UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG - 2 2018

OFFICE OF
AIR AND RADIATION

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

Dear Mr. Shrader:

The U.S. Environmental Protection Agency conducted inspections at the Waste Isolation Pilot Plant (WIPP) during the week of October 23, 2017 as part of the Agency's continuing oversight. These inspections were performed under the authority of 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 DOE and its contract staff at the 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. Some minor areas for improvement were noted. The EPA encourages the DOE to consider more robust radiological monitoring of the salt shaft exhaust point. During the next inspection cycle, the EPA will work with DOE to find the best method of documenting waste emplacement activities in the restricted areas of Panel 7.

Copies of the enclosed reports will be placed on 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

Lee Ann B. Veal
Director
Radiation Protection Division

UNIQUE #	DOE NO.	DATE RECVD	ADDRESSEES
1801632	230000	AUG 21 2018	See list

Enclosures (3)

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E-DOCKET: EPA-HQ-OAR-2001-0012-0477

2017—Emplacement Inspection Report

INSPECTION No. EPA-WIPP-10.24-26c
OF THE
WASTE ISOLATION PILOT PLANT
October 24–26, 2017

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

August 2018

Table of Contents

1.0 Executive Summary 1

2.0 Inspection Purpose and Scope 1

3.0 Inspection Team, Observers and Participants 2

4.0 Performance of the Inspection 3

5.0 Training and Exercises 4

6.0 Waste Emplacement/WDS 5

7.0 Magnesium Oxide Backfill 8

8.0 Comparison With Inventory Limits 9

9.0 Summary 10

Attachment A: Emplacement Inspection Plan—2017 Inspection 11

Attachment B: Summary Totals Waste Data System Nuclide Report Through October 27, 2017 13

Attachment C: EPA Emplacement Inspection Checklist, October 24–26, 2017 14

Figures

Figure 1. The inspection team in the WIPP underground. 4
Figure 2. Underground map showing emplaced waste in black. 6
Figure 3. The waste transfer point near Panel 7 6
Figure 4. The waste emplacement map serves as a physical backup for the WDS bar code reader 7
Figure 5. The interior of the Waste Handling Building, with stored containers awaiting emplacement. 8

Tables

Table 1. Inspection Team 2
Table 2. Inspection Participants 2
Table 3. Waste Containers Reviewed During Inspection 4
Table 4. MgO-Related Information 9
Table 5. Emplaced Materials as of October 27, 2017 9

1.0 Executive Summary

The U.S. Environmental Protection Agency (EPA or the Agency) conducted an inspection of the U.S. Department of Energy's (DOE) Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico, from October 24 to 26, 2017, in accordance with 40 CFR 194.21. The WIPP is a disposal facility for defense-related transuranic (TRU) waste as defined by the WIPP Land Withdrawal Act. The EPA first certified that the WIPP complies with the Agency's radioactive waste disposal regulations (Subparts B and C of 40 CFR 191) on May 18, 1998. Attachment A includes the inspection plan.

The WIPP restarted waste emplacement in January 2017 after suspending waste operations for almost 3 years to allow recovery from operational incidents in 2014. During this inspection, the facility was emplacing waste in Room 5 of Panel 7 using emplacement procedures that assure worker safety in a contaminated environment. The emplacement inspection documents the recovery progress and confirms information that DOE has submitted to EPA regarding recovery and current facility operations. Though the inspection team did not enter the contamination area in Panel 7, the inspection confirmed information entered into the Waste Data System (WDS) for waste emplaced while the inspection team was on site.

The EPA concluded that DOE's emplacement activities are adequate based on interviews with the contractors and documentation provided by the DOE Carlsbad Field Office (CBFO). The EPA confirmed that cellulosic, plastic and rubber material (CPR) is appropriately tracked and recorded, and magnesium oxide (MgO) balances are calculated properly. Because of the safety training and equipment required to enter the active waste panel, the Agency was unable to directly observe waste emplacement procedures in the underground, and the site did not provide photographs of waste emplacement activities. A review of available records provided evidence that waste emplacement is taking place according to procedure. The EPA did not identify any findings or concerns regarding waste emplacement during this inspection.

2.0 Inspection Purpose and Scope

The purpose of this annual inspection is to verify that Contact-handled (CH) TRU waste sent to WIPP since January 2017 has been emplaced in the underground facility in the manner specified in DOE's Compliance Certification Application (EPA Air Docket A-93-02, Item II-G-01) and other approvals. The EPA performed this inspection under the authority of 40 CFR 194.21, which authorizes the Agency to inspect 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 emplaced amounts support the chemistry model that DOE uses for the WIPP performance assessment.

Activities within the scope of this inspection included reviewing the WIPP site's ability to receive, process and emplace CH TRU wastes within the repository, emplace MgO backfill to fulfill certification requirements and other approvals, and 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. The WIPP site is operated by the Nuclear Waste Partnership (NWP) under contract to DOE, and waste handling and tracking activities are described by or controlled through NWP procedures.

3.0 Inspection Team, Observers and Participants

The inspection team consisted of four EPA staff. Andrea Goodbar of the New Mexico Environment Department WIPP Oversight Bureau also observed the inspection activities. A partial list of inspection participants is provided in Table 1.

Table 1. Inspection Team

Inspection Team Member	Position	Affiliation
Jonathan Walsh	Inspection Leader	EPA Office of Radiation and Indoor Air (ORIA)
Nick Stone	Inspector	EPA Region 6
Wagnus Prioleau	Inspector	EPA ORIA
Kishor Fruitwala	Observer	EPA Region 6
Andrea Goodbar	Observer	New Mexico Environment Department

Numerous DOE staff and contractors participated in the inspection; Table 2 includes a partial list.

Table 2. Inspection Participants

Participant	Affiliation
Larry Madl	Regulatory and Environmental Services (RES), Inspection Coordinator
Russ Patterson	DOE Carlsbad Field Office (CBFO)
Anderson Ward	CBFO
Jacqueline Davis	Nuclear Waste Partnership (NWP)
Chuck Mills	NWP
Jill Farnsworth	NWP
Ed Thomas	NWP
Leonard Davis	NWP
Matt Carnathan	NWP
Ed Picazo	RES
Ashley Urdiquez	RES
Stewart Jones	RES
Rick Salness	RES
Steve Kouba	RES
Mansour Akbarzadeh	WIPP Laboratories

4.0 Performance of the Inspection

The inspection took place from October 24 to 26, 2017, at DOE's CBFO and the WIPP facility, which is located approximately 26 miles southeast of Carlsbad, New Mexico. The opening meeting with CBFO and NWP personnel was held on the morning of October 24, 2017. Facility staff presented information addressing program status, updates and changes since the last EPA emplacement inspection, which took place from November 7 to 9, 2016. The primary focus of the emplacement inspection was to determine the nature and extent of changes in emplacement activities and documentation since the facility resumed emplacement in January 2017.

EPA inspectors accompanied CBFO and NWP personnel into the underground repository on the morning of October 25 (Figure 1). The inspection team viewed the transfer point at the radiological boundary area between the "clean side" and potentially contaminated side near Panel 7. A facility pallet is placed directly on the radiological boundary. Following downloading, waste is transferred to the radiological boundary using an uncontaminated forklift and placed on the facility pallet. A forklift that remains in the contaminated area is then used to retrieve that waste and emplace it.

Inspectors reviewed records documenting that waste emplacement and MgO tracking were conducted in accordance with procedures. Inspectors selected three containers and recorded their identification numbers (Table 3), and both paper and electronic records for these containers were examined for complete waste tracking and emplacement information. NWP personnel answered questions from the inspection team about how waste is handled and emplaced.

During the afternoon of October 25, EPA inspectors observed operations in the Waste Handling Building above ground. On October 26, inspectors accessed the WDS and could generate Container and Canister Data Reports for the CH waste containers observed in the Waste Handling Building before emplacement. Inspectors discussed record-keeping procedures with WDS data administrators at the CBFO. The inspection team presented preliminary observations at a close-out meeting on the afternoon of October 26.

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, which limited the extent of the inspection. Therefore, the team identified three containers in the Waste Handling Building scheduled for emplacement and followed their associated records to confirm that procedures were followed.



Figure 1. The inspection team in the WIPP underground.

Table 3. Waste Containers Reviewed During Inspection

CH Waste Containers Reviewed During Inspection (Waste Handling Building)	Container Number	Container Type
	BN10627901	Ten-drum overpack (TDOP)
	BN10620210	TDOP
	BN10627896	TDOP

5.0 Training and Exercises

The recovery process has required WIPP to re-evaluate standard operating procedures, document training, and conduct operational exercises to assure compliance with all applicable requirements for the facility. Training records are kept on site and each position requires documented compliance with the training requirements applicable for that position. Members of the inspection team (N. Stone and K. Fruitwala) spent an hour observing the exercise titled "New Dawn 2017" in the Emergency Operations Center, located in the Skeen-Whitlock building in Carlsbad. The team also observed the Central Monitoring Room (CMR) at the WIPP site and interviewed one of the CMR supervisors regarding operations after resumption of emplacement.

6.0 Waste Emplacement/WDS

Wastes received at the repository include CH TRU wastes from Argonne National Laboratory-East (ANL-E), Bettis Atomic Power Laboratory, GE Vallecitos Nuclear Center, Lawrence Livermore National Laboratory, Sandia National Laboratory, Los Alamos National Laboratory, Idaho National Laboratory (INL), the Hanford Site, the Rocky Flats Environmental Technology Site, the Savannah River Site (SRS), the Nevada National Security Site (formerly the Nevada Test Site) and Oak Ridge National Laboratory (ORNL). These wastes are received and emplaced in several configurations: standard waste boxes (SWBs), 55-gallon drums assembled in groups of seven called a "seven pack," 100-gallon drums for super-compacted waste, ten-drum overpacks (TDOPs), standard large boxes (SLB2s) and shielded containers. Remote-handled (RH) wastes from INL, ORNL, ANL-E and SRS have been emplaced in the WIPP using the 72-B canister. CH waste containers are stacked in columns (waste stacks) combining SWBs, drum packs and TDOPs. TDOPs are always placed on the floor of the room, occupying the bottom and middle position of a waste column. SWBs and drums may be emplaced in any order, with most wastes emplaced as received. The waste columns are in a series of staggered rows, with a row consisting of three columns that span the distance of a disposal room from left to right.

The repository is subdivided into panels, each panel consisting of seven rooms. CH waste emplacement had begun in Room 7 of Panel 7 prior to the fire on February 5, 2014. The radiation release of February 14, 2014, contaminated Panel 7. As of the 2017 inspection, Rooms 7, 6 and 4 of Panel 7 remain isolated because of either contamination or unstable roof integrity. Cross-hatched areas in Figure 2 indicate the drifts and rooms to which access is restricted due to a lack of roof beam maintenance. Current emplacement activity takes place in the intake drift near Room 6 and will continue to fill Room 5. Areas of waste emplacement are shown in black, including the locations in Panel 7 where CH emplacement was discontinued and resumed. Figure 3 shows the waste transfer point near Panel 7, used to transfer waste from fully decontaminated areas in to potentially contaminated areas for emplacement.

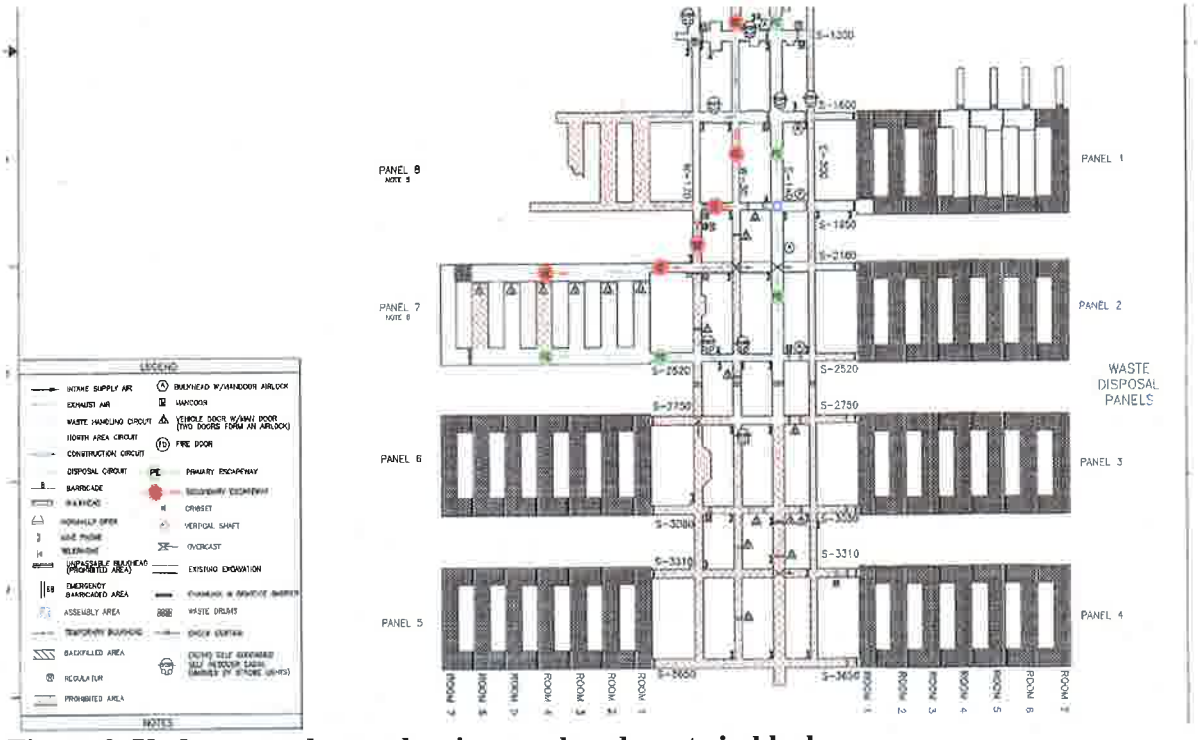


Figure 2. Underground map showing emplaced waste in black.



Figure 3. The waste transfer point near Panel 7.

The EPA team inspected the Waste Handling Building on the afternoon of October 25 and observed waste that was being processed for downloading an emplacement, including a limited amount of waste still being stored since the 2014 incidents and awaiting final recharacterization. As part of the emplacement inspection, the EPA team typically identifies containers that have been emplaced in the underground and verifies that those containers have been correctly tracked and recorded using the WDS. Because the waste face in Panel 7 remains inaccessible without specialized training and protective equipment, the inspectors identified three containers that were stored in the Waste Handling Building (see Table 3 above). The containers were emplaced while the inspectors were on site, and the inspection team collected and examined the records created during emplacement (Figure 4). Figure 5 shows the Waste Handling Building, with containers awaiting emplacement.

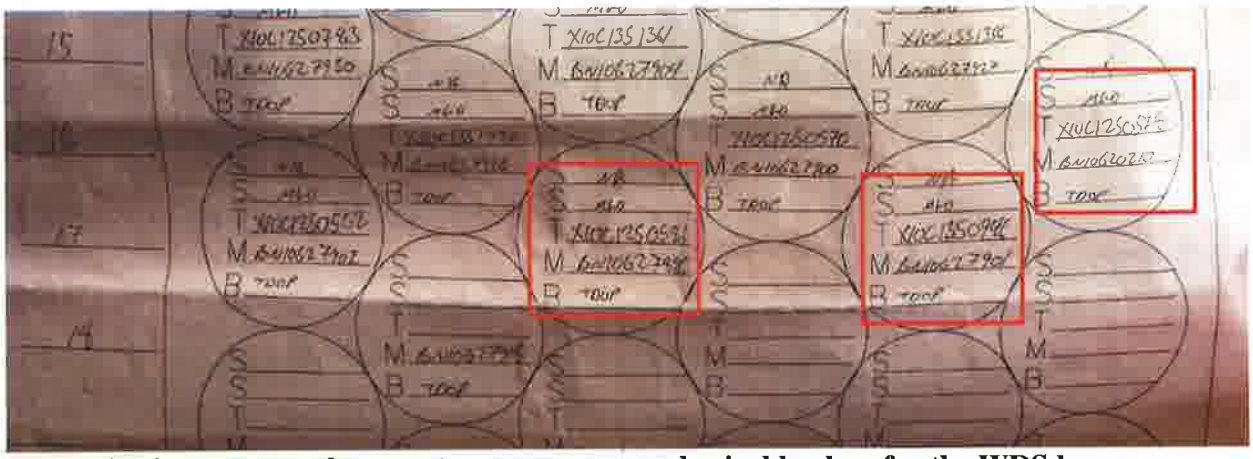


Figure 4. The waste emplacement map serves as a physical backup for the WDS bar code reader.



Figure 5. The interior of the Waste Handling Building, with stored containers awaiting emplacement.

On the afternoon of October 26 at CBFO, inspectors met with Chris Luoma, an administrator of the WDS. Container reports were produced for all three containers. All electronic records were found to contain the required information including waste stream, container contents and status.

7.0 Magnesium Oxide Backfill

MgO is the engineered barrier used in the repository as backfill, specified in DOE's Compliance Certification Application (CCA). The EPA requires the DOE to maintain an MgO excess factor (safety factor) to ensure that adequate MgO is chemically available to control the chemistry of each room after closure. The Agency approved lowering the required excess factor to 1.2 (that is, emplacement of sufficient MgO to react with 1.2 times the amount of carbon present in the repository) in February 2008. Conditions of EPA's agreement stipulate 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. The DOE maintains an excess factor of 1.2 on a room-by-room basis. Table 4 shows the MgO Excess factor for Panel 7 as shown in the Summary of Waste Emplacement Report dated October 27, 2017.

Table 4. MgO-Related Information

Panel	Room	MgO (kg)	Waste (kg)	CPR (kg)	Excess Factor
7	7	57,692	127,168	15,876	1.76
7	6	99,320	111,871	25,911	1.83

8.0 Comparison with Inventory Limits

The EPA establishes limits for certain waste components at WIPP by approving performance assessment inventory estimates. 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 October 27, 2017, is 27,763,444 kg, which is 139 percent of the minimum. The other established performance limit is a maximum for cellulosic, plastic, and rubber (CPR) materials. In the original CCA, DOE calculated 2.2×10^7 kg of CPR, establishing EPA's limit. In the subsequent performance assessment baseline calculations, DOE added packaging materials to the calculations, and now the maximum CPR limit for WIPP is 2.4×10^7 kg (Table 5). The CPR values are tracked per container, and the total CPR as of October 27, 2017 is 8,948,158 kg or 37.3 percent of the limiting value.

The Summary of Waste Emplacement Inventory Report provided data for emplaced waste, including total activities of the 10 EPA-tracked radionuclides, total weights of ferrous and non-ferrous metals, and the CPR/MgO balance by room as of October 27, 2017.

Table 5. Emplaced Materials as of October 27, 2017

Material Type	Weight (kg)	Limiting Value (kg)	2017	2014	2013	2012	2011	2010	2009
CPR	8,948,158	24,000,000 (max)	37.3%	37.1%	36.3%	34.3%	32.3%	29.9%	26.3%
Ferrous Metal	27,763,444	20,000,000 (min)	139%	138%	132%	123%	113%	101%	87.5%
Non-Ferrous Metal	439,764	N/A							
Other Material[1]	13,526,005	N/A							

[1] Other Material reflects inorganic material and metal alloys.

The WIPP Land Withdrawal Act of 1992 limits the total waste to no more than 176,000 cubic meters (6.1 million cubic feet) and the total activity of the RH waste to 5.1 million curies. The emplaced waste as of October 27, 2017, is 91,797 cubic meters or 3,241,352 cubic feet. The emplaced waste is 52 percent of the maximum allowed. The RH activity is shown in Attachment B as 24,050 curies, which is 0.47 percent of the maximum RH activity allowed.

9.0 Summary

Using the checklist contained in Attachment C, the inspectors reviewed recovery operations, NWP procedures, training and exercise records, and records associated with selected stored containers. The procedures for processing CH waste were reviewed and found to be adequate, according to specified plans documented in the CCA. The EPA concludes that the DOE emplacement activities and records are adequate and that CPR and MgO are appropriately tracked. The Agency identified no findings or concerns with the emplacement portion of the inspection.

Attachment A: Emplacement Inspection Plan—2017 Inspection

WIPP FY 2017 Inspection Plan for Emplaced Waste, Specified in DOE's Compliance Certification Application and Per 40 CFR 194.2

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 U.S. Department of Energy's (DOE) Compliance Certification Application (EPA Air Docket A-93-02, Item II-G-01) and other approvals.

The U.S. Environmental Protection Agency (EPA or Agency) is performing this inspection under the authority of 40 CFR 194.21, which authorizes the Agency to inspect the 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 traditionally has included a demonstration of the site's ability to receive, process and emplace contact-handled (CH) and remote-handled (RH) transuranic wastes within the repository; the use of magnesium oxide (MgO) backfill in appropriate amounts to fulfill DOE commitments and requirements; and maintenance of relevant waste packaging records, including the electronic WIPP Waste Data System (WDS) and the verification of appropriately implemented quality assurance practices. Documentation related to these processes and activities will be a major component of the review.

Focal Areas for This Year's Inspection: This is the first annual inspection that will be conducted following the resumption of waste handling operations. The EPA expects DOE to explain the status of waste emplacement and any changes made to the emplacement process since its resumption. The EPA will inspect waste that is being stored aboveground in the Waste Handling Building and review waste tracking in the WDS.

Prior to the 2014 incidents that restricted access to the underground, The EPA practice was to visually inspect the active waste emplacement face and collect information on recently emplaced waste containers that could be verified during record reviews. The EPA understands that physically inspecting the waste face is not practical so long as waste emplacement occurs in potentially contaminated areas, but the Agency still must collect objective evidence that waste emplacement is occurring as planned. Recent, time-stamped photographs of emplaced waste with legible container and shipment numbers would be one way to meet this need during the inspection.

Location: The inspection will be held at DOE's WIPP facility located 26 miles southeast of Carlsbad, New Mexico, and the Carlsbad Field Office in Carlsbad. Inspection activities will include examination of the waste handling and underground facilities, review of records related to waste emplacement, and other information requests as needed.

Duration: The EPA expects to complete its inspection in 3 days. Each full day will begin with an opening meeting at 8:00 a.m. and end no later than 5:00 p.m. with a closeout session.

Expected Dates: October 24–26, 2017.

Documents for Review: DOE is requested to electronically provide EPA inspection staff with the latest version of pertinent documentation in advance of the inspection. This includes procedures and reports related to CH and RH waste emplacement, MgO handling, management of the WDS, and recent training or exercises related to waste handling and emplacement. Please identify any procedures that have changed as a result of facility recovery.

Attachment B: Summary Totals Waste Data System Nuclide Report Through October 26, 2017

Panel: ALL Room: ALL

Radionuclide	Repository Contact-Handled Activity (Ci)	Repository Remote-Handled Activity (Ci)	Total Repository Activity (Ci)
AM-241 Americium 241	2.591E5	6.208E2	2.597E5
CS-137 Cesium 137	1.422E1	1.444E4	1.445E4
PU-238 Plutonium 238	4.83E5	7.289E2	4.837E5
PU-239 Plutonium 239	3.356E5	3.839E2	3.359E5
PU-240 Plutonium 240	8.295E4	2.802E2	8.323E4
PU-242 Plutonium 242	2.729E1	3.821E-1	2.767E1
SR-90 Strontium 90	1.595E1	7.599E3	7.615E3
U-233 Uranium 233	6.546E0	3.848E-1	6.931E0
U-234 Uranium 234	8.672E1	1.14E0	8.786E1
U-238 Uranium 238	1.759E1	3.915E-2	1.763E1
Totals:	**1.161E6**	**2.405E4**	**1.185E6**

Attachment C: EPA Emplacement Inspection Checklist, October 24–26, 2017

	Questions: Waste Emplacement	Comments and Objective Evidence	Results
1	Is waste being emplaced in the underground facility in the manner specified in the U.S Department of Energy's (DOE) Compliance Certification/ Re-Certification or other relevant documentation?	Manner specified in DOE's Compliance Certification Application (EPA Air Docket A-93-02, Item II-G-01) and other approvals. EPA performed this inspection under the authority of 40 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.	Satisfactory
2	Are contact-handled (CH) waste containers stacked in columns appropriately given the type of container?	Inspectors were not able to access the waste face near Room 6 of Panel 7. Paper emplacement maps and Waste Data System (WDS) record provided indirect evidence that waste is being stacked according to procedure.	Satisfactory
3	Are records adequate? Randomly select three CH waste containers to verify records for waste approval, shipment and receipt. NOTE: Because waste emplacement requires access to a contaminated area, inspectors selected three containers in the Waste Handling Building and followed their emplacement electronically.	Yes. Transuranic (TRU) Waste Receipt WP 08-NT3020 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. Selected Containers: **CH Waste** (Waste Handling Building) - Ten-drum overpack—BN10620210 - Ten-drum overpack—BN10627901 - Ten-drum overpack—BN10627896	Satisfactory
4	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 05-WH1025, Rev. 23-FR2, MgO is emplaced on top of the waste stacks to maintain a ratio greater than 1.2.	Satisfactory

5	Verify documentation for the containers listed in item 3—waste generator site transmittal of waste to WIPP, WIPP approval, shipment certification for transport to WIPP, shipment initiation documentation, shipment received at WIPP records, waste emplaced in the underground, and placement of engineered barrier (MgO).	Inspectors examined electronic records kept aboveground for the selected containers. Documentation was determined to be adequate.	Satisfactory
	Questions: Remote-Handled (RH) Waste Emplacement	**Comments and Objective Evidence**	**Results**
6	Are RH containers approved for receipt, received, processed and emplaced properly?	N/A. No RH waste emplaced since February 5, 2014.	N/A
7	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?	N/A. No RH waste emplaced since February 5, 2014.	N/A
8	Content of RH canisters. No RH in storage; access to emplaced RH restricted.	N/A. No RH waste has been emplaced since February 5, 2014.	N/A
9	Volume and mass and/or concentration of important waste components and radionuclides (RH and CH)? Are they within statutory and regulatory limits?	Detailed description of nuclide information is included in the Waste Emplacement Report. Yes.	Satisfactory

10	Are RH boreholes closed properly? (Note: also see Item 9 for tracking of RH waste in the underground.)	N/A. No RH waste emplaced since February 5, 2014.	N/A
11	Is a photographic record made of the RH canister number during emplacement and retained in the permanent record?	N/A. No RH waste emplaced since February 5, 2014.	N/A
	Questions: Procedures	**Comments and Objective Evidence**	**Results**
12	Do DOE procedures reflect an MgO safety factor to 1.2?	Yes. WP 05-WH1025, CH Waste Downloading and Emplacement, Rev. 23-FR2, Section 5.3, Backfill establishes procedures to maintain a safety factor of 1.2 or greater per room daily. Procedures in the WDS User's Manual, WP 05-WH.02, Rev. 3, Sections 6.2.5, 8.3.3, and Attachment 1 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 more than 1.2 for all rooms in each panel.	Satisfactory
13	Are CPR materials and MgO calculated and tracked on a room-by-room basis?	Yes. WP 05-WH1025, CH Waste Downloading and Emplacement, Rev. 23-FR2, Section 5.3, Backfill establishes procedures to maintain a safety factor of 1.2 or greater per room daily.	Satisfactory
14	Are sampling and analytical procedures in place to ascertain that emplaced MgO maintains a minimum of 96% reactivity?	Yes. Specification D-0101, Rev. 10, Specification for Prepackaged MgO Backfill, Section 3.3.1 and WP 05-WH1105, Rev. 5, MgO Sample Records Management set forth analytical and document management procedures to verify that each shipment of MgO maintains a 96 +/- 2% reactivity.	Satisfactory
15	Is the acceptance of the MgO backfill material from the supplier documented?	Yes. WP 05-WH1105, Rev. 5, MgO Sample Records Management, Sec. 1.0 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	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 Operation WDS User's Manual, WP 05–WH.02, Rev. 3, Attachment 1, Special Requirements for Additional MgO. Section 5.3 of WP 05-WH1025, Rev. 23-FR2 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	Is there documentation that identifies how MgO should be placed with high CPR waste?	Yes. WP 05-WH1025, Rev. 23-FR2, CH Waste Downloading and Emplacement, Attachment 3, Super Sack/BRT ["big red thing"] Emplacement Data Sheet and WP 05-WH1058, Rev. 18, CH Waste Handling Abnormal Operations, Section 5.4, Emplacement of BRT.	Satisfactory
18	Verify documentation of procedures for abnormal operating conditions and documentation of training for contingencies.	Inspectors observed the Annual Emergency Operations Center Exercise, "New Dawn," on October 26, 2017. Abnormal operating and emergency procedures were reviewed, including, but not limited to, those listed below. WP 02-EC3506, Rev. 10, Environmental Incident Reporting is the Management Control Procedure for reporting releases and includes statutory requirement charts, Attachment 1, for notifications and decision flowcharts. WP 05-WH1058, Rev. 18, CH Waste Handling Abnormal Operations 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." WP 12-9, Rev. 43, WIPP Emergency Management Plan is the top-level document outlining emergency response procedures and responsibilities and includes training requirements for response roles. WP 05-WH4401, Rev. 4, Waste Handler Operator Event Response includes alarm, alert and exit procedures.	Satisfactory

		WP 12-ER3906, Rev. 19, Categorization and Classification of Operational Emergencies includes tables of procedures for emergency notifications and classification of events. WP 12-HP4000, Rev. 10-FR2, Emergency Radiological Control Responses 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 WP 12-5.	
	Questions: Records/WDS	**Comments and Objective Evidence**	**Results**
19	Does the WDS adequately record required information?	Reports available through the EPA Dashboard contain the container number, shipment number, emplacement data and underground location. EPA staff queried the WDS to verify that this information is recorded correctly.	Satisfactory
20	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	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. Dose limits for each of the containers examined by EPA inspectors (listed in Item 3) were below statutory limits.	Satisfactory
22	Review a Container Query. Does this report adequately record the Waste Stream Profile information?	Yes. For all containers inspected, inspectors found the information in the Container Query and Certification Data Values.	Satisfactory
23	Review the Container Query. Does the 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	Review the Waste Emplacement Report. Does this report adequately record the date of	Yes. See Item 21.	Satisfactory

	receipt and disposal locations of containers?		
25	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?	Yes. See Items 12–17. EPA inspectors reviewed ISL Matrix Requirements WWIS2-REQ-2126 and -2127 to verify that the WDS software calculates MgO excess appropriately.	Satisfactory

E-DOCKET: EPA-HQ-OAR-2001-0012-0477

2017—Monitoring Inspection Report

INSPECTION No. EPA-WIPP-10.24-26b
OF THE
WASTE ISOLATION PILOT PLANT
October 24–26, 2017

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

August 2018

Table of Contents

1.0 Executive Summary 1

2.0 Scope 1

3.0 Inspection Team, Observers and Participants 2

3.1 Monitoring of Geomechanical Parameters 4

3.2 Monitoring of Hydrological Parameters 7

3.3 Monitoring of Waste Activity Parameters 7

3.4 Monitoring of Drilling Related Parameters 9

3.5 Monitoring of Subsidence Parameters 9

4.0 Conclusions 9

Attachment A: Inspection Plan 10

Attachment B: 2017 Monitoring Inspection Checklist 11

Attachment C: Documents Reviewed 15

Figures

Figure 1. Displacement data from Panel 7, Room 6 (Extensometer at W-1050,- S-2350). 55

Figure 2. Displacement rate data from Panel 7, Room 6 (Extensometer at W1050-S2350). 66

Figure 3. Convergence and convergence rate data from Panel 7, Room 6 ultrasonic sensor. 66

Figure 4. Panel 7, Room 6 convergence and convergence rate data from the "pogo stick" extensometer. 77

Tables

Table 1. Monitored Parameters 2

Table 2. Inspection Team 2

Table 3. Inspection Participants 33

Table 4. Summary Totals WDS Nuclide Report (as of October 27, 2017) 88

1.0 Executive Summary

The U.S. Environmental Protection Agency (EPA) conducted an inspection of the Department of Energy's (DOE) Waste Isolation Pilot Plant (WIPP) from October 24 to 26, 2017, as part of the EPA's continuing WIPP oversight program. The purpose of this inspection was to verify that the DOE continues to adequately monitor 10 parameters listed in the Compliance Certification Application (CCA), Volume 1, Section 7.0, in particular, Table 7-7. Attachments A and B contain the inspection plan and the checklist used by the EPA inspectors, and Attachment C lists documents reviewed by EPA. The monitoring inspection examines the monitoring of geomechanical, hydrological, waste activity, drilling-related and subsidence parameters.

This was the first annual inspection since the facility resumed limited waste emplacement in January 2017. In February 2014, two separate incidents— a salt haul truck fire and a radiological release—occurred, which halted facility operations and continue to restrict access to areas of the underground. The EPA monitoring inspections in April 2015 (E-Docket EPA-HQ-OAR-2001-0012-0458) and November 2016 (EPA-HQ-OAR-2001-0012-0469) took place while the facility was undergoing active recovery and not emplacing waste.

EPA inspectors toured locations where measurements are taken, examined data, and reviewed documents and procedures directing these monitoring activities. The inspection checklist in Attachment B provides details of these inspection activities. EPA found that the site has continued to effectively implement the monitoring programs at the WIPP throughout facility recovery 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.

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" (40 CFR 194.42(a)). The results of these analyses were included in the 1996 CCA, confirmed in the most recent Compliance Recertification Application, and used to develop pre-closure and post-closure monitoring requirements.

Volume 1, Section 7.0 of the CCA documents DOE's analysis of monitoring parameters. Table 7-7 of the CCA lists the ten parameters that DOE 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 2017 Recertification Decision.

Table 1. Monitored Parameters

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	Subsidence measurements
Drilling-Related	Drilling rate Probability of encountering a Castile brine reservoir
Waste Activity	Waste Activity

This inspection was performed under authority of 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 both on and off site and in the underground. EPA 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 Attachment C).

3.0 Inspection Team, Observers and Participants

The inspection team consisted of three EPA staff members and two observers (Table 2). Numerous DOE staff and contractors participated in the inspection; Table 3 includes a partial list.

Table 2. Inspection Team

Inspection Team Member	Position and Inspection Focus	Affiliation
Jonathan Walsh	Inspection Leader	EPA Office of Radiation and Indoor Air (ORIA)
Nick Stone	Inspector	EPA Region 6
Wagnus Prioleau	Inspector	EPA ORIA
Kishor Fruitwala	Observer	EPA Region 6
Andrea Goodbar	Observer	New Mexico Environment Department

Table 3. Inspection Participants

Participant	Affiliation
Larry Madl	Regulatory and Environmental Services (RES), Inspection
Russ Patterson	DOE Carlsbad Field Office (CBFO)
Anderson Ward	CBFO
Jacqueline Davis	Nuclear Waste Partnership (NWP)
Chuck Mills	NWP
Jill Farnsworth	NWP
Ed Thomas	NWP
Leonard Davis	NWP
Matt Carnathan	NWP
Ed Picazo	RES
Ashley Urdiquez	RES
Stewart Jones	RES
Rick Salness	RES
Steve Kouba	RES
Mansour Akbarzadeh	WIPP Laboratories

The inspection began on Tuesday morning, October 24, with an opening meeting at the WIPP site, in which program managers briefly presented on changes that had taken place to their programs since the previous annual inspection. That afternoon the inspection team met with Geotechnical Engineering Program personnel responsible for subsidence surveys of the surface and monitoring geotechnical parameters in the WIPP underground. On the morning of October 25, the inspection team went underground to inspect accessible areas of the repository. On the afternoon of October 25, the inspection team discussed the Groundwater Surveillance and Environmental Monitoring programs. On the morning of October 26, inspectors discussed changes in the Delaware Basin Surveillance Program in the Cascades Building in Carlsbad, New Mexico, and Nick Stone met with the Waste Data System (WDS) administrator to discuss monitoring of waste parameters at the Skeen-Whitlock Building in Carlsbad. The inspection closeout meeting was held during the afternoon of October 26 at the Skeen-Whitlock Building.

EPA inspectors reviewed three fundamental areas to verify continued implementation of the DOE parameter monitoring program during the pre-closure 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, intermediate reports and final annual reports.

3.1 Monitoring of Geomechanical Parameters

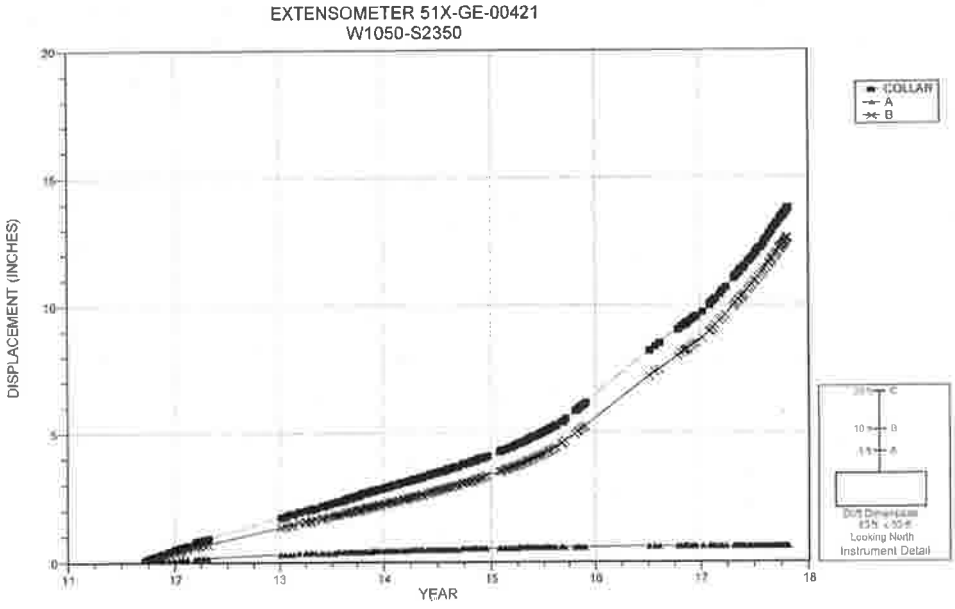
DOE committed to measure four geomechanical parameters in the CCA: creep closure, extent of deformation, initiation of brittle deformation, and displacement of deformation features. These parameters are monitored through convergence monitoring, deformation monitoring, fracture mapping, and stratigraphic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

Geomechanical parameter monitoring has been most affected by the 2014 incidents and subsequent facility recovery. The radiological release interrupted routine manual geotechnical measurements and roof bolting and other ground control measures. In 2016, DOE reported rock falls in the access drifts to Panels 3 and 4; reported a large rock fall in Panel 7, Room 4; and proposed closing the southern end of the repository (Panel 9) to reduce the amount of required ground control. In 2017, DOE reported to EPA that Room 6 of Panel 7 was exhibiting measurements similar to those in Room 4 and that a roof failure was expected. Personnel access to the room was prohibited. Increased convergence rates and a loss of personnel access were reported during the opening meeting as the most significant changes to the geotechnical monitoring program.

The inspection team met with Ed Lewis and Rey Carrasco on the afternoon of October 24. The discussion largely focused on the status of Panel 7, Room 6. A limited amount of remote-handled waste had been emplaced in the walls of Room 6 before it was contaminated during the 2014 release. Neither decontamination nor further waste emplacement in Room 6 was planned during or following facility recovery. When it was first mined, an initial, minimal pattern of rock bolts was installed. More extensive bolting would have taken place after initial rock strains equilibrated, typically over several months, to maximize bolt effectiveness and longevity. Full bolting did not take place because of the restricted access following the February 2014 incidents, and none of the original bolts in Room 6 are observed to be intact any longer. This was also the case with Panel 7, Room 4.

Under typical conditions, geotechnical measurements of underground convergence are completed by hand for all accessible areas of the repository every 6 weeks, and automated extensometer data are reviewed weekly. Because of the rapid increase in displacement rate in Panel 7, Room 6, manual readings can no longer be taken, and automated convergence data for the room are reviewed multiple times daily. The room is monitored by a three-wire extensometer installed at W-1050, S-2350, a "pogo stick"-type extensometer that was installed on the center line at the north end of the room, and an ultrasonic extensometer that was pushed into the northeast corner of the room after access was restricted. The inspection team reviewed the extensometer and convergence point data from Panel 7, Room 6. Similar data were reviewed for Panel 7, Room 4 during the previous inspection cycle. The rapid increase in displacement and displacement rate observed in Panel 7, Room 6 is shown in Figures 1-4. These data are reported weekly in the Geomechanical Mine Stability Surveillance Report.

JPV - 2017 - 006



NOTES:
1. Excavation date: November 2010.
2. The gap in readings from 2012 to 2013 is due to the area being inaccessible by aerial lift.

Figure 1. Displacement data from Panel 7, Room 6 (Extensometer at W-1050,- S-2350).

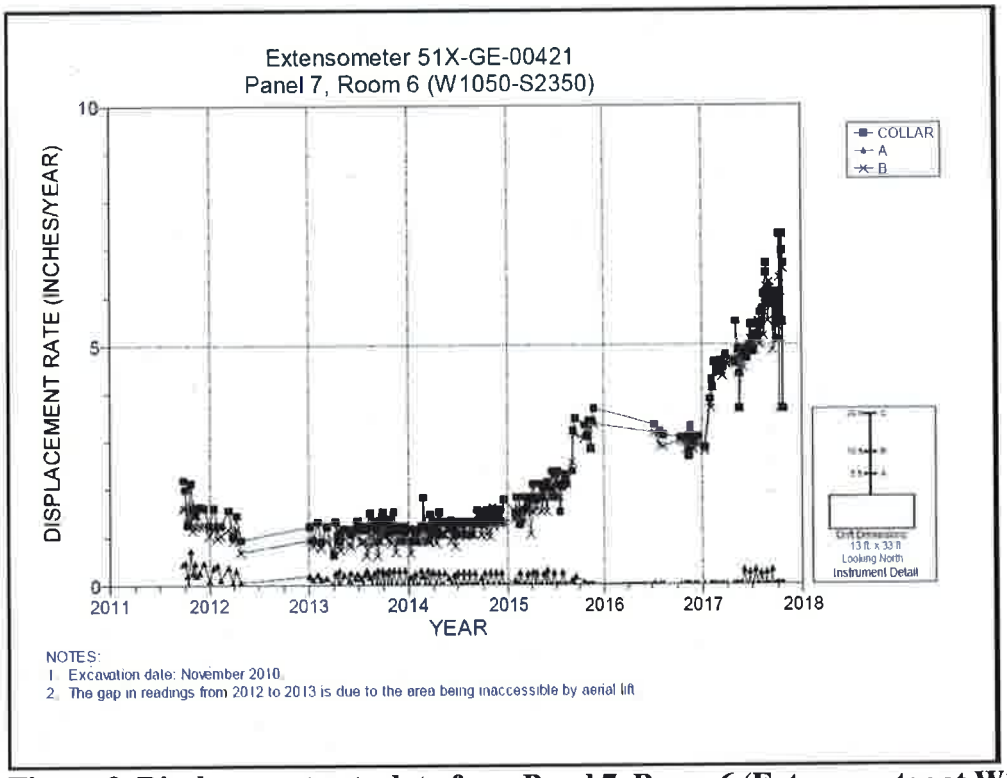


Figure 2. Displacement rate data from Panel 7, Room 6 (Extensometer at W1050-S2350).

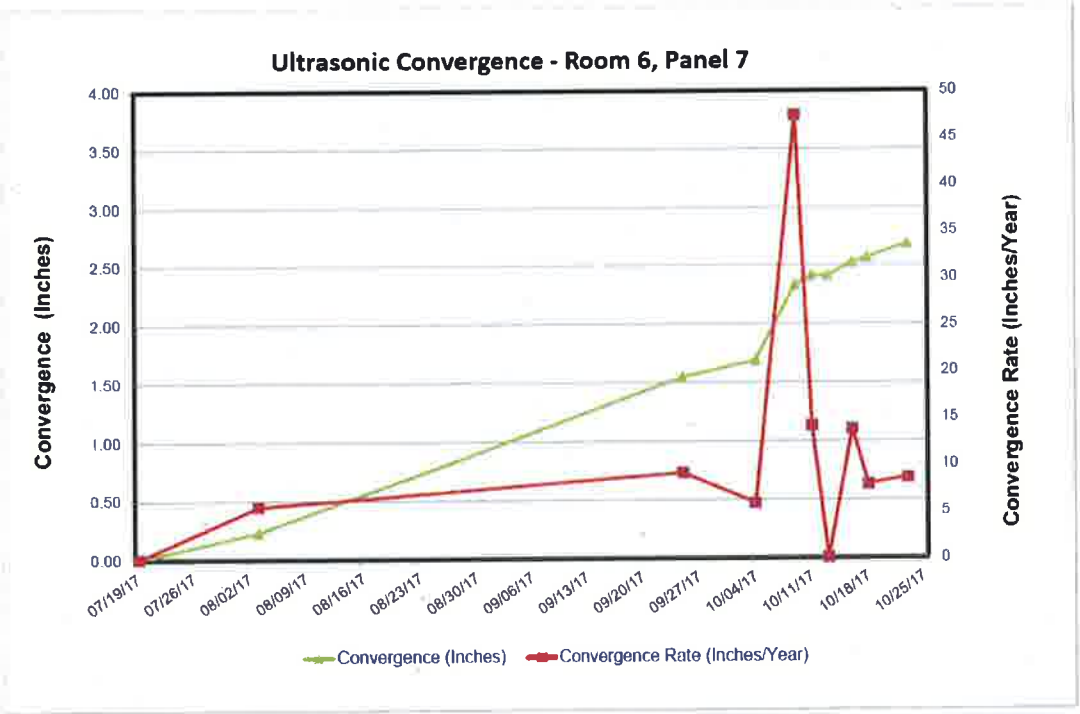


Figure 3. Convergence and convergence rate data from Panel 7, Room 6 ultrasonic sensor.

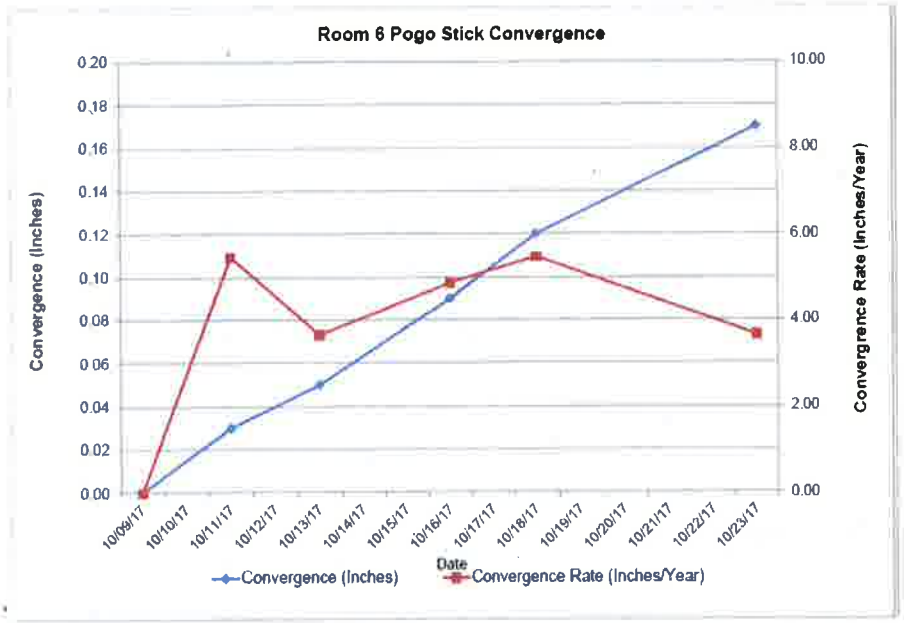


Figure 4. Panel 7, Room 6 convergence and convergence rate data from the "pogo stick" extensometer.

3.2 Monitoring of Hydrological Parameters

DOE committed to measure two hydrological parameters in the CCA: (1) Culebra groundwater composition and (2) changes in the Culebra groundwater flow direction. Culebra flow direction is determined by using annual measurements of Culebra fresh water heads as inputs to a calibrated potentiometric map. Programmatic functions and responsibilities are outlined in the *WIPP Groundwater Monitoring Program Plan*, WP 02-1, Revision 13, effective February 23, 2015. Results of this program are published in the WIPP Annual Site Environmental Report (ASER).

On the afternoon of October 25, Rick Salness met with inspectors on the WIPP groundwater surveillance program. No major changes to the program had occurred since the fall of 2016. Funding had been interrupted for updating the Culebra potentiometric monitoring well network, and no well replacements took place in 2017, but three well replacements are planned in 2018. Sandia National Laboratory has installed submersible pressure transducers in all Culebra wells. The water quality sampling program was significantly updated in 2014 to simplify the laboratory procedures associated with collecting water quality samples. No field activities were observed during the 2017 inspection; EPA will time a future inspection to observe site personnel performing the sampling procedures. Based on the discussion and a review of the WIPP ASER for 2016 (DOE/WIPP-17-3591, September 2017), EPA inspectors did not identify any concerns or findings related to the monitoring of hydrological parameters.

3.3 Monitoring of Waste Activity Parameters

In the CCA, DOE committed to monitor the total radioactivity of waste emplaced in the WIPP. Waste activity is collected for each container shipped to the WIPP and stored in the WIPP, a

database that tracks total radioactivity, as well as other components in waste emplaced in the WIPP (e.g., ferrous and non-ferrous 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, Revision 31.

On the afternoon of October 26, inspectors met with WDS staff, who answered questions and generated reports, including the current total activities of the 10 EPA-tracked radionuclides emplaced in the repository. 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 EPA-tracked radionuclides, as of October 27, 2017. The waste activities are included in Table 4. Only contact-handled waste has been emplaced since February 2014.

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

Table 4. Summary Totals WDS Nuclide Report (as of October 27, 2017)

Panel: ALL Room: ALL			
Radionuclide	**Repository Contact Handled Activity (Ci)**	**Repository Remote Handled Activity (Ci)**	**Total Repository Activity (Ci)**
AM-241 Americium 241	2.591E5	6.208E2	2.597E5
CS-137 Cesium 137	1.422E1	1.444E4	1.445E4
PU-238 Plutonium 238	4.83E5	7.289E2	4.837E5
PU-239 Plutonium 239	3.356E5	3.839E2	3.359E5
PU-240 Plutonium 240	8.295E4	2.802E2	8.323E4
PU-242 Plutonium 242	2.729E1	3.821E-1	2.767E1
SR-90 Strontium 90	1.595E1	7.599E3	7.615E3
U-233 Uranium 233	6.546E0	3.848E-1	6.931E0
U-234 Uranium 234	8.672E1	1.14E0	8.786E1
U-238 Uranium 238	1.759E1	3.915E-2	1.763E1
Totals:	**1.161E6**	**2.405E4**	**1.185E6**

3.4 Monitoring of Drilling Related Parameters

DOE committed in the CCA 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 a program that is described in the *Delaware Basin Drilling Surveillance Plan*, WP 02-PC.02 Rev 6 (12/3/14). The results of the surveillance program are documented quarterly and reported annually. The most recent *Delaware Basin Monitoring Annual Report* (DOE/WIPP-16-2308, September 2016) was provided in the inspection documentation.

On the morning of October 26, inspection staff met with the staff of the Delaware Basin Surveillance Program at the Cascades Building in Carlsbad. A written summary of changes to the surveillance program was provided (JPW-2017-12). The calculated deep drilling rate as of September 1, 2017, is 93.4 boreholes per square kilometer. No additional Castile brine encounters had been reported since September 2016.

3.5 Monitoring of Subsidence Parameters

In the CCA, DOE committed to measure 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. 7. DOE performs subsidence surveys at the site annually during preclosure operations. The most recent survey results are provided in the *WIPP Subsidence Monument Leveling Survey 2014*, DOE/WIPP 14-3541. 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 fulfills the requirement that the subsidence parameter be measured and reported on a yearly basis.

On the afternoon of October 24, the inspection team met with Ty Zimmerly to discuss the surface subsidence monitoring program. No major changes have been made since surveying hardware was updated in 2013 and software in 2017. Ty Zimmerly demonstrated procedure WP 09-ES4001, Rev. 4, downloading and processing data that had been collected the previous day on Loop 10. Inspectors collected the Digital Leveling Log Sheet (JPW-2017-004) and Level Summary Report (JPW-2017-005). The reported closure was 0.0005 feet, with a distance balance of -1.5049 feet.

4.0 Conclusions

Based on program documents, interviews and field demonstrations during the inspection, EPA concludes that the monitoring program covers the 10 monitoring parameters required by EPA'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 adequately, and appropriate quality assurance measures are applied. EPA continues to find that DOE has maintained adequate parameter monitoring during the past year and has the procedures and requirements in place to sustain the program into the next year.

Attachment A: Inspection Plan

Monitoring Inspection Plan 40 CFR 194.42 for the Year 2017

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 documentation to support the U.S. Environmental Protection Agency's (EPA) certification decision, in particular Compliance Certification Application, Volume 1, Section 7.2, Table 7.7 and Appendix MON. This inspection is part of EPA's continued oversight to ensure that the U.S. Department of Energy (DOE) appropriately and accurately monitors the performance of significant parameters of the disposal system and is conducted under the authority of 40 CFR 194, Sections 21 (Inspections) and 42 (Monitoring).

Scope: Inspection activities will include an examination of monitoring and sampling equipment 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 also will be reviewed.

EPA will meet with staff from the WIPP Geotechnical Engineering Program, WIPP Groundwater Monitoring Program, WIPP Underground and Surface Surveying Program, and Delaware Basin Drilling Surveillance Program, as well as with Waste Data System database 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 in the past year.

Location: This inspection will be held at the WIPP facility location 26 miles southeast of Carlsbad, New Mexico, and the surrounding vicinity as needed.

Duration: EPA expects to complete its inspection in 3 days. Each day will begin with an opening meeting at 8:00 a.m. and end before 5:00 p.m. with a closeout session.

Expected Dates: October 24–26, 2017.

Documents for Review: DOE is requested to electronically provide EPA inspection staff with the latest versions of procedures and reports related to parameter monitoring in advance of the inspection. Please identify any procedures that have changed as a result of facility recovery.

Attachment B: 2017 Monitoring Inspection Checklist

Checklist for Geotechnical Monitoring Commitments			
	Monitoring Commitments	Geotechnical Parameters	
#	Question	Comment (Objective Evidence)	Result
1	Does the U.S. Department of Energy (DOE) demonstrate that it has implemented plans, programs, and/or procedures to measure (a) Creep Closure, (b) Extent of Deformation, (c) Initiation of Brittle Deformation, and (d) Displacement of Deformation Features during the pre-closure phase of operations as specified in the Compliance Certification Application (CCA) part of the geomechanical monitoring system? (CCA, Volume 1, Table 7-7; Appendix MON, Table MON-1) 40 CFR 194.42 (c) and (e)	*WIPP Geotechnical Engineering Program Plan*, WP 07-01, Rev. 7 documents plans to measure and report, as well as 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. The program has recovered from disruptions resulting from the 2014 radiological contamination of the underground. 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 the DOE. Results of this program are documented annually in the Geotechnical Analysis Report for each reporting period (DOE/WIPP-16-3559).	Satisfactory
2	Does the 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. 36, effective December 22, 2015.	Satisfactory

3	Does the DOE demonstrate that the results of the geotechnical investigations are reported annually? (CCA, App. MON, Page MON-10)	WP 07-01, Rev. 7, Section 3.2 requires that analysis be performed annually and results be published in the annual geotechnical analysis report. The report for calendar year 2015 was provided and reviewed by inspectors (DOE/WIPP-16-3572).	Satisfactory
Checklist for Hydrologic Monitoring Commitments			
	Monitoring Commitments	**Hydrological Parameters**	
#	**Question**	**Comment (Objective Evidence)**	**Result**
1	Does the DOE demonstrate it has implemented plans, programs, and/or procedures to measure— (a) Culebra Groundwater Composition; (CCA, Volume 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 pre-closure phase of operations as specified in the CCA part of WIPP's groundwater monitoring plan? (CCA, Volume 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. 14, effective March 30, 2016. Yes. See *WIPP Groundwater Monitoring Program Plan*, WP 02-1, Rev. 14, effective March 30, 2016; *Waste Isolation Pilot Plant Annual Site Environmental Report for 2016*, DOE/WIPP-17-3591; and the Annual Culebra Groundwater Report.	Satisfactory
2	Does the DOE demonstrate that it has implemented an effective quality assurance program for Item 1 above? (CCA, App MON, Page MON-22) 40 CFR 194.22	Yes. See *WIPP Groundwater Monitoring Program Plan*, WP 02-1, Rev. 14, Sections 5 and 9.	Satisfactory
3	Does the DOE demonstrate that the results of the groundwater monitoring program are reported annually? (CCA, App. MON, Page MON-22)	Yes. See *Waste Isolation Pilot Plant Annual Site Environmental Report for 2016*, DOE/WIPP-17-3591.	Satisfactory

Checklist for Waste Activity Monitoring Commitments			
	Monitoring Commitments	Waste Activity Parameters	
#	Question	Comment (Objective Evidence)	Result
1	Does the DOE demonstrate that it has implemented plans, programs, and/or procedures to measure waste activity? (CCA, Volume 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. 31 describes the programmatic plan used to monitor and store waste activity information.	Satisfactory
2	Does the DOE demonstrate it has program for Item 1? (CCA, App WAP, page C-30) 40 CFR 194.22	Yes. See Nuclear Waste Partnership, LLC Quality Assurance Program Description, WP 13-1, Rev. 36, and *Waste Data System Software Quality Assurance Plan*, WP 08-NT.04, Rev. 23.	Satisfactory
3	Does the DOE demonstrate that the results of the waste activity parameters are reported annually? (CCA Volume 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 and Annual Change Report.	Satisfactory
Checklist for Drilling Rate Monitoring Commitments			
	Monitoring Commitments	Drilling Related Parameters	
#	Question	Comment (Objective Evidence)	Result
1	Does the 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, Volume 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. 6 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. 8 documents the process used to update databases with information from various commercial and state sources.	Satisfactory

2	Does the DOE demonstrate that it has implemented an effective quality assurance program for Item 1 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, Rev. 6.	Satisfactory
3	Does the DOE demonstrate that the results of the drilling-related parameters are reported annually? (CCA Volume 1, Section 7.2.4 Reporting; App DMP, page DMP-9)	Yes. Parameter updates are reported in the *Delaware Basin Monitoring Annual Report,* DOE/WIPP-16-2308, September 2016.	Satisfactory
Checklist for Subsidence Monitoring Commitments			
	Monitoring Commitments	**Subsidence Measurements**	
#	**Question**	**Comment (Objective Evidence)**	**Result**
1	Does the DOE demonstrate that it has implemented plans/programs/ procedures to measure subsidence measurement? (CCA, Volume 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. 7, effective December 17, 2014.	Satisfactory
2	Does the DOE demonstrate that it has implemented an effective quality assurance program for Item 1 above? (CCA, App DMP, page DMP-9) 40 CFR 194.22	Yes. See *WIPP Underground and Surface Surveying Program,* WP 09-ES.01, Rev. 7, Section 4.	Satisfactory
3	Does the DOE demonstrate that the results of the subsidence measurements are reported annually? (CCA Volume 1, Section 7.2.4, Reporting)	The results of this program are reported annually in the *WIPP Subsidence Monument Leveling Survey.*	Satisfactory

Attachment C: Documents Reviewed

Monitoring of Geomechanical Parameters	ID	Source
Geotechnical Analysis Report for July 2014–June 2015, Volumes 1–2, October 2016	DOE/WIPP-16-3559	DOE/WIPP
Geomechanical Mine Stability Surveillance Report for the week ending October 18, 2016	EN:16:00457 UFC:6500.00	DOE/WIPP
Geologic and Fracture Mapping of Facility Horizon Drifts	WP 07-EU1001, Rev. 6	DOE/WIPP
Rev. 1 Geologic Core Logging	WP 07-EU1002, Rev. 1	DOE/WIPP
Manually Acquired Geomechanical Instrument Data	WP 07-EU1301, Rev. 11	DOE/WIPP
Geomechanical Instrument Data Processing	WP 07-EU1303, Rev. 10	DOE/WIPP
Installing Convergence Reference Points	WP 07-EU1304, Rev. 6	DOE/WIPP
Installing Multiposition Borehole Rod Extensometers	WP 07-EU1305, Rev. 3	DOE/WIPP
Installing Rock Bolt Load Cells	WP 07-EU1306, Rev. 5	DOE/WIPP
Installing Wire Convergence Meters	WP 07-EU1307, Rev. 5	DOE/WIPP
Installing Wire Extensometers	WP 07-EU1308, Rev. 3	DOE/WIPP
Software Screening and Control	WP 16-2, Rev. 15	DOE/WIPP

Monitoring of Hydrological Parameters	ID	Source
WIPP Groundwater Monitoring Program Plan	WP 02-1, Rev. 14	DOE/WIPP
Waste Isolation Pilot Plant Environmental Monitoring Plan	DOE/WIPP-99-2194, Rev. 9	DOE/WIPP
Field Parameter Measurements and Final Sample Collection	WP 02-EM1010, Rev. 2	DOE/WIPP
Administrative Processes for Environmental Monitoring and Hydrology Programs	WP 02-EM3001, Rev. 24	DOE/WIPP
Fluid Density Survey	WP 02-EM1021, Rev. 10	DOE/WIPP
Groundwater Level Measurement	WP 02-EM1014, Rev. 8	DOE/WIPP
Data Review for the Annual Culebra Groundwater Report	WP 02-EM1025, Rev. 6	DOE/WIPP
Water Level Data Handling and Reporting	WP 02-EM1026, Rev. 6	DOE/WIPP
Integrated Sample Control Plan	WP 02-EM.02, Rev. 5	DOE/WIPP
Electric Submersible Pump Operation	WP 02-EM1002, Rev. 6	DOE/WIPP

Monitoring of Delaware Basin Parameters	ID	Source
Delaware Basin Surveillance Plan	WP 02-PC.02, Rev. 6	DOE/WIPP
Delaware Basin Drilling Database Upgrade Process	WP 02-EC3002, Rev. 8	DOE/WIPP
Delaware Basin Monitoring Annual Report	DOE WIPP 16-2308	DOE/WIPP

Monitoring of Subsidence Parameters	ID	Source
WIPP Underground and Surface Surveying Program	WP 09-ES.01, Rev. 7	DOE/WIPP
Subsidence Survey Data Acquisition Report	WP 09-ES4001, Rev. 4	DOE/WIPP
WIPP Panel Closure Survey Plan	WP 09-ES.02, Rev. 4	DOE/WIPP
WIPP Subsidence Monument Leveling Survey 2014	N/A	DOE/WIPP

Monitoring of Waste Activities	ID	Source
WIPP Waste Data System Program and Data Management Plan	WP 08-NT.01, Rev. 31	DOE/WIPP
Waste Stream Profile Form Review and Approval Program	WP 08-NT.03, Rev. 18	DOE/WIPP
Waste Data System User's Manual	DOE/WIPP-09-3427, Rev. 13	DOE/WIPP
TRU Waste Receipt	WP 08-NT3020, Rev. 27	DOE/WIPP
Waste Data System Software Quality Assurance Plan	WP 08-NT.04, Rev. 23	DOE/WIPP