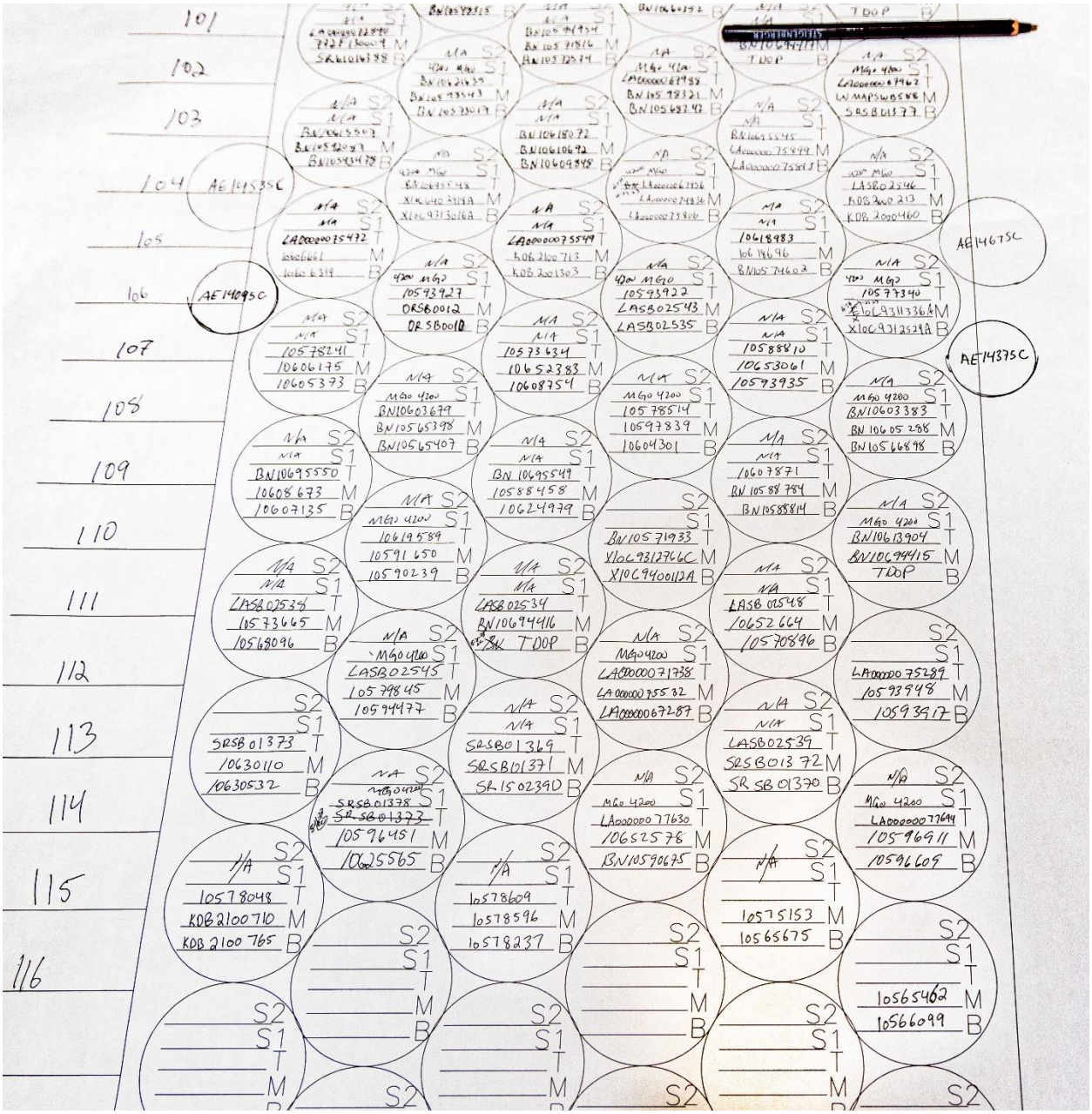


Figure 3. Underground emplacement map with selected waste, dated May 17, 2023. DOE-provided photo of a paper copy. It records the locations of waste containers that are placed underground (Panel 8 of Room 7 in this case). Row numbers are labeled on the left. "B," "M," and "T" stand for the bottom, middle, and top positions. "S1" and "S2" are reserved for MgO sacks. Waste containers starting with "AE" are SCAs; for example, AE1409SC is located in Row 106, Column 1i, and in the bottom position. Waste container information is verified at the active waste face (Figure 2) during inspection and later in the WDS.

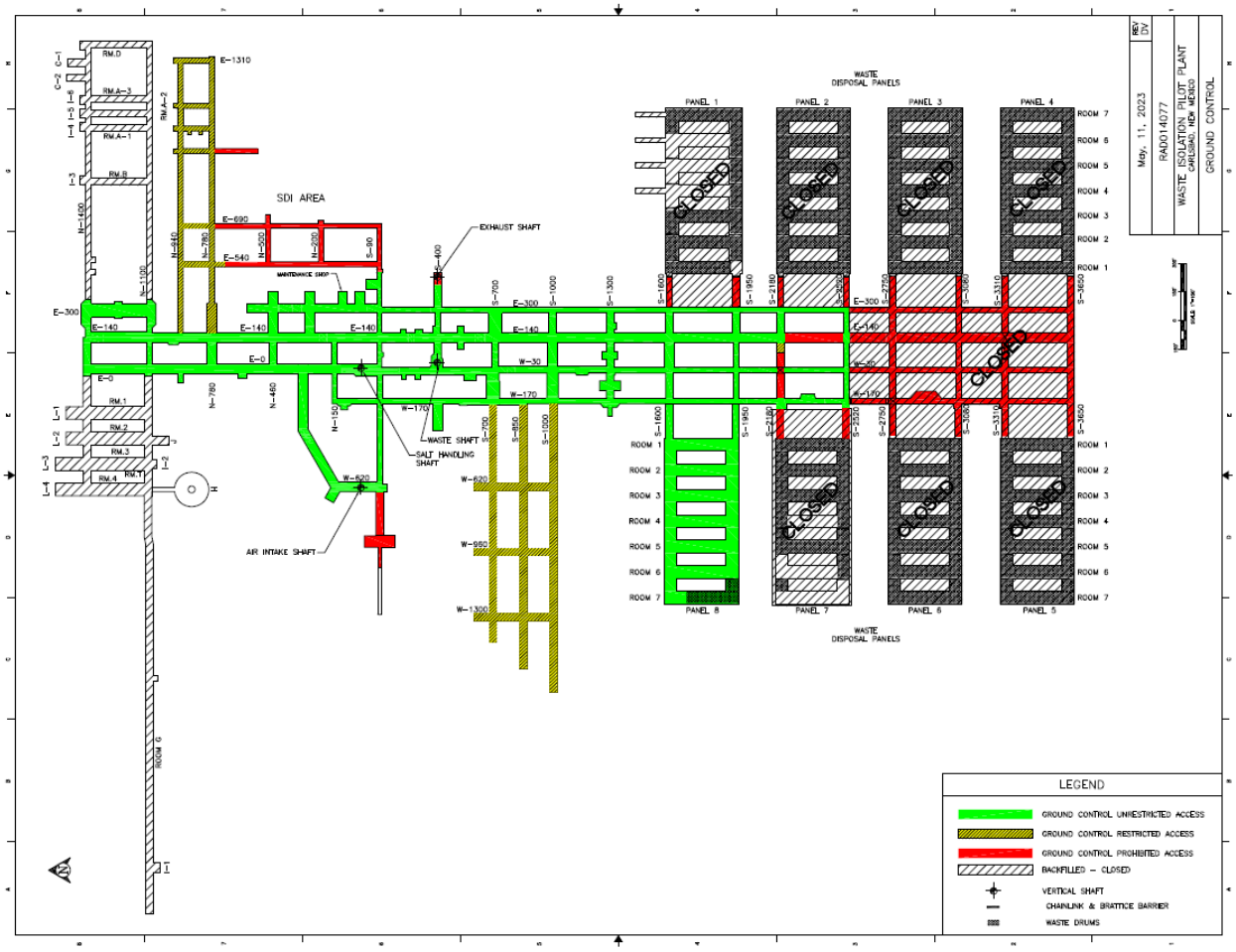


Figure 4. Underground map showing emplaced waste canisters as of May 11, 2023. DOE-provided figure. The gray areas indicate where waste drums have been placed. Waste Panel 7 has been filled and closed since the 2022 WIPP site inspection. Current emplacement activities are in Panel 8 of Room 7.

5.0 Magnesium Oxide Backfill

MgO is the engineered barrier used in the repository as backfill, as specified in DOE's CCA. EPA requires DOE to maintain a MgO excess factor (safety factor) to ensure that adequate MgO is chemically available to prevent carbon dioxide gas buildup and to buffer repository pH after closure. The Agency approved lowering the required excess factor to 1.2 (that is, the emplacement of sufficient MgO to react with 1.2 times the amount of carbon present in the repository) in February 2008. EPA's agreement stipulates that DOE must ensure a minimum reactivity of 96 percent for the MgO emplaced and maintain the excess factor on a room-by-room basis.

Table 5 shows the MgO excess factor for Panel 7 as documented in the WDS Emplacement History Overview Report for Panel 7, dated May 18, 2023. The *Summary of Waste Emplacement Inventory Report* for all panels and rooms (May 18, 2023) also contains the MgO excess factor information. Both documents are found in Appendix D:. During the 2022 inspection, EPA

inspectors found inconsistent values of the MgO excess factor between those two reports and raised the discrepancy with WDS administrators. During the 2023 inspection, the WDS administrator confirmed that the official correction of this issue will be in WDS version 3.5, which will be available in late 2023. A report generated from the preview WDS version 3.5 was provided to EPA in which the issue has been corrected. EPA inspectors will examine the correction when WDS version 3.5 is officially available. The current WDS is version 3.4.

During the underground inspection on the afternoon of May 16, 2023, EPA inspectors requested the chain of custody for MgO supersack #E2185 (Figure 5) as objective evidence that emplaced MgO is being tracked. EPA reviewed documents, including paper records (Appendix D:), and confirmed the requirements were fulfilled. Inspectors also observed the MgO supersack storage area on the morning of May 17, 2023.

Table 5. MgO-Related Information from the Waste Data System

Panel	Room	MgO (kg)	Waste (kg)	CPR (kg)	Adjusted CPR (kg)*	Excess Factor
7	1	370,098	574,946	149,116	195,832	1.27
7	2	555,112	849,866	218,639	295,297	1.26
7	3	321,088	930,341	110,875	165,515	1.3
7	4	161,905	445,712	32,436	51,632	2.1
7	5	315,646	934,715	76,186	117,359	1.8
7	6	99,320	111,871	28,832	36,391	1.83
7	7	57,692	127,168	15,900	21,926	1.76

*Adjusted CPR – plastic component multiplied by a factor of 1.7.

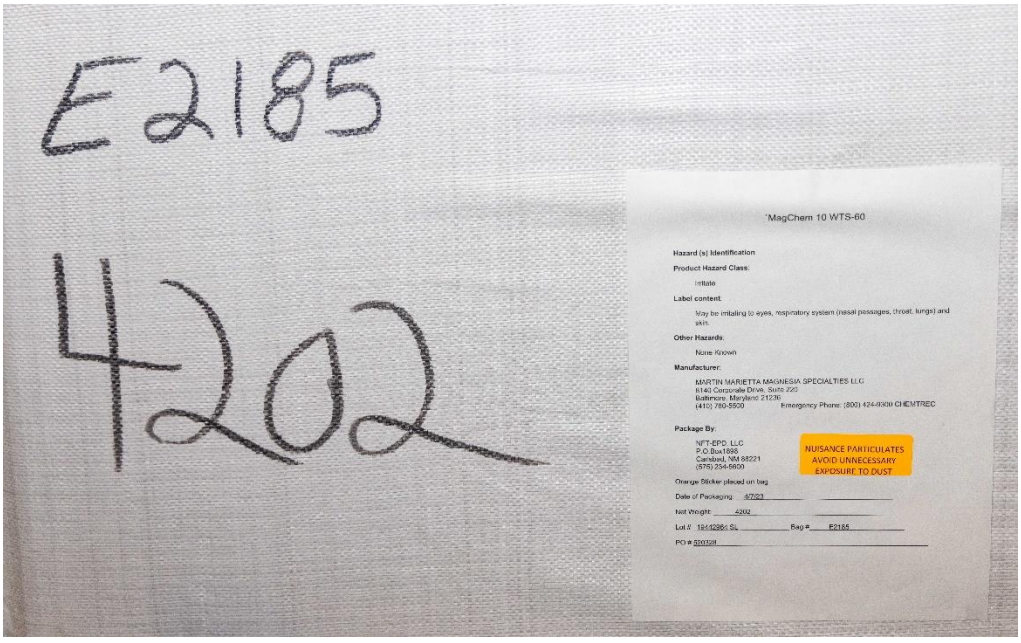


Figure 5. MgO supersack in the underground on May 16, 2023. DOE-provided photo. "E2185" is the supersack number; "4202" is the actual weight of

this sack in pounds. The attachment is one of the lifecycle documents for this MgO supersack that EPA reviewed (Appendix D:).

6.0 Comparison with Inventory Limits

EPA establishes limits for certain waste components at the WIPP by approving performance assessment inventory estimates (Table 6). The minimum limit for ferrous metals is 20 million kilograms (kg). This limit was reached in 2010. The amount of ferrous metal currently emplaced as of May 18, 2023, is 31,523,010 kg, which is 158 percent of the minimum. The other established performance limit is a maximum for CPR materials. In the original CCA, DOE calculated 2.2×10^7 kg of CPR, establishing EPA's limit. The CPR values are tracked per container, and the total CPR (as of May 18, 2023) is 9,643,636 kg, or 43.8 percent of the limiting value.

The *Summary of Waste Emplacement Inventory Report* for all panels and rooms (May 18, 2023; see Appendix D:) provided data for emplaced waste, including the total activities of the 10 EPA-tracked radionuclides (Appendix B:),[6] the total weights of ferrous and nonferrous metals, and the CPR/MgO balance by room.

The LWA limits the total waste volume to no more than 6.2 million cubic feet (175,564 cubic meters) and the total activity of the RH waste to 5.1 million curies. The emplaced waste volume (including non-containerized materials) as of May 18, 2023, is 73,460.57 cubic meters, or 2,594,236 cubic feet.[7] The emplaced waste volume is 41.8 percent of the maximum allowed. According to the WDS Nuclide Report, as of May 18, 2023, the RH activity is 57,409 curies, which is 1.13 percent of the maximum RH activity allowed. Last year (2022) was the first inspection since DOE began reporting waste volumes using the LWA TRU waste volume accounting method instead of the TRU mixed waste (TMW) volume used previously. That is in accordance with the January 16, 2019, CBFO *Policy on Implementation of a Tracking Methodology to Ensure Compliance with the Total Capacity Limit for Transuranic Waste* and cited in the Annual Change Report 2018/2019 and subsequent years. The Emplaced LWA/TMW Volumes Report (May 18, 2023; see Appendix D:) shows the method used in the WDS to track both volumes. This report also includes emplaced LWA and TMW volumes broken down by handling code, container type, container count, and corresponding volume contributions. This report also shows that the two volumes are calculated appropriately in the WDS, as follows:

1. TMW volumes are based on the volume of the outermost container emplaced in the WIPP repository.
2. For non-overpacked waste, LWA volumes are based on the volume of the WIPP-approved container.
3. For overpacked waste, LWA volumes are based on the sum of the volumes of the containers inside the overpack container.

[6] The radionuclide inventory emplaced at the WIPP is an important input to performance assessment. The cumulative activity of emplaced waste is inspected as a monitored parameter, and its tracking is addressed in EPA's monitoring inspection report (see Docket EPA-HQ-OAR-2001-0012-0782).
[7] This is the LWA TRU waste volume. The TMW volume is 103,154.40 cubic meters, or 3,642,863.26 cubic feet.

4. For pipe overpacks and criticality control overpacks, LWA volumes are based on the inner container volume of the single pipe component.

Table 6. Emplaced CPR and Ferrous Metal Materials as of May 18, 2023[8]

Material Type	Weight (kg)	Limiting Value (kg)	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013
CPR	9,643,636	22,000,000 (max)	43.8%	42.9%	42.3%	41.4%	41.3%	40.9%	40.6%	40.5%	40.5%	40.5%	39.6%
Ferrous Metal	31,523,010	20,000,000 (min)	158%	153%	151%	147%	145%	142%	140%	139%	139%	139%	133%

[8] The percentages of limiting value emplaced for CPR and ferrous metal for 2021 and prior years are updated according to DOE's Annual Change Reports.

7.0 Underground Experiments

The WIPP facility provides opportunities to perform certain scientific experiments that cannot be performed at the surface. EPA's regulatory concern is whether any experimental or non-routine activity could degrade safety or long-term repository performance. The Agency has previously reviewed and approved individual experiments and inspected experiments underground. The March 11, 2003, letter from Frank Marcinowski, EPA, to Ines Triay, CBFO, formally approved a process by which experiments that meet certain criteria may be placed underground without explicit prior approval by EPA. Key requirements of this streamlined process are that EPA must be notified three months before an experiment is started, that experiments must not alter ventilation or introduce new hazards, and experiments must take place in designated areas.

Information on other underground experiments is listed in Table 1 of the WIPP Annual Change Reports and in the summary slides ("Overview of the WIPP URL and Science Program", dated May 19, 2023) provided to EPA. Based on these documents, it appears that current experimental activities in the WIPP underground meet EPA's approval processes and will not degrade the safety or long-term performance of the repository.

DOE notified EPA of potential future experiments, including hydrogen safety sensor testing and potential coring, sampling, ground control, and robotics testing. EPA expects to be formally notified three months before each new experiment starts. DOE sent EPA a PCN on the hydrogen safety sensor testing on July 13, 2023.[9] EPA found no issues with the PCN.[10]

8.0 Conclusions

Using the checklist contained in Appendix C:, the inspectors reviewed recovery operations, NWP and SIMCO procedures, and records associated with selected containers. The procedures for processing CH waste were reviewed and found to be adequate, according to specified plans documented in the CCA. EPA concludes that DOE emplacement activities and records are adequate and that CPR and MgO are appropriately tracked. The reporting error impacting the MgO excess factor in the WDS found during the 2022 inspection will be corrected in WDS version 3.5 (Version 3.5 is expected to be released in late 2023. During the inspection, the WDS administrator provided a preview version 3.5 in which the discrepancy issue has been resolved.), which EPA will verify.

[9] Bollinger, M. 2023. Planned Change Notice for Start of Experimental Activities Associated with Sensor Testing in the Waste Isolation Pilot Plant Northern Underground Experimental Area. Letter from Mark Bollinger, DOE CBFO, to Lee Ann Veal, EPA. July 13, 2023.

[10] Veal, L. 2023. Start of Experimental Activities Associated with Hydrogen Safety Senor Testing in the Waste Isolation Pilot Plant (WIPP) Northern Underground Experimental Area. Letter from Lee Ann B. Veal, EPA, to Mark Bollinger, DOE CBFO. August 17, 2023.

Appendix A: EPA WIPP Waste Emplacement Inspection Plan for 2023

Purpose:
The purpose of this inspection is to verify that waste is emplaced in the Waste Isolation Pilot Plant (WIPP) underground disposal facility in the manner specified in the Compliance Certification Application (EPA Air Docket A-93-02, Item II-G-01) and other approvals. The U.S. Environmental Protection Agency (EPA or the Agency) is performing this inspection under the authority of Title 40 of the Code of Federal Regulations Section 194.21 (40 CFR 194.21), which authorizes the Agency to inspect WIPP during its operational period to verify continued compliance with the EPA's WIPP Compliance Criteria and the certification decision of May 18, 1998.

Scope:
The scope of this inspection includes the site's ability to receive, process, and emplace transuranic wastes within the repository; the use of magnesium oxide (MgO) backfill in appropriate amounts to fulfill the U.S. Department of Energy (DOE) commitments and requirements; and the maintenance of relevant records including the electronic WIPP Waste Data System (WDS) and the implementation of appropriate quality assurance practices. Inspection activities will include examination of the waste handling and underground facilities and reviews of records and other procedures related to waste emplacement.

Focal Areas for this Year's Inspection:
The EPA will inspect waste that is being stored aboveground in the Waste Handling Building, and review waste tracking in the WDS. EPA will visit Panel 8 and observe waste emplacement.

Location:
The inspection will be held at the DOE's WIPP facility located twenty-six miles southeast of Carlsbad, New Mexico, and at office locations in Carlsbad, as needed.

Duration:
EPA expects to complete the on-site portion of its inspection in three days. An opening meeting will be held on the first morning of the inspection, and a closing meeting held after the conclusion of site inspection activities.

Expected Dates: May 16–18, 2023.

Documents for Review:
DOE has electronically provided the EPA inspection staff with the latest version of procedures and reports related to waste emplacement, MgO handling, and management of the WDS. The inspection team will identify and request additional records during the inspection.

Appendix B: Summary Totals Waste Data System Nuclide Report Through May 18, 2023

Table B-1. EPA-Tracked Radiological Activity Inventory Panel: ALL Room: ALL

Radionuclide		Repository Contact-Handled Activity (Ci)	Repository Remote-Handled Activity (Ci)	Total Repository Activity (Ci)
Am-241	Americium-241	2.822E+05	6.229E+02	2.828E+05
Cs-137	Cesium-137	2.463E+01	1.448E+04	1.450E+04
Pu-238	Plutonium-238	5.356E+05	7.313E+02	5.364E+05
Pu-239	Plutonium-239	3.578E+05	3.858E+02	3.582E+05
Pu-240	Plutonium-240	8.844E+04	2.813E+02	8.872E+04
Pu-242	Plutonium-242	2.979E+01	3.833E-01	3.017E+01
Sr-90	Strontium-90	1.295E+02	7.622E+03	7.752E+03
U-233	Uranium-233	2.213E+01	3.848E-01	2.252E+01
U-234	Uranium-234	9.586E+01	1.148E+00	9.701E+01
U-238	Uranium-238	1.980E+01	3.926E-02	1.984E+01
Total		**1.264E+06**	**2.412E+04**	**1.289E+06**

Appendix C: EPA Emplacement Inspection Checklist, May 16–18, 2023

Table C-1. EPA Emplacement Inspection Checklist, May 16–18, 2023

Question No.	Question Category	Question	Comments and Objective Evidence	Results
1	Waste Emplacement	Is waste being emplaced in the underground facility in the manner specified in the U.S Department of Energy's (DOE's) Compliance Certification/Recertification or other relevant documentation?	The U.S. Environmental Protection Agency (EPA or Agency) performed this inspection under the authority of Title 40 of the *Code of Federal Regulations* (CFR) 194.21, which authorizes the Agency to inspect the Waste Isolation Pilot Plant (WIPP) during its operational period to verify continued compliance with EPA's WIPP compliance criteria and the certification decision of May 18, 1998. Waste is being emplaced in the manner specified in DOE's Compliance Certification Application (EPA Air Docket A-93-02, Item II-G-01) and other approvals.	Satisfactory
2	Waste Emplacement	Are contact-handled (CH) waste containers stacked in columns appropriately given the type of container?	Inspectors were able to access the waste face near Room 7 of Panel 8 for the first time since the 2014 incident. Photographs taken by DOE personnel, paper emplacement maps, interviews, and Waste Data System (WDS) records also provided evidence that waste is being stacked according to the procedure.	Satisfactory
3	Waste Emplacement	Are records adequate? Randomly select number of CH waste containers to verify records for waste approval, shipment and receipt.	Yes. *TRU [Transuranic] Waste Receipt* (WP 08-NT3020, Rev. 28-FR3, dated September 18, 2019) describes the process. Records produced are the *Uniform Hazardous Waste Manifest*, *TRU Waste Receipt Checklist*, *Shipment Summary Report*, and *Radiological Survey Report*. EPA reviewed the records and found them to be adequate.	Satisfactory
4	Waste Emplacement	Is DOE properly emplacing backfill material (magnesium oxide [MgO]) with the waste packages? Are super sacks placed on top of waste stacks, according to procedure?	Yes, using *CH Waste Downloading and Emplacement* (WP 05-WH1025, Rev. 33, dated December 1, 2022), MgO is emplaced on top of the waste stacks to maintain a safety factor greater than 1.2.	Satisfactory

Question No.	Question Category	Question	Comments and Objective Evidence	Results
5	Waste Emplacement	Verify documentation for the containers listed in Table 3—waste generator site transmittal of waste to the WIPP, WIPP approval, shipment certification for transport to WIPP, shipment initiation documentation, shipment received at the WIPP records, waste emplaced in the underground, and placement of the engineered barrier (MgO).	Inspectors examined electronic records kept aboveground and in the WDS for the selected containers. Documentation was determined to be adequate.	Satisfactory
6	Remote-Handled (RH) Waste Emplacement	Are RH containers approved for receipt received, processed, and emplaced properly?	Yes. Since the May 2022 inspections, 2.31 cubic meters of RH waste were placed in 11 shielded container assemblies (SCAs) in Room 2 of Panel 7 (*Emplacement History Overview Report for Panel 7*, May 18, 2023). There are also 5.04 cubic meters of RH waste placed in 24 SCAs in Room 7 of Panel 8 (*Emplacement History Overview Report for Panel 8*, May 18, 2023).	Satisfactory
7	RH Waste Emplacement	Are RH containers appropriately tracked? Where is the information? – In the WDS, what report? – During the receipt/transfer process, where is it recorded? – In the underground?	Yes. *Emplacement History Overview Report for Panel 7* (May 18, 2023) and *Emplacement History Overview Report for Panel 8* (May 18, 2023) show the RH containers emplaced only in Panel 7 of Room 2 and Panel 8 of Room 7 since the last inspection (May 2022). The *Waste Emplacement Inventory Report for Panel 8, Room 7* (May 18, 2023) shows the RH containers are appropriately tracked.	Satisfactory
8	RH Waste Emplacement	Content of RH canisters.	N/A. There is no RH in storage and access to emplaced RH is restricted. Since the May 2022 inspections, RH waste has only been placed in SCAs, not in RH canisters.	N/A

Question No.	Question Category	Question	Comments and Objective Evidence	Results
9	RH Waste Emplacement	What are the volume and mass and/or concentration of important waste components and radionuclides (RH and CH)? Are they within statutory and regulatory limits?	Yes. A detailed description of nuclide information is included in the following waste emplacement reports: *Waste Emplacement Inventory Report for Panel 8, Room 7* (May 18, 2023), *Emplacement History Overview Report for Panel 7* (May 18, 2023), and *Emplacement History Overview Report for Panel 8* (May 18, 2023).	Satisfactory
10	RH Waste Emplacement	Are RH boreholes closed properly? (Note: see also Items 6–9 for tracking of RH waste in the underground.)	N/A for this inspection. Access to RH waste emplacement is restricted. No RH waste has been emplaced in boreholes since 2014. SCAs are used for RH waste emplacement. Each SCA is placed on the floor of each room, similar to CH waste (*Emplacement History Overview Report for Panel 7*, May 18, 2023, and *Emplacement History Overview Report for Panel 8*, May 18, 2023).	N/A
11	RH Waste Emplacement	Is a photographic record made of the RH canister number during emplacement and retained in the permanent record?	Underground emplacement map (Figure 3) shows the locations of SCAs in Panel 8 of Room 7. Access to RH waste emplacement is restricted. No RH waste has been emplaced in boreholes since 2014. SCAs are used for RH waste emplacement. Each SCA is placed on the floor of each room, similar to CH waste (*Emplacement History Overview Report for Panel 7*, May 18, 2023, and *Emplacement History Overview Report for Panel 8*, May 18, 2023).	N/A
12	Procedures	Do the DOE procedures reflect an MgO safety factor to 1.2?	Yes. WP 05-WH1025, Rev. 33, Section 5.3, "Backfill," establishes procedures to maintain a safety factor of 1.2 or greater per room daily. Procedures in the *Waste Data System User's Manual* (DOE/WIPP-09-3427, Rev. 21, June 22, 2021), Section 5, "Volume Conversion, Weight Conversion, Packing Fractions, and MgO Calculations," reflect the 1.2 safety factor and the use of 3,000-pound super sacks as necessary. Review of the *Summary of Waste Emplacement Inventory Report* documents an MgO safety factor of more than 1.2 for all rooms in each panel (*Emplacement History Overview Report for Panel 7*, May 18, 2023, and *Emplacement History Overview Report for Panel 8*, May 18, 2023).	Satisfactory

Question No.	Question Category	Question	Comments and Objective Evidence	Results
13	Procedures	Are cellulosic, plastic, and rubber materials (CPR) and MgO calculated and tracked on a room-by-room basis?	Yes. WP 05-WH1025, Rev. 33, Section 5.3 establishes procedures to maintain a safety factor of 1.2 or greater per room daily. The *Summary of Waste Emplacement Inventory Report* for all panels and rooms, dated May 18, 2023, tracked the CPR material, MgO, and MgO safety factor on a room-by-room basis. The reporting error impacting the MgO excess factor in the WDS found during the 2022 inspection is to be corrected in WDS version 3.5 (expected to be released in late 2023), which EPA will verify.	Satisfactory
14	Procedures	Are sampling and analytical procedures in place to ascertain that emplaced MgO maintains a minimum of 96% +/- 2% reactivity?	Yes. Specification D-0101 (Rev. 13, dated February 28, 2023), *Specification for Prepackaged MgO Backfill*, Section 3.3.1, "General Requirements," and *MgO Sample Records Management* (WP 05-WH1105, Rev. 7, dated July 19, 2022), set forth analytical and document management procedures to verify that each shipment of MgO maintains a greater than or equal to 94% reactivity.	Satisfactory
15	Procedures	Is the acceptance of the MgO backfill material from the supplier documented?	Yes. WP 05-WH1105 (Rev. 7, dated July 19, 2022), *MgO Sample Records Management*, Section 1.1 "Introduction - Purpose" requires each shipment to be numbered and the MgO supplier to provide an Analysis of Shipment and a sample under Chain of Custody for each shipment.	Satisfactory
16	Procedures	For the MgO needed for high CPR, are there procedures or documentation to help site personnel identify when and where additional MgO is needed?	Yes. General procedures are found in the *WIPP Waste Handling Operations WDS User's Manual*, WP 05-WH.02 (Rev. 3, dated October 4, 2017), Attachment 1, "Special Requirements for Additional MgO." Section 5.3 of WP 05-WH1025 (Rev. 33, dated December 1, 2022), calls for notification of the Waste Handling Manager if daily reports show the MgO safety factor of a room to be less than 1.2.	Satisfactory
17	Procedures	Is there documentation that identifies how MgO should be placed with high-CPR waste?	Yes. WP 05-WH1025, Rev. 33, Attachment 3, "Super Sack/BRT ["big red thing"] Emplacement Data Sheet," and *CH Waste Handling Abnormal Operations* (WP 05-WH1058, Rev. 21, dated January 10, 2019), Section 5.4, "Emplacement of BRT."	Satisfactory

Question No.	Question Category	Question	Comments and Objective Evidence	Results
18	Procedures	Verify documentation of procedures for abnormal operating conditions and documentation of training for contingencies.	Yes. Emergency procedures include: *Environmental Incident Reporting* (WP 02-EC3506, Rev. 11, dated March 25, 2021), is the Management Control Procedure for reporting releases and includes statutory requirement charts for notifications and decision flowcharts. *CH Waste Handling Abnormal Operations* (WP 05-WH1058, Rev. 21, dated January 10, 2019), includes instructions for recovering from a torn slip sheet, moving emplaced waste, returning waste to the surface, and emplacing BRTs. Specifies that "Abnormal operations of a large scope (e.g., overpack and retrieval) will have specific plans developed." *Waste Isolation Pilot Plant Emergency Management Plan* (DOE/WIPP-17-3573, Rev. 0, dated February 14, 2018), is the top-level document outlining emergency response procedures and responsibilities and includes training requirements for response roles. *Waste Handler Operator Event Response* (WP 05-WH4401, Rev. 6, dated January 31, 2019) includes alarm, alert, and exit procedures. *Categorization and Classification of Operational Emergencies* (WP 12-ER3906, Rev. 22, dated February 22, 2021) includes tables of procedures for emergency notifications and classification of events. *Emergency Radiological Control Responses* (WP 12-HP4000, Rev. 11, dated January 13, 2021) provides guidance for responding to an actual or suspected breach of a TRU container, contamination found outside controlled areas, and/or radiation levels exceeding the limits set in the *Waste Isolation Pilot Plant Radiation Safety Manual* (WP 12-5, Rev. 22, dated April 30, 2018).	Satisfactory
19	Records/WDS	Does the WDS adequately record required information?	Reports available through the EPA Dashboard contain the container number, shipment number, emplacement data, and underground location. The EPA staff queried the WDS to verify that this information is recorded correctly.	Satisfactory

Question No.	Question Category	Question	Comments and Objective Evidence	Results
20	Records/WDS	Does the WDS adequately document waste shipment and emplacements information for waste containers selected? (Item 3 above.)	Yes. The Container Query was generated, which correctly reflected container number and shipment number.	Satisfactory
21	Records/WDS	Do records verify that CH waste container surface doses fall within statutory requirements? Where are CH surface dose records maintained?	Yes. CH surface dose measurements are recorded in the Container Query.	Satisfactory
22	Records/WDS	Review a Container Query. Does this report adequately record the Waste Stream Profile information?	Yes. The inspector found the information in the Overpack Data Report Query.	Satisfactory
23	Records/WDS	Review the Container Query. Does this report correctly record the containers shipped?	Yes, under the Transportation Data Report. By querying the shipment number, the Shipment Data Report may be generated. Inspectors verified that the report reflects the containers shipped.	Satisfactory
24	Records/WDS	Review the Waste Emplacement Report. Does this report adequately record the date of receipt and disposal locations of containers?	Yes. See Item 22.	Satisfactory

Question No.	Question Category	Question	Comments and Objective Evidence	Results
25	Records/WDS	Is DOE assuring that the 1.2 safety factor is being maintained on a room-by-room basis? Does the WDS accurately calculate the excess factor and recommend the proper amount of MgO to emplace it?	Yes. See Items 12–17. The *Summary of Waste Emplacement Report* for all panels and rooms, dated May 18, 2023, shows that the MgO safety factor of a minimum of 1.2 is maintained on a room-by-room basis.	Satisfactory for MgO safety being maintained, but unsatisfactory for WDS calculations being reported.

Appendix D: Documents Reviewed

Table D-1. Documents Reviewed

Document Type	ID and/or Date	Document Title	Subject Matter	Source
Referenced Report	*WP 08-NT3020, Rev. 28-FR3 (September 18, 2019)	*TRU Waste Receipt*	This procedure provides instructions for receipt of mixed or non-mixed transuranic (TRU) waste shipments at the Waste Isolation Pilot Plant (WIPP).	DOE/WIPP
Referenced Report	*WP 05-WH1011 Rev. 68-FR2 (May 3, 2023)	*CH Waste Processing*	This procedure provides instructions for surface processing and transport of contact-handled (CH) packages exclusive to TRUPACT-II or HalfPACT shipping containers.	DOE/WIPP
Referenced Report	*WP 05-WH1025 Rev. 33 (December 1, 2022)	*CH Waste Downloading and Emplacement*	Technical procedure that provides instructions for preparing the CH waste payloads for downloading and emplacement in the underground disposal area.	DOE/WIPP
Referenced Report	*D-0101, Rev. 13 (February 28, 2023)	*Specification for Prepackaged MgO Backfill*	Technical specification covering the definition of the prepackaged backfill material to be emplaced in the underground areas at the WIPP. Includes analytical methods to ensure reactivity, and Analysis Request/Chain of Custody forms.	DOE/WIPP
Referenced Report	WP 05-WH1105, Rev. 7 (July 19, 2022)	*MgO Sample Records Management*	This procedure provides the administrative guidance for Nuclear Waste Partnership Operations personnel to maintain the records associated with magnesium oxide (MgO) sampling activities.	DOE/WIPP
Referenced Report	WP 05-WH.02, Rev. 3 (October 4, 2017)	*WIPP Waste Handling Operations WDS User's Manual*	WIPP waste handling operations WIPP Waste Information System user's manual, for the use of waste handling technicians and waste handling engineers.	DOE/WIPP

Document Type	ID and/or Date	Document Title	Subject Matter	Source
Referenced Report	WP 08-NT.01, Rev. 35 (February 21, 2019)	*Waste Data System Program and Data Management Plan*	Summarizes the functional requirements for the Waste Data System (WDS).	DOE/WIPP
Referenced Report	WP 08-NT.03, Rev. 20 (August 25, 2020)	*Waste Stream Profile Form Review and Approval Program*	Summarizes the requirements and criteria for WIPP review and approval of Waste Stream Profile Forms prepared by generator/storage sites and submitted for approval by the permittee.	DOE/WIPP
Referenced Report	WP 08-NT.04, Rev. 29 (January 19, 2023)	*Waste Data System Software Quality Assurance Plan*	Identifies the software quality assurance work activities associated with the WIPP WDS.	DOE/WIPP
Referenced Report	DOE/WIPP-09-3427, Rev. 21 (June 22, 2021)	*Waste Data System User's Manual*	Gives summary information to users of the WDS, including data entry, data review, searches, and producing output reports.	DOE/WIPP
Referenced Report	May 19, 2022	*Overview of the WIPP URL and Science Program*	Summary slides on ongoing and planned experiments and testing in the WIPP underground.	DOE/EM
Referenced Report	DOE/WIPP-17-3573, Rev. 0 (February 14, 2018)	*WIPP Emergency Management Plan*	This plan provides an organized process for handling significant incidents, emergency events or potential events that could threaten human health or the environment.	DOE/WIPP
Referenced Report	WP 05-WH4401, Rev. 6 (January 31, 2019)	*Waste Handling Operator Event Response*	Emergency procedure for continuous air monitor alarms, fire, smoke, toxic gas, structural issues, or spill/release.	DOE/WIPP
Referenced Report	WP 12-5, Rev. 22 (April 30, 2018)	*Waste Isolation Pilot Plant Radiation Safety Manual*	This manual discusses the radiological protection program at the WIPP.	DOE/WIPP

Document Type	ID and/or Date	Document Title	Subject Matter	Source
Referenced Report	November 13, 2019, November 13, 2020, October 19, 2021, January 31, 2022	WIPP Annual Change Reports 2018/2019, 2019/2020, 2020/2021, 2021/2022	The U.S. Department of Energy (DOE) provides an annual report each November of applicable changes over the time period July 1 to June 30. This annual report informs the U.S. Environmental Protection Agency (EPA) of changes to information in the most recent compliance application. Significant planned changes must be reported to EPA prior to implementation by DOE.	DOE/WIPP
Generated Documents	Emplacement History Overview Report for Panel 7 (May 18, 2023)	*WDS Emplacement History Overview Report for Panel 7*	Lists the amounts and types of waste emplaced in Panel 7.	DOE/WIPP
Generated Documents	Emplacement History Overview Report for Panel 8 (May 18, 2023)	*WDS Emplacement History Overview Report for Panel 8*	Lists the amounts and types of waste emplaced in Panel 8.	DOE/WIPP
Generated Documents	Summary of Waste Emplacement Inventory Report for Panel 8 of Room 7 (May 18, 2023)	*Summary of Waste Emplacement Inventory Report; Panel 8 Room 7*	Lists the amounts and types of waste emplaced in Panel 8, Room 7 and the MgO safety factor.	DOE/WIPP
Generated Documents	Summary of Waste Emplacement Inventory Report for All Panels and Rooms (May 18, 2023)	*WDS Emplacement History Overview Report for All Panels*	Lists the amounts and types of waste emplaced in all panels and rooms of the WIPP and the MgO safety factor for each.	DOE/WIPP
Generated Documents	Container Data Report SRSB01372 (May 18, 2023)	*WIPP Overpack Data Report for Container SRSB01372*	Contains information on the CH waste container selected for inspection.	DOE/WIPP

Document Type	ID and/or Date	Document Title	Subject Matter	Source
Generated Documents	Container Data Report X10C9311922A (May 18, 2023)	*WIPP Container Data Report for Container X10C9311922A*	Contains information on the CH waste container selected for inspection.	DOE/WIPP
Generated Documents	Shipment Summary Report IN230108 (May 18, 2023)	*WIPP Shipment Summary Report for Shipment IN230108*	Contains information on the CH waste shipment selected for inspection.	DOE/WIPP
Generated Documents	Container Data Report AE1409SC (May 18, 2023)	*WIPP Container Data Report for Shielded Container Assembly AE1409SC*	Contains information on the remote-handled waste in the shielded container assembly selected for inspection.	DOE/WIPP
Generated Documents	Container Data Report 10581693 (May 18, 2023)	*WIPP Container Data Report for Container 10581693*	Contains information on the CH waste container selected for inspection.	DOE/WIPP
Generated Documents	Container Data Report 10565462 (May 18, 2023)	*WIPP Container Data Report for Container 10565462*	Contains information on the CH waste container selected for inspection.	DOE/WIPP
Generated Documents	Container Data Report NFSS9457235 (May 18, 2023)	*WIPP Container Data Report for Container NFSS9457235*	Contains information on the CH waste container selected for inspection.	DOE/WIPP
Generated Documents	Emplaced LWA/TMW Volumes (May 18, 2023)	*Emplaced LWA/TMW Volumes*	Land Withdrawal Act of 1992 (LWA) and TRU mixed waste (TMW) volumes (in cubic meters) emplaced at the WIPP as of May 18, 2023.	DOE/WIPP

* Indicates a newer version of the report exists, but it may have not been specifically reviewed.