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

JAN 2 8 2020

OFFICE OF
AIR AND RADIATION

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

Dear Mr. Sosson:

The U.S. Environmental Protection Agency (EPA or the Agency) conducted inspections at the Waste Isolation Pilot Plant (WIPP) on March 19-21, 2019 and May 14-16, 2019, as part of the Agency's continuing oversight of the facility. These inspections were performed under the authority of 40 CFR 194.21. 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 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. However, in the course of the Emplacement Inspection, the inspection team also encountered procedural issues that led to two inspection concerns and one inspection finding.

At the time of the inspection, EPA inspectors noted that two heater experiments are taking place in the WIPP underground. Established procedures for properly notifying the Agency had not taken place for either experiment, and in the case of the canister heater adjacent to the air intake shaft, EPA approval was required due to its location outside the areas designated for experiments. Additional information subsequently provided by the CBFO allowed the EPA to determine that the experiments do not alter either the facility's ability to safely emplace waste or the current certified design of the disposal system. This determination was transmitted to the DOE by letter on November 4, 2019 (copy enclosed). Because notification and approval procedures are designed to prevent violations under §194.14(b), the deviations from these procedures led to two inspection concerns, detailed in the Emplacement Inspection Report. No response is necessary, though the EPA will use future inspections and reviews of the Annual Change Report to verify that experiments in the underground are properly documented.

However, the EPA also notes one inspection finding associated with the heater experiments. During the inspection on May 15, 2019, inspectors orally requested documents related to the

internal approval of the experiments that were cited in the 2017 Annual Change Report. EPA's WIPP certification regulations (40 CFR Part 194) provide, in part, that records requested by EPA shall be made available upon request, or if such records are not immediately available, they must be delivered within 30 calendar days. See, e.g. 40 C.F.R. § 194.21(b).
CBFO did not assert that the records requested were not available but did not provide the information when requested. Assuming the information was not immediately available, CBFO nonetheless failed to deliver the information requested within 30 calendar days. Indeed, it was not until July 17, 2019—more than 60 days after request—that CBFO delivered the requested information.

As a result, the EPA finds that CBFO is in violation of the WIPP certification regulations, as noted above. The EPA requests that you take steps to emphasize that CBFO management and staff need to ensure that future review and transmittal procedures will facilitate—rather than hinder—effective communication between our organizations. The EPA believes this will adequately address this finding and no response to the Agency is required.

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

Enclosures (3)

cc: George Basabilvaso, DOE/CBFO
Michael Brown, DOE/CBFO
Kirk Lachman, DOE/CBFO
Russ Patterson, DOE/CBFO
Anderson Ward, DOE/CBFO
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Ricardo Maestas, NMED
Kevin Pierard, NMED
EPA WIPP Team
Charles Starrs, EPA OGC
EPA Docket

E-DOCKET: EPA-HQ-OAR-2001-0012-0700

2019—Monitoring Inspection Report

INSPECTION OF THE
WASTE ISOLATION PILOT PLANT
May 14–16, 2019

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

December 2019

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List of Abbreviations

CBFO	Carlsbad Field Office
CCA	Compliance Certification Application
CFR	Code of Federal Regulations
DOE	United States Department of Energy
EPA	United States Environmental Protection Agency
NWP	Nuclear Waste Partnership
ORIA	Office of Radiation and Indoor Air
RES	Regulatory and Environmental Services
VOC	Volatile Organic Compound
WDS	Waste Data System
WIPP	Waste Isolation Pilot Plant

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 May 14 to 16, 2019, as part of the Agency's continuing WIPP oversight program. The purpose of this inspection was to verify that the DOE continues to adequately monitor ten parameters listed in the 1996 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 the EPA. The monitoring inspection examines the monitoring of geomechanical, hydrological, waste activity, drilling-related and subsidence parameters. The EPA conducted its most recent prior inspection from October 24 to 26, 2017 (EPA-HQ-OAR-2001-0012-0477).

The EPA inspectors toured locations where measurements are taken and were given demonstrations on how personnel conducted measurements. The EPA also examined data and reviewed documents and procedures directing these monitoring activities. The inspection checklist in Attachment B provides details of these inspection activities. The 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 the 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 the 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 2014 Compliance Recertification Application, and used to develop pre-closure and post-closure monitoring requirements.

The DOE documents the analysis of monitoring parameters in Volume 1, Section 7.0 of the CCA. Table 7-7 of the CCA lists the ten parameters that the Department determined may affect the disposal system. These parameters are grouped into major categories and listed in Table 1. The EPA accepted these ten 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 the 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 in the 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 Attachment C).

3.0 Inspection Team, Observers and Participants

The inspection team consisted of four EPA staff members and five 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	Affiliation
Jonathan Walsh	Inspection Leader	EPA Office of Radiation and Indoor Air (ORIA)
Nick Stone	Inspector	EPA Region 6
Harry Shah	Inspector	EPA Region 6
Ronnie Crossland	Observer	EPA Region 6
Melissa Smith	Observer	EPA Region 6
Thomas Peake	Inspector	ORIA
Ingrid Rosencrantz	Inspector	ORIA
Jay Santillan	Inspector	ORIA
Joe Rustick	Observer	ORIA (Science and Technology Fellow, American Association for the Advancement of Science)

Table 3. Inspection Participants

Participant	Affiliation
Larry Madl	Regulatory and Environmental Services (RES)
Judy McLemore	RES
Natalie LaClair	RES
Michael Brown	DOE Carlsbad Field Office (CBFO)
Russ Patterson	CBFO
Anderson Ward	CBFO
Alton Harris	DOE Environmental Management
Becky Brown	Nuclear Waste Partnership (NWP)
Chris Luoma	NWP
Terry Batchelder	NWP
Rey Carrasco	NWP
Ed Lewis	NWP
Rob Watson	RES
Ed Picazo	RES

Participant	Affiliation
Ashley Urdiquez	RES
Stewart Jones	RES
Rick Salness	RES
Jerome Hernandez	RES
John Thurston	RES
Ritchie Jemenez	RES
Steve Kouba	RES

The inspection began on Tuesday morning, May 14, with demonstrations of groundwater sampling and air monitor filter changes from the Groundwater Surveillance and Environmental Monitoring programs. An opening meeting at the WIPP site took place in the early afternoon in which program managers briefly summarized the changes that had taken place to their programs since the previous annual inspection. That afternoon, the inspection team also inspected waste handling and had a follow-up discussion of the Groundwater Surveillance and Environmental Monitoring programs from the morning's observations.

On the morning of May 15, the inspection team went underground to inspect accessible areas of the repository. This underground tour showed routes of movement for waste emplacement, Panel 8 mining, and the experimental areas. The tour also included a demonstration of salt convergence measurements from the Geotechnical Program. On the afternoon of May 15, the inspection team met to discuss the Delaware Basin Surveillance Program in the Cascades Building in Carlsbad, including the Program's methods for monitoring drilling as well as updates to drilling rates. This was followed by a meeting with the Waste Data System (WDS) team at the Skeen-Whitlock Building in Carlsbad to discuss the monitoring of waste parameters.

On the morning of May 16, inspectors met with the Geotechnical Program and observed how the Subsidence Program conducts surveys at the WIPP site. This was followed by a follow-up discussion on the geotechnical measurements taken in the underground the day before. The inspection closeout meeting was held during the afternoon of May 16 at the WIPP site.

The 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

The DOE committed to measuring 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, and stratigraphic and fracture mapping, respectively.

The 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 the following day. Under typical conditions, geotechnical measurements of underground convergence are completed by hand for all accessible areas of the repository every six weeks, and automated extensometer data are reviewed weekly. However, the frequency of measurement is increased if convergence accelerates.

For the measurement demonstration at the WIPP underground, Rey Carrasco and geotechnical staff showed the EPA inspectors measurements of E-140, S-1950 where convergence was measured using an extensometer. Geotechnical staff demonstrated their methodology (WP 07-EU1301, Rev. 13), which incorporated an extension pole of a known length to the extensometer, which was then used to link to the ceiling. This method allowed technicians to measure the distance from floor to ceiling without the need for ladders. There have been no major updates to the methods used in this or other geomechanical procedures since the last inspection.



Figure 1. Extensometer at E-140, S-1950.

Technicians also discussed the level of precision of the extensometers, which can reach to ten-thousandths of an inch but are most useful at one-hundredths of an inch. Instruments are calibrated yearly by an outside vendor. Extension poles are periodically measured to ensure they are the same length, and damage to the poles would be immediately evident upon the collection of data. During the underground tour, inspectors also witnessed bolts being drilled for the mining of Panel 8. Geotechnical staff discussed the frequency of measuring convergence in Panel 8, which usually occurs within a month of new bolts being drilled. However, technicians attempt to take measurements whenever they are in the area and it is possible to do so, even if measurements have already been taken within the month timeframe.

The inspection team met with Rey Carrasco on the morning of May 16 and discussed how the geotechnical staff entered and analyzed data from measurements (WP 07-EU1303, Rev. 11). Data entry procedures have had several minor changes since 2016, including updates on the references and documents cited, a slight streamlining of data entry procedures, and document formatting changes. One important application of the geotechnical measurements is for ground control (i.e., to monitor convergence and determine when bolt installation is warranted). Staff demonstrated how data are entered into the system, with an emphasis on Quality Control checks. Further, staff provided the EPA with a discussion on how data are analyzed using Junior GIS, a program developed by site contractor staff in-house. Staff provided a visualization of the data collected by looking at total convergence and displacement rates. Convergence rates of 5 to 10 in/year or beyond would typically initiate action such as the installation of new bolts.

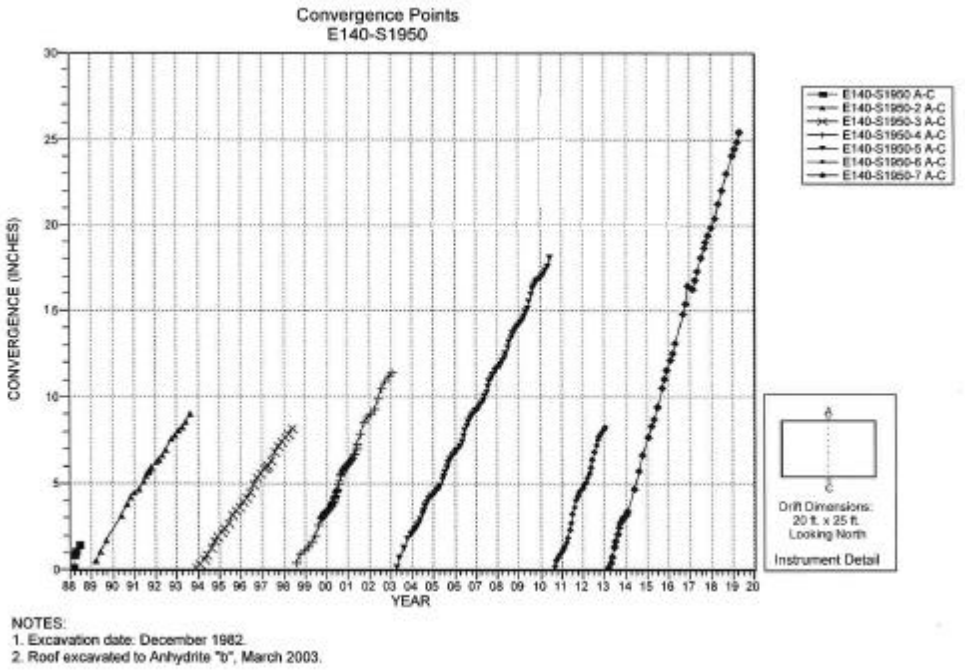

Figure 2. Displacement data from E-140, S-1950.

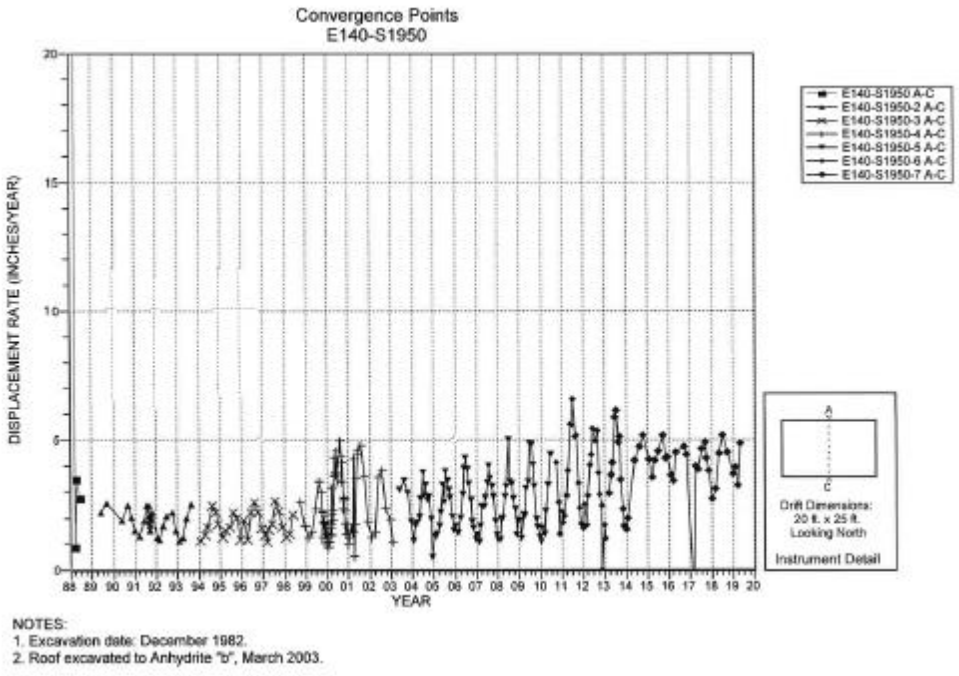

Figure 3. Displacement rate data from E-140, S-1950.

3.2 Monitoring of Hydrological Parameters

The DOE committed to measuring 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, Rev. 15. These functions have not changed since the last inspection, though the document has been modified to include minor language changes and updated well numbers. Results of this program are published in the *WIPP Annual Site Environmental Report* (DOE-WIPP-18-3591).

On the morning of May 14, Rick Salness and staff of the WIPP groundwater surveillance program met with the EPA inspectors. Staff demonstrated their methods by sampling well WQSP-5, a central, downgradient well from the WIPP. Staff demonstrated methods according to WP 02-EM1010, Rev. 2. This procedure was last updated in 2014. Discussions with staff indicated that all laboratory equipment used for the monitoring are calibrated prior to each sampling day, with spot checks between samples to ensure the equipment remains calibrated.

For sampling, water is pumped from downhole, through tubing and into a mobile laboratory. In the mobile laboratory, water samples are collected in bottles and sent elsewhere for analyses of volatile organic compounds (VOCs), radionuclides, cations, anions, and other geochemical parameters. Sample bottles for each parameter are treated accordingly prior to sample collection, e.g., samples used for cation analyses have been pre-treated and contain nitric acid, all supplied by the analyzing laboratory. Stabilization of wells is monitored prior to sample collection using a

probe in a flowthrough cell. Stabilization of the well's chemistry is determined when differences in pH, conductivity, temperature, and density are less than 5% after three successive readings or after three wellbore volumes have been purged from the well. A 0.45 µm filter is attached to the flowthrough cell and samples are collected into sample vials. Two technicians perform the sampling in order to perform Quality Control checks and verify each other's documentation. Additionally, extra sample bottles are included in case more samples are needed. Both trip blanks and field blanks are included, the latter from a supply of deionized water supplied in the mobile lab. Field measurements and collections are documented in WP 02-EM1010, Rev. 2, an example of which is provided at the end of this document (EUS-2019-001, Attachment C).

3.3 Monitoring of Waste Activity Parameters

In the CCA, the DOE committed to monitoring the total radioactivity of waste emplaced in 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 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, Rev. 35.

On the afternoon of May 15, inspectors met with WDS staff, who answered questions and generated reports, including the current total activities of the ten 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 ten EPA-tracked radionuclides, as of May 15, 2019. The waste activities are included in Table 4.

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 May 15, 2019)

Panel: ALL Room: ALL			
Radionuclide	**Repository Contact-Handled Activity (Ci)**	**Repository Remote-Handled Activity (Ci)**	**Total Repository Activity (Ci)**
AM-241 Americium 241	2.699E5	6.213E2	2.645E5
CS-137 Cesium 137	1.792E1	1.445E4	1.447E4
PU-238 Plutonium 238	4.847E5	7.296E2	4.855E5
PU-239 Plutonium 239	3.367E5	3.842E2	3.371E5
PU-240 Plutonium 240	8.324E4	2.803E2	8.352E4
PU-242 Plutonium 242	2.775E1	3.824E-1	2.813E1

Panel: ALL Room: ALL			
Radionuclide	**Repository Contact-Handled Activity (Ci)**	**Repository Remote-Handled Activity (Ci)**	**Total Repository Activity (Ci)**
SR-90 Strontium 90	7.583E1	7.605E3	7.680E3
U-233 Uranium 233	6.647E0	3.848E-1	7.032E0
U-234 Uranium 234	8.730E1	1.141E0	8.844E1
U-238 Uranium 238	1.804E1	3.918E-2	1.808E1
Totals:	**1.169E6**	**2.407E4**	**1.193E6**

3.4 Monitoring of Drilling-Related Parameters

The 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. 8 (4/11/19). Only minor editorial changes have been made to this plan since its last revision. The results of the surveillance program are documented quarterly and reported annually. The most recent *Delaware Basin Monitoring Annual Report* (DOE/WIPP-18-2308, September 2018) was provided in the inspection documentation.

On the afternoon of May 15, inspection staff met with Rob Watson and the staff of the Delaware Basin Surveillance Program at the Cascades Building in Carlsbad. Staff presented the EPA with maps summarizing drilling for the last 100 years as well as the recent drilling trends in the basin. The staff also discussed how they collect drilling reports by directly contacting drillers, and what information they glean from these reports. Drilling has been increasing over the past several years, with the majority of the drilling focused south of the WIPP site in Reeves and Pecos counties in Texas. The calculated deep drilling rate as of September 1, 2018, is 99.0 boreholes per square kilometer per year. No additional Castile brine encounters had been reported since September 2016.

3.5 Monitoring of Subsidence Parameters

In the CCA, the DOE committed to measuring 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 the EPA's previous inspection. The 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 2018*, DOE/WIPP-18-3604. 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 morning of May 16, the inspection team met with Ty Zimmerly to discuss the surface subsidence monitoring program. Mr. Zimmerly and his team demonstrated field procedures for the EPA by surveying a small loop, and explaining each step in the procedure. The demonstration included running a functional test on surveying equipment to ensure the yearly calibrations done on the instruments are still valid.

Following the mock survey, Mr. Zimmerly demonstrated procedure WP 09-ES4001, Rev. 4, downloading and processing data that had been collected on the mock survey loop. Inspectors collected the *Digital Leveling Log Sheet* (EUS-2019-002) and *Level Summary Report* (EUS-2019-003), both listed in Attachment C and provided at the end of this document.

4.0 Conclusions

Based on program documents, interviews and field demonstrations during the inspection, the EPA concludes that the monitoring program covers the ten 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 adequately, and appropriate quality assurance measures are applied. The EPA continues to find that the 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: Monitoring Inspection Plan 40 CFR 194.42 for the Year 2019

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 EPA's certification decision, in particular CCA Volume 1, Section 7.2, Table 7.7 and Appendix MON. This inspection is part of the EPA's continued oversight to ensure that the DOE appropriately and accurately monitors the performance of the disposal system, and is conducted under the authority of 40 CFR Part 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 will also be reviewed.

The 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 database administrators. The 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: The 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 twenty-six miles southeast of Carlsbad, New Mexico, and the surrounding vicinity as needed.

Duration: The EPA expects to complete the on-site portion of its inspection in three days, with an opening meeting on the first day and a closeout session to complete the inspection.

Expected Dates: May 14 to 16, 2019.

Documents for Review: The DOE has electronically provided the EPA inspection staff with the latest versions of procedures and reports related to parameter monitoring. The inspection team will request additional records that are identified in the course of conducting the inspection.

Attachment B: 2019 Monitoring Inspection Checklist

Checklist for Geomechanical Monitoring Commitments			
#	**Question**	**Comment (Objective Evidence): Geotechnical Parameters**	**Result**
1	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 pre-closure phase of operations as specified in the Compliance Certification Application (CCA, Volume 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, effective April 12, 2017, 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 the DOE. Results of this program are documented annually in the *Geotechnical Analysis Report* for each reporting period (DOE/WIPP-18-3561).	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. 38, effective February 6, 2018**.**	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. 8, Section 3.2 requires that analysis be performed annually and results be published in the annual geotechnical analysis report. The report for calendar year 2018 was provided and reviewed by inspectors (DOE/WIPP-18-3561).	Satisfactory
Checklist for Hydrologic Monitoring Commitments			
#	**Question**	**Comment (Objective Evidence): Hydrological Parameters**	**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? (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. 15, effective June 1, 2018. Yes. See *WIPP Groundwater Monitoring Program Plan*, WP 02-1, Rev. 15; *Waste Isolation Pilot Plant Annual Site Environmental Report for 2017*, DOE/WIPP-18-3591; 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. 15, 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 2017*, DOE/WIPP-18-3591.	Satisfactory

Checklist for Waste Activity Monitoring Commitments			
#	**Question**	**Comment (Objective Evidence): Waste Activity Parameters**	**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. 35, effective February 1, 2019, describes the programmatic plan used to monitor and store waste activity information.	Satisfactory
2	Does the DOE demonstrate it has an effective quality assurance 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. 38, effective February 6, 2018, and *Waste Data System Software Quality Assurance Plan*, WP 08-NT.04, Rev. 27, effective March 18, 2019.	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-Related Monitoring Commitments			
#	**Question**	**Comment (Objective Evidence): Drilling-Related Parameters**	**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. 8, effective April 11, 2019, 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. 9, effective November 27, 2018, 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. 8.	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-18-2308, September 2018.	Satisfactory
Checklist for Subsidence Monitoring Commitments			
#	**Question**	**Comment (Objective Evidence): Subsidence Measurements**	**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. 8, effective February 11, 2019.	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. 8, 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*, DOE/WIPP-18-3604.	Satisfactory

Attachment C: Documents Reviewed

Monitoring of Geomechanical Parameters	ID	Source
Geotechnical Analysis Report for July 2016–June 2018, Volumes 1–2, October 2018	DOE/WIPP-18-3561	DOE/WIPP
Geologic and Fracture Mapping of Facility Horizon Drifts	WP 07-EU1001, Rev. 7	DOE/WIPP
Rev. 1 Geologic Core Logging	WP 07-EU1002, Rev. 3	DOE/WIPP
Manually Acquired Geomechanical Instrument Data	WP 07-EU1301, Rev. 13	DOE/WIPP
Geomechanical Instrument Data Processing	WP 07-EU1303, Rev. 11	DOE/WIPP
Installing Convergence Reference Points	WP 07-EU1304, Rev. 7	DOE/WIPP
Installing Rock Bolt Load Cells	WP 07-EU1306, Rev. 6	DOE/WIPP
Installing Wire Convergence Meters	WP 07-EU1307, Rev. 6	DOE/WIPP
Installing Wire Extensometers	WP 07-EU1308, Rev. 4	DOE/WIPP
Installing Vibrating Wire Crackmeters	WP 07-EU1310, Rev. 1	DOE/WIPP
Software Screening and Control	WP 16-2, Rev. 16	DOE/WIPP
WIPP Geotechnical Engineering Program Plan	WP 07-1, Rev. 8	DOE/WIPP
WIPP Core Storage Handling and Distribution	WP 07-EU3504, Rev. 6	DOE/WIPP
Nuclear Waste Partnership, LLC Quality Assurance Program Description	WP 13-1, Rev. 38	DOE/WIPP

Monitoring of Hydrological Parameters	ID	Source
WIPP Annual Site Environmental Report for 2017	DOE-WIPP-18-3591	DOE/WIPP
WIPP Groundwater Monitoring Program Plan	WP 02-1, Rev. 15	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
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
Low-Flow Groundwater Purging and Sampling	WP 02-EC1003, Rev. 10	DOE/WIPP
Low-Volume Air Particulate Sampler Maintenance Guide	WP 02-EM.04, Rev. 0	DOE/WIPP
Shallow Subsurface Water Potentiometric Surface Map Construction	WP 02-EM1027, Rev. 3	DOE/WIPP
Special Soil Sampling	WP 02-EM1029, Rev. 1	DOE/WIPP
Special Vegetation Sampling	WP 02-EM1030, Rev. 0	DOE/WIPP
Radiological Data Verification and Validation	WP 02-EM3004, Rev. 11	DOE/WIPP
Field Parameter Measurements	EUS-2019-001	DOE/WIPP
Annual Culebra Groundwater Report	None	DOE/WIPP

Monitoring of Drilling-Related Parameters	ID	Source
Delaware Basin Drilling Surveillance Plan	WP 02-PC.02, Rev. 8	DOE/WIPP
Delaware Basin Drilling Database Upgrade Process	WP 02-EC3002, Rev. 9	DOE/WIPP
Delaware Basin Monitoring Annual Report	DOE-WIPP-18-2308	DOE/WIPP

Monitoring of Subsidence Parameters	ID	Source
WIPP Underground and Surface Surveying Program	WP 09-ES.01, Rev. 8	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 2018	DOE-WIPP-18-3604	DOE/WIPP
Digital Leveling Log Sheet	EUS-2019-002	DOE/WIPP
Level Summary Report	EUS-2019-003	DOE/WIPP

Monitoring of Waste Activities	ID	Source
WIPP Waste Data System Program and Data Management Plan	WP 08-NT.01, Rev. 35	DOE/WIPP
Waste Stream Profile Form Review and Approval Program	WP 08-NT.03, Rev. 19	DOE/WIPP
Waste Data System User's Manual	DOE/WIPP-09-3427, Rev. 19	DOE/WIPP
TRU Waste Receipt	WP 08-NT3020, Rev. 28	DOE/WIPP
Waste Data System Software Quality Assurance Plan	WP 08-NT.04, Rev. 27	DOE/WIPP
Nuclear Waste Partnership, LLC Quality Assurance Program Description	WP 13-1, Rev. 38	DOE/WIPP
Annual Transuranic Waste Inventory Report – 2018	DOE/TRU-18-3425, Rev. 0	DOE/WIPP
Annual Change Report 2016/2017	None	DOE/WIPP

Attachment 1 - Field Parameter Measurement Summary Report

DMW Sampling Information

DMW ID: WQSP-5 Date: 5/13/2019

Zone: Culebra DMP Round #: 41

Day Measured: 1 Sampler: RJ R Jimenez / J. Thurston JT

Field Parameter	Unit	Final Field Measurement[a]	Date Tested	Time Tested	Sampler
Specific Conductance @ 25°C	µmhos/cm	49,900	5/13/2019	9:50	R Jimenez / J. Thurston
Temperature	°C	21.9	5/13/2019	9:50	R Jimenez / J. Thurston
pH	SU	7.81	5/13/2019	9:50	R Jimenez / J. Thurston
Specific Gravity		1.027 @ 20.4 °C	5/13/2019	10:09	R Jimenez / J. Thurston

[a]Data represent last measurement (after determining parameters have stabilized).

Remarks:

FOR INFORMATION ONLY

Attachment 2 - Field Parameter Measurement for Specific Conductance and Temperature

DMW Sampling Information

DMW ID: WQSP-5 Date: 5/13/2019

Zone: Culebra DMP Round #: 41

Day Measured: 1 Sampler: R Jimenez / J. Thurston JT

Equipment Specifics/Calibration Standards

Meter: M&DC ID, Serial #: ZE 0176 V00878 Calibration Expiration Date: 12/7/2019

Conductivity Cell: Vendor, Model #, Serial #: Orion 013005MD RX1-12210

Temperature Probe: Vendor, Model #, Serial #: N/A, Conductivity cell has built-in ATC

1K Standard: Vendor, Lot #: Ricca Lot # 1901C56 Expiration Date: 1/31/2021

10K Standard: Vendor, Lot #: Ricca Lot # 1902E27 Expiration Date: 2/28/2021

100K Standard: Vendor, Lot #: Ricca Lot # 1812805 Expiration Date: 11/30/2020

Equipment Calibration/QC Checks

Standard	Test Time	Temperature, °C	Conductivity, uS	Cell Constant, K/cm	SC, µhmos/cm @ 25°C[a]
1K	9:15	18.7	1,879	0.5322	1,000
10K	9:15	18.5	18,903	0.5287	9,994
100K	9:15	18.5	189,968	0.5290	100,493
QC 1: (Circle One: 1K 10K 100K)	9:16	18.7	N/A		100,000
QC 2: (Circle One: 1K 10K 100K)	9:57	19.1			99,900

[a]SC, µmhos/cm = [(Conductivity, uS) x (Measured Cell Constant, K/cm)]

GW Measurements

GW Test ID	Test Time	SC, µhmos/cm @ 25°C	Temperature, °C	Percentage Change[b] SC	Percentage Change[b] Temp
SC-1	9:30	50,500	21.8	N/A	N/A
SC-2	9:35	50,400	21.9	N/A	N/A
SC-3	9:40	50,300	21.9	0.4	0.5
SC-4	9:45	50,000	21.9	0.8	0.0
SC-5	9:50	49,900	21.9	0.8	0.0
SC-6					
SC-7					
SC-8					
SC-9					
SC-10					
SC-11					
SC-12					
SC-13					

[b]Percentage Change = {(Max - Min of Last 3 Readings)/Last Reading} x 100

Remarks:

FOR INFORMATION ONLY

Thermo Scientific (c) 2012

ORION VERSA STAR

Meter Serial No	: V00878
Software Revision	: 2.73
Reported DateTime	: 5/13/2019 9:16:28 AM

WQSP.5 R41 Day 1 Cond Cal

Channel No	: Ch-3
Method Number	: M-300
Probe Serial Number	: -----
Calibration Time	: 05-13-19,09:15
User ID	: -----
Module Serial Number	: VA01476

Conductivity Calibration Report

Point	: 1		
Conductivity Value	: 1000 uS/cm	Conductance Value	: 1979.15 uS
Temperature	: 18.7 °C (ATC)		
Calibration Type	: Manual		
Point	: 2		
Conductivity Value	: 10.00 mS/cm	Conductance Value	: 18903.32 uS
Temperature	: 18.5 °C (ATC)		
Calibration Type	: Manual		
Point	: 3		
Conductivity Value	: 100.0 mS/cm	Conductance Value	: 189968.33 uS
Temperature	: 18.5 °C (ATC)		
Calibration Type	: Manual		
K 1	: 0.5322 /cm	Offset 1	: 0.00 uS/cm
K 2	: 0.5287 /cm	Offset 2	: 6.57 uS/cm
Average K	: 0.5290 /cm		
Cal #	: 305		
Operator	: _____		
Signature	: _____		

FOR INFORMATION ONLY

Thermo Scientific (c) 2012

ORION VERSA STAR

WQSP-5 RH1 Daily Cal QC1

Meter Serial No	: V00878
Software Revision	: 2.73

Measurement Data

Channel No	: Ch-3
Method Number	: 300
Probe Serial Number	: ----
Sample ID	: ~~WQSP6~~ 5/13/19
User ID	: -----
Module Serial Number	: VA01476

Mode - Conductivity

1	Date/Time	: 5/13/2019 9:16:54 AM		
	Conductivity	: 100.0 mS/cm	Conductance	: 189925.50(
	Cell K Value	: 0.5261 /cm	Temperature	: 18.7 °C (F
	Temperature Coefficient	: 0.0 %/C	Reference Temperature	: 25.0 °C

FOR INFORMATION ONLY

Thermo Scientific (c) 2012

ORION VERSA STAR WQS-5 R41 Day 1 Con QC 2

Meter Serial No	: V00878
Software Revision	: 2.73

Measurement Data

Channel No	: Ch-3
Method Number	: 300
Probe Serial Number	: -----
Sample ID	: ~~WQSP6~~ JT 5/13/19
User ID	: -----
Module Serial Number	: VA01476

Mode - Conductivity

1	Date/Time	: 5/13/2019 9:57:52 AM		
	Conductivity	: 99.9 mS/cm	Conductance	: 189781.50(
	Cell K Value	: 0.5261 /cm	Temperature	: 19.1 °C (A
	Temperature Coefficient	: 0.0 %/C	Reference Temperature	: 25.0 °C

FOR INFORMATION ONLY

WQSP5 R41 Day1 Cal Data

Channel No	: Ch-3
Method Number	: 300
Probe Serial Number	: ----- JT 5/13/19
Sample ID	: ~~WQSP6~~
User ID	: -----
Module Serial Number	: VA01476

Mode - Conductivity

1	Date/Time	: 5/13/2019 9:30:52 AM		
	Conductivity	: 50.5 mS/cm	Conductance	: 95879.110
	Cell K Value	: 0.5261 /cm	Temperature	: 21.8 °C (F
	Temperature Coefficient	: 0.0 %/C	Reference Temperature	: 25.0 °C
2	Date/Time	: 5/13/2019 9:35:52 AM		
	Conductivity	: 50.4 mS/cm	Conductance	: 95673.770
	Cell K Value	: 0.5261 /cm	Temperature	: 21.9 °C (F
	Temperature Coefficient	: 0.0 %/C	Reference Temperature	: 25.0 °C
3	Date/Time	: 5/13/2019 9:40:52 AM		
	Conductivity	: 50.3 mS/cm	Conductance	: 95375.370
	Cell K Value	: 0.5261 /cm	Temperature	: 21.9 °C (F
	Temperature Coefficient	: 0.0 %/C	Reference Temperature	: 25.0 °C
4	Date/Time	: 5/13/2019 9:45:52 AM		
	Conductivity	: 50.0 mS/cm	Conductance	: 95016.250
	Cell K Value	: 0.5261 /cm	Temperature	: 21.9 °C (F
	Temperature Coefficient	: 0.0 %/C	Reference Temperature	: 25.0 °C
5	Date/Time	: 5/13/2019 9:50:52 AM		
	Conductivity	: 49.9 mS/cm	Conductance	: 94821.090
	Cell K Value	: 0.5261 /cm	Temperature	: 21.9 °C (F
	Temperature Coefficient	: 0.0 %/C	Reference Temperature	: 25.0 °C

FOR INFORMATION ONLY

Attachment 3 - Field Parameter Measurement for pH

DMW Sampling Information

DMW ID: WQSP-5 Date: 5/13/2019

Zone: Culebra DMP Round #: 41

Day Measured: 1 Sampler: RJS R Jimenez / J. Thurston JT

Equipment Specifics/Calibration Buffers

Meter: M&DC ID, Serial #: ZE 0176 V00878 Calibration Expiration Date: 12/7/2019

Electrode: Vendor, Model #, Serial #: Orion 8157BNUMD RX1-15654 Electrode Filling Solution: Orion 810007 Lot # TO1

Temperature Probe: Vendor, Model #, Serial #: N/A, pH electrode has built-in ATC

pH 4 Buffer: Vendor, Lot #: Ricca Lot # 4805K72 Expiration Date: 5/31/2020

pH 7 Buffer: Vendor, Lot #: Ricca Lot # 4805L24 Expiration Date: 5/31/2020

pH 10 Buffer: Vendor, Lot #: Ricca Lot # 4806M04 Expiration Date: 12/31/2019

Equipment Calibration/QC Checks

Buffer	Buffer Type	Test Time	Temperature, °C	pH Value, SU	Average Electrode Slope, %
pH 4	Calibration	9:01	18.5	4.00	N/A
pH 7	Calibration	9:01	18.5	7.00	100.7
pH 10	Calibration	9:01	18.4	10.00	N/A
QC 7.0 Check 1	QC Check	9:06	18.7	7.01	
QC 7.0 Check 2	QC Check	10:01	19.7	7.00	

GW Measurements

GW Test ID	Test Time	Temperature, °C	pH Value, SU	Percentage Change[b]	
				Temp	pH
pH-1	9:30	21.9	7.85	N/A	N/A
pH-2	9:35	22.0	7.83	N/A	N/A
pH-3	9:40	22.0	7.82	0.5	0.4
pH-4	9:45	22.0	7.81	0.0	0.3
pH-5	9:50	22.1	7.81	0.5	0.1
pH-6					
pH-7					
pH-8					
pH-9					
pH-10					
pH-11					
pH-12					
pH-13					

[b]Percentage Change = {(Max - Min of Last 3 Readings)/Last Reading} x 100

Remarks:

FOR INFORMATION ONLY

Thermo Scientific (c) 2012

ORION VERSA STAR

WQSP-5 241 Day 1 pH Cal

Meter Serial No	: V00878
Software Revision	: 2.73
Reported DateTime	: 5/13/2019 9:05:16 AM

Channel No	: Ch-1
Method Number	: M-101
Probe Serial Number	: -----
Calibration Time	: 05-13-19,09:1
User ID	: -----
Module Serial Number	: VA01474

pH Calibration Report

Point	: 1		
pH	: 4 pH	mV	: 211.8 mV
Temperature	: 18.5 °C (ATC)		
Calibration Type	: Manual		
Point	: 2		
pH	: 7 pH	mV	: 36.4 mV
Temperature	: 18.5 °C (ATC)		
Calibration Type	: Manual		
Point	: 3		
pH	: 10 pH	mV	: -137.8 mV
Temperature	: 18.4 °C (ATC)		
Calibration Type	: Manual		
Slope 1	: 101.1 %	Offset 1	: 36.4 mV
Slope 2	: 100.4 %	Offset 2	: 36.4 mV
Average Slope	: 100.7 %		
Cal #	: 102		
Operator	: _____		
Signature	: _____		

FOR INFORMATION ONLY

Thermo Scientific (c) 2012

ORION VERSA STAR WQSP.5 R41 Day 1 pH QC 1

Meter Serial No	: V00878
Software Revision	: 2.73

Measurement Data

Channel No	: Ch-1
Method Number	: 101
Probe Serial Number	: -----
Sample ID	: ~~WQSP6~~ JT 5/13/19
User ID	: -----
Module Serial Number	: VA01474

Mode - PH

1	Date/Time	: 5/13/2019 9:06:53 AM		
	pH	: 7.01 pH	mV	: 36.0 mV
	Temperature	: 18.7 °C (ATC)	Average Slope	: 100.7 %

FOR INFORMATION ONLY

Thermo Scientific (c) 2012

ORION VERSA STAR WQSP.5 R41 Day 1 pH QC2

Meter Serial No	: V00878
Software Revision	: 2.73

Measurement Data

Channel No	: Ch-1
Method Number	: 101
Probe Serial Number	: -----
Sample ID	: ~~WQSP6~~ JT 5/13/19
User ID	: -----
Module Serial Number	: VA01474

Mode - PH

1	Date/Time	: 5/13/2019 10:01:15 AM		
	pH	: 7.00 pH	mV	: 36.1 mV
	Temperature	: 19.7 °C (ATC)	Average Slope	: 100.7 %

FOR INFORMATION ONLY

Attachment 4 - Field Parameter Measurement for Specific Gravity

DMW Sampling Information

DMW ID: WQSP-5 Date: 5/13/2019

Zone: Culebra DMP Round #: 41

Day Measured: 1 Sampler: R Jimenez / J. Thurston

Equipment Specifics

Thermometer: M&DC ID, Serial #: ZE 0179 140126779 Calibration Expiration Date: 8/21/2019

Hydrometer: M&DC ID, Serial #: ZE0160 9371374 Calibration Expiration Date: 8/27/2019

GW Measurements

GW Test ID	GW Collection Time	Degas Time	Test Time	Temperature, °C	Hydrometer Reading (SG)	Percentage Change[b]	
						Temp	SG
SG-1	9:26	0:36	10:02	20.7	1.026	N/A	N/A
SG-2	9:27	0:38	10:05	20.5	1.027	N/A	N/A
SG-3	9:28	0:39	10:07	20.3	1.027	N/A	0.1
SG-4	9:29	0:40	10:09	20.4	1.027	N/A	0.0
SG-5						N/A	
SG-6						N/A	
SG-7						N/A	
SG-8						N/A	
SG-9						N/A	
SG-10						N/A	
SG-11						N/A	
SG-12						N/A	
SG-13						N/A	

[b]Percentage Change = {(Max - Min of Last 3 Readings)/Last Reading} x 100

Remarks Percentage change only calculated for SG on this attachment.

FOR INFORMATION ONLY

Thermo Scientific (c) 2012

ORION VERSA STAR WQSP-5 RH1 Day 1 Data pH

Meter Serial No	: V00878
Software Revision	: 2.73

Measurement Data

Channel No	: Ch-1
Method Number	: 101
Probe Serial Number	: ----- JT 5/13/19
Sample ID	: ~~WQSP6~~
User ID	: -----
Module Serial Number	: VA01474

Mode - PH

1	Date/Time	: 5/13/2019 9:30:52 AM		
	pH	: 7.85 pH	mV	: -13.3 mV
	Temperature	: 21.9 °C (ATC)	Average Slope	: 100.7 %
2	Date/Time	: 5/13/2019 9:35:52 AM		
	pH	: 7.83 pH	mV	: -12.3 mV
	Temperature	: 22.0 °C (ATC)	Average Slope	: 100.7 %
3	Date/Time	: 5/13/2019 9:40:52 AM		
	pH	: 7.82 pH	mV	: -11.6 mV
	Temperature	: 22.0 °C (ATC)	Average Slope	: 100.7 %
4	Date/Time	: 5/13/2019 9:45:52 AM		
	pH	: 7.81 pH	mV	: -11.4 mV
	Temperature	: 22.0 °C (ATC)	Average Slope	: 100.7 %
5	Date/Time	: 5/13/2019 9:50:52 AM		
	pH	: 7.81 pH	mV	: -11.0 mV
	Temperature	: 22.1 °C (ATC)	Average Slope	: 100.7 %

FOR INFORMATION ONLY

Attachment 2 - Field Parameter Measurement for Specific Conductance and Temperature

DMW Sampling Information

DMW ID: WQSP-5 Date: 5/14/2019

Zone: Culebra DMP Round #: 41

Day Measured: 2 Sampler: RJ R Jimenez / J. Thurston JT

Equipment Specifics/Calibration Standards

Meter: M&DC ID, Serial #: ZE 0176 V00878 Calibration Expiration Date: 12/7/2019

Conductivity Cell: Vendor, Model #, Serial #: Orion 013005MD RX1-12210

Temperature Probe: Vendor, Model #, Serial #: N/A, Conductivity cell has built-in ATC

1K Standard: Vendor, Lot #: Ricca Lot # 1901C55 Expiration Date: 1/31/2021

10K Standard: Vendor, Lot #: Ricca Lot # 1902E27 Expiration Date: 2/28/2021

100K Standard: Vendor, Lot #: Ricca Lot # 1812805 Expiration Date: 11/30/2020

Equipment Calibration/QC Checks

Standard	Test Time	Temperature, °C	Conductivity, uS	Cell Constant, K/cm	SC, µhmos/cm @ 25°C[a]
1K	7:42	20.8	1,949	0.5132	1,000
10K	7:42	20.7	19,570	0.5107	9,994
100K	7:42	20.4	194,778	0.5125	99,824
QC 1: Circle One 1K 10K (100K)	7:44	20.4	N/A		100,000
QC 2: Circle One 1K (10K) 100K	8:12	20.7			9,990

[a]SC, µmhos/cm = [(Conductivity, uS) x (Measured Cell Constant, K/cm)]

GW Measurements

GW Test ID	Test Time	SC, µhmos/cm @ 25°C	Temperature, °C	Percentage Change[b] SC	Percentage Change[b] Temp
SC-1	7:47	48,000	21.6	N/A	N/A
SC-2	7:52	48,000	21.7	N/A	N/A
SC-3	7:57	48,100	21.7	0.2	0.5
SC-4	8:02	48,100	21.7	0.2	0.0
SC-5	8:07	48,000	21.7	0.2	0.0
SC-6					
SC-7					
SC-8					
SC-9					
SC-10					
SC-11					
SC-12					
SC-13					

[b]Percentage Change = {(Max - Min of Last 3 Readings)/Last Reading} x 100

Remarks:

FOR INFORMATION ONLY

Attachment 1 - Field Parameter Measurement Summary Report

DMW Sampling Information

DMW ID: WQSP-5

Date: 5/14/2019

Zone: Culebra

DMP Round #: 41

Day Measured: 2

Sampler: RJ R Jimenez / J. Thurston JT

Field Parameter	Unit	Final Field Measurement[a]	Date Tested	Time Tested	Sampler
Specific Conductance @ 25°C	µmhos/cm	48,000	5/14/2019	8:07	R Jimenez / J. Thurston
Temperature	°C	21.7	5/14/2019	8:07	R Jimenez / J. Thurston
pH	SU	7.50	5/14/2019	8:07	R Jimenez / J. Thurston
Specific Gravity		1.026 @ 20.8 °C	5/14/2019	8:18	R Jimenez / J. Thurston

[a]Data represent last measurement (after determining parameters have stabilized).

Remarks:

FOR INFORMATION ONLY

Thermo Scientific (c) 2012

ORION VERSA STAR

WWSP-5 R41 Day 2 Con Cal

Meter Serial No	: V00878
Software Revision	: 2.73
Reported DateTime	: 5/14/2019 7:43:31 AM
Channel No	: Ch-3
Method Number	: M-300
Probe Serial Number	: -----
Calibration Time	: 05-14-19,07:42
User ID	: -----
Module Serial Number	: VA01476

Conductivity Calibration Report

Point	: 1		
Conductivity Value	: 1000 uS/cm	Conductance Value	: 1948.64 uS
Temperature	: 20.8 °C (ATC)		
Calibration Type	: Manual		
Point	: 2		
Conductivity Value	: 10.00 mS/cm	Conductance Value	: 19569.88 uS
Temperature	: 20.7 °C (ATC)		
Calibration Type	: Manual		
Point	: 3		
Conductivity Value	: 100.0 mS/cm	Conductance Value	: 194777.79 uS
Temperature	: 20.4 °C (ATC)		
Calibration Type	: Manual		
K 1	: 0.5132 /cm	Offset 1	: 0.00 uS/cm
K 2	: 0.5107 /cm	Offset 2	: 4.74 uS/cm
Average K	: 0.5125 /cm		
Cal #	: 306		
Operator	: _____		
Signature	: _____		

FOR INFORMATION ONLY

Thermo Scientific (c) 2012

ORION VERSA STAR

WQSP-5 R41 Dev 2 Con QC1

Meter Serial No	: V00878
Software Revision	: 2.73

Measurement Data

Channel No	: Ch-3
Method Number	: 300
Probe Serial Number	: -----
Sample ID	: WQSP-5
User ID	: -----
Module Serial Number	: VA01476

Mode - Conductivity

1	Date/Time	: 5/14/2019 7:44:23 AM		
	Conductivity	: 100.0 mS/cm	Conductance	: 194817.300
	Cell K Value	: 0.5137 /cm	Temperature	: 20.4 °C (A
	Temperature Coefficient	: 0.0 %/C	Reference Temperature	: 25.0 °C

FOR INFORMATION ONLY

WQSP-5 R41 Day 2 Con Data

Channel No	: Ch-3
Method Number	: 300
Probe Serial Number	: -----
Sample ID	: WQSP-5
User ID	: -----
Module Serial Number	: VA01476

Mode - Conductivity

1	Date/Time	: 5/14/2019 7:47:11 AM		
	Conductivity	: 48.0 mS/cm	Conductance	: 93584.550
	Cell K Value	: 0.5137 /cm	Temperature	: 21.6 °C (A
	Temperature Coefficient	: 0.0 %/C	Reference Temperature	: 25.0 °C
2	Date/Time	: 5/14/2019 7:52:11 AM		
	Conductivity	: 48.0 mS/cm	Conductance	: 93651.550
	Cell K Value	: 0.5137 /cm	Temperature	: 21.7 °C (A
	Temperature Coefficient	: 0.0 %/C	Reference Temperature	: 25.0 °C
3	Date/Time	: 5/14/2019 7:57:11 AM		
	Conductivity	: 48.1 mS/cm	Conductance	: 93842.380
	Cell K Value	: 0.5137 /cm	Temperature	: 21.7 °C (A
	Temperature Coefficient	: 0.0 %/C	Reference Temperature	: 25.0 °C
4	Date/Time	: 5/14/2019 8:02:11 AM		
	Conductivity	: 48.1 mS/cm	Conductance	: 93732.450
	Cell K Value	: 0.5137 /cm	Temperature	: 21.7 °C (A
	Temperature Coefficient	: 0.0 %/C	Reference Temperature	: 25.0 °C
5	Date/Time	: 5/14/2019 8:07:11 AM		
	Conductivity	: 48.0 mS/cm	Conductance	: 93550.390
	Cell K Value	: 0.5137 /cm	Temperature	: 21.7 °C (A
	Temperature Coefficient	: 0.0 %/C	Reference Temperature	: 25.0 °C

FOR INFORMATION ONLY

Thermo Scientific (c) 2012

ORION VERSA STAR WQSP-5 R41 Day 2 Con Q C2

Meter Serial No	: V00878
Software Revision	: 2.73

Measurement Data

Channel No	: Ch-3
Method Number	: 300
Probe Serial Number	: -----
Sample ID	: WQSP-5
User ID	: -----
Module Serial Number	: VA01476

Mode - Conductivity

1	Date/Time	: 5/14/2019 8:12:18 AM		
	Conductivity	: 9.99 mS/cm	Conductance	: 19558.340
	Cell K Value	: 0.5107 /cm	Temperature	: 20.7 °C (A
	Temperature Coefficient	: 0.0 %/C	Reference Temperature	: 25.0 °C

FOR INFORMATION ONLY

Attachment 3 - Field Parameter Measurement for pH

DMW Sampling Information

DMW ID: WQSP-5 Date: 5/14/2019

Zone: Culebra DMP Round #: 41

Day Measured: 2 Sampler: R Jimenez / J. Thurston

Equipment Specifics/Calibration Buffers

Meter: M&DC ID, Serial #: ZE 0176 V00878 Calibration Expiration Date: 12/7/2019

Electrode: Vendor, Model #, Serial #: Orion 8157BNUMD RX1-15654 Electrode Filling Solution: TO1

Temperature Probe: Vendor, Model #, Serial #: N/A, pH electrode has built-in ATC

pH 4 Buffer: Vendor, Lot #: Ricca Lot # 4805K72 Expiration Date: 5/31/2020

pH 7 Buffer: Vendor, Lot #: Ricca Lot # 4805L24 Expiration Date: 5/31/2020

pH 10 Buffer: Vendor, Lot #: Ricca Lot # 4806M04 Expiration Date: 12/31/2019

Equipment Calibration/QC Checks

Buffer	Buffer Type	Test Time	Temperature, °C	pH Value, SU	Average Electrode Slope, %
pH 4	Calibration	7:32	20.8	4.00	N/A
pH 7	Calibration	7:32	20.8	7.00	101.0
pH 10	Calibration	7:32	20.8	10.00	N/A
QC 7.0 Check 1	QC Check	7:34	20.8	7.03	
QC 7.0 Check 2	QC Check	8:11	20.6	6.95	

GW Measurements

GW Test ID	Test Time	Temperature, °C	pH Value, SU	Percentage Change[b]	
				Temp	pH
pH-1	7:47	21.8	7.48	N/A	N/A
pH-2	7:52	21.8	7.49	N/A	N/A
pH-3	7:57	21.8	7.50	0.0	0.3
pH-4	8:02	21.8	7.50	0.0	0.1
pH-5	8:07	21.8	7.50	0.0	0.0
pH-6					
pH-7					
pH-8					
pH-9					
pH-10					
pH-11					
pH-12					
pH-13					

[b]Percentage Change = {(Max - Min of Last 3 Readings)/Last Reading} x 100

Remarks:

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Thermo Scientific (c) 2012

ORION VERSA STAR

Meter Serial No	: V00878
Software Revision	: 2.73
Reported DateTime	: 5/14/2019 7:33:14 AM

WQSP-5 R41 Day 2 pH Cal

Channel No	: Ch-1
Method Number	: M-101
Probe Serial Number	: -----
Calibration Time	: 05-14-19,07:32
User ID	: -----
Module Serial Number	: VA01474

pH Calibration Report

Point	: 1		
pH	: 4 pH	mV	: 213.5 mV
Temperature	: 20.8 °C (ATC)		
Calibration Type	: Manual		
Point	: 2		
pH	: 7 pH	mV	: 33.5 mV
Temperature	: 20.8 °C (ATC)		
Calibration Type	: Manual		
Point	: 3		
pH	: 10 pH	mV	: -139.9 mV
Temperature	: 20.8 °C (ATC)		
Calibration Type	: Manual		
Slope 1	: 102.8 %	Offset 1	: 33.6 mV
Slope 2	: 99.1 %	Offset 2	: 33.5 mV
Average Slope	: 101.0 %		
Cal #	: 103		

Operator : _____

Signature : _____

FOR INFORMATION ONLY

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ORION VERSA STAR WASP-5 R41 Day 2 pH CXC1

Meter Serial No	: V00878
Software Revision	: 2.73

Measurement Data

Channel No	: Ch-1
Method Number	: 101
Probe Serial Number	: -----
Sample ID	: ~~WQSP6~~ JT 5/14/19
User ID	: -----
Module Serial Number	: VA01474

Mode - PH

1	Date/Time	: 5/14/2019 7:34:07 AM		
	pH	: 7.03 pH	mV	: 31.8 mV
	Temperature	: 20.8 °C (ATC)	Average Slope	: 101.0 %

FOR INFORMATION ONLY

Thermo Scientific (c) 2012

ORION VERSA STAR

WQSP-5 R41 Day 2 pH QC2

Meter Serial No	: V00878
Software Revision	: 2.73

Measurement Data

Channel No	: Ch-1
Method Number	: 101
Probe Serial Number	: -----
Sample ID	: WQSP-5
User ID	: -----
Module Serial Number	: VA01474

Mode - PH

1	Date/Time	: 5/14/2019 8:11:08 AM		
	pH	: 6.95 pH	mV	: 36.6 mV
	Temperature	: 20.6 °C (ATC)	Average Slope	: 101.0 %

FOR INFORMATION ONLY

Thermo Scientific (c) 2012

ORION VERSA STAR

WQSP-5 R41 Day 2 pH Data

Meter Serial No	: V00878
Software Revision	: 2.73

Measurement Data

Channel No	: Ch-1
Method Number	: 101
Probe Serial Number	: -----
Sample ID	: WQSP-5
User ID	: -----
Module Serial Number	: VA01474

Mode - PH

1	Date/Time	: 5/14/2019 7:47:11 AM		
	pH	: 7.48 pH	mV	: 5.4 mV
	Temperature	: 21.8 °C (ATC)	Average Slope	: 101.0 %
2	Date/Time	: 5/14/2019 7:52:11 AM		
	pH	: 7.49 pH	mV	: 4.8 mV
	Temperature	: 21.8 °C (ATC)	Average Slope	: 101.0 %
3	Date/Time	: 5/14/2019 7:57:11 AM		
	pH	: 7.50 pH	mV	: 4.4 mV
	Temperature	: 21.8 °C (ATC)	Average Slope	: 101.0 %
4	Date/Time	: 5/14/2019 8:02:11 AM		
	pH	: 7.50 pH	mV	: 4.4 mV
	Temperature	: 21.8 °C (ATC)	Average Slope	: 101.0 %
5	Date/Time	: 5/14/2019 8:07:11 AM		
	pH	: 7.50 pH	mV	: 4.6 mV
	Temperature	: 21.8 °C (ATC)	Average Slope	: 101.0 %

FOR INFORMATION ONLY

Attachment 4 - Field Parameter Measurement for Specific Gravity

DMW Sampling Information

DMW ID: WQSP-5

Date: 5/14/2019

Zone: Culebra

DMP Round #: 41

Day Measured: 2

Sampler: RJS R Jimenez / J. Thurston JT

Equipment Specifics

Thermometer: M&DC ID, Serial #: ZE 0179 140126779

Calibration Expiration Date: 8/21/2019

Hydrometer: M&DC ID, Serial #: ZE0160 9371374

Calibration Expiration Date: 8/27/2019

GW Measurements

GW Test ID	GW Collection Time	Degas Time	Test Time	Temperature, °C	Hydrometer Reading (SG)	Percentage Change[b]	
						Temp	SG
SG-1	7:29	0:45	8:14	20.9	1.027	N/A	N/A
SG-2	7:34	0:41	8:15	20.7	1.027	N/A	N/A
SG-3	7:37	0:40	8:17	20.7	1.027	N/A	0.0
SG-4	7:40	0:38	8:18	20.8	1.026	N/A	0.1
SG-5						N/A	
SG-6						N/A	
SG-7						N/A	
SG-8						N/A	
SG-9						N/A	
SG-10						N/A	
SG-11						N/A	
SG-12						N/A	
SG-13						N/A	

[b]Percentage Change = {(Max - Min of Last 3 Readings)/Last Reading} x 100

Remarks: Percentage change only calculated for SG on this attachment.

FOR INFORMATION ONLY

Thermo Scientific (c) 2012

ORION VERSA STAR

Meter Serial No	: V00878
Software Revision	: 2.73

Measurement Data

Channel No	: Ch-1
Method Number	: 101
Probe Serial Number	: -----
Sample ID	: WQSP-5
User ID	: -----
Module Serial Number	: VA01474

Mode - PH

1	Date/Time	: 5/14/2019 8:12:57 AM		
	pH	: 7.46 pH	mV	: 6.9 mV
	Temperature	: 21.9 °C (ATC)	Average Slope	: 101.0 %

Channel No	: Ch-3
Method Number	: 300
Probe Serial Number	: -----
Sample ID	: WQSP-5
User ID	: -----
Module Serial Number	: VA01476

Mode - Conductivity

1	Date/Time	: 5/14/2019 8:12:57 AM		
	Conductivity	: 48.3 mS/cm	Conductance	: 94061.150
	Cell K Value	: 0.5137 /cm	Temperature	: 21.8 °C (A
	Temperature Coefficient	: 0.0 %/C	Reference Temperature	: 25.0 °C

Sp gravity

collection time	degas time	test time	temp °C	Hydrometer reading
11:08	13 min	11:21	21.7	1.026

FOR INFORMATION ONLY

Attachment 5 - Final Sample Checklist

Project Name: WIPP / DMP
DMW ID: WQSP-5
DMP Round: 41
Zone: Culebra

Filter Type: Whatman, cellulose nitrate
Pore Size: 0.45 µm
Lot #: 7122223

Samplers: Richard Jimenez, John Thurston
Date Sampled: 5/14/2019

Sample Number	Parameters	Sample Matrix/Type	Destination	Sample Containers			Sample Filtered	Preservative	Collection Time, Start
				# Required	Volume	Container Type			
GW-WQ5-C-R41-N1	VOC	GW	HEAL	6	40 mL	VOA	No	HCl, pH < 2	9:45
GW-WQ5-C-R41-N1D	VOC	GW	HEAL	4	40 mL	VOA	No	HCl, pH < 2	9:53
GW-WQ5-C-R41-N2	VOC Field Blank	DI-H_2O	HEAL	4	40 mL	VOA	No	HCl, pH < 2	9:58
GW-WQ5-C-R41-N3	VOC Trip Blank	DI-H_2O	HEAL	4	40 mL	VOA	No	HCl, pH < 2	N/A; HEAL Provided
GW-WQ5-C-R41-N4	TOC	GW	HEAL	4	40 mL	VOA	No	HCl, pH < 2	10:04
GW-WQ5-C-R41-N4D	TOC	GW	HEAL	2	40 mL	VOA	No	HCl, pH < 2	10:12
GW-WQ5-C-R41-N5	Semi-VOC	GW	HEAL	6	1 Liter	Amber Glass	No	NONE	9:14
GW-WQ5-C-R41-N5D	Semi-VOC	GW	HEAL	2	1 Liter	Amber Glass	No	NONE	9:26
GW-WQ5-C-R41-N6	Metals	GW	HEAL	2	250 mL	Plastic	No	HNO_3, pH < 2	9:36
GW-WQ5-C-R41-N6D	Metals	GW	HEAL	2	250 mL	Plastic	No	HNO_3, pH < 2	9:40
GW-WQ5-C-R41-N7	General Chemistry	GW	HEAL	1	1 Liter	Plastic	No	NONE	9:31
GW-WQ5-C-R41-N7D	General Chemistry	GW	HEAL	1	1 Liter	Plastic	No	NONE	9:34
GW-WQ5-C-R41-N8	Radionuclides	GW	WIPP Lab	1	2 Liter	Plastic	Yes	HNO_3, pH < 2	10:17
GW-WQ5-C-R41-N8D	Radionuclides	GW	WIPP Lab	1	2 Liter	Plastic	Yes	HNO_3, pH < 2	10:28
GW-BU5-C-R41-N9	Radionuclides Blank	DI-H_2O	WIPP Lab	1	2 Liter	Plastic	No	HNO_3, pH < 2	10:29
GW-WQ5-C-R41-N10	HOLD	GW	RETAIN	1	2 Liter	Plastic	Yes	HNO_3, pH < 2	10:35

PRESERVATIVES

Preservative	Manufacturer	Lot #	Expiration Date
Nitric Acid, HNO_3	EP Scientific	NA-9014130	1/14/2020

FOR INFORMATION ONLY

ISSUED

Digital Leveling Log Sheet (Loop) EUS-2019-002

1. Level Person: T. Zimmerly Rod E: T. Moffatt Rod F: J. Montemez		2. Date: 5-16-19	3. DOY: 136
		4. Level S/N: 344910	
		5. WIPP M&TE ID #: DM1357	
		6. Calibration Expiration Date: Jul 28, 2019	
7. Loop #: EPA Demo dh T: -0.6806 DTot: 436.83 TBal: -1.70		8. Collimation Check: Yes ☑ No: ☐ Coll. err old = -3.2" Coll. err new = -2.1" Difference = 1.1"	
9. Start Time: 0854		10. End Time: 0925	
Weather Conditions:			
11. Sky Start:	Clear: ☐	Partly Cloudy: ☑	Overcast: ☐
Sky End:	Clear: ☐	Partly Cloudy: ☑	Overcast: ☐
12. Temperature Start:	Cold: ☐	Cool: ☐	Warm: ☑ Hot: ☐
Temperature End:	Cold: ☐	Cool: ☐	Warm: ☑ Hot: ☐
13. Wind Start:	Calm: ☐	Light: ☑	Moderate: ☐ Brisk: ☐
Wind End:	Calm: ☐	Light: ☑	Moderate: ☐ Brisk: ☐
14. Data File: EPA13619			

EUS-2019-003

- when it has to be right

Level Summary

EPA13619

05/16/2019 09:47:01

Project Information

Project name:	EPA13619
Date created:	05/16/2019 09:41:49
Application software:	LEICA Geo Office 8.3

LINE00001

Line length:	436.8340 fts
Method:	BF
Start point id:	S01
Number of stations:	6
Date/time:	02/28/2019 20:50:07
Number of observations:	12
Processing Parameters Adjustment method:	by station
Processed with Staff Corrections:	No
Height difference:	-0.0006 fts

Tolerance	**Permitted [fts]**	**Actual [fts]**	**Accepted**
Misclosure	0.0125	-0.0006	✔
Distance balance	32.8083	-1.6977	✔

Points

Point Id	Epoch	Height [fts]	Corr [fts]	Delta Hgt. [fts]	Point Class	Sd. Hgt. [fts]
S01	02/28/2019 20:50:07	500.0000	-	-	Control	-
1	02/28/2019 20:51:02	502.5350	500.0001	2.5350	Measured	0.0002 T1
	02/28/2019 20:54:56	503.2927	500.0002	0.7577	Measured	0.0001 5
	02/28/2019 20:57:52	502.8069	500.0003	-0.4858	Measured	0.0002
6	02/28/2019 21:00:11	502.1539	500.0004	-0.6531	Measured	0.0001 7
	02/28/2019 21:03:10	502.2090	500.0005	0.0551	Measured	0.0001 S01
	02/28/2019 21:11:16	500.0000	-	-2.2090	Control	-

E-DOCKET: EPA-HQ-OAR-2001-0012-0700

2019—Emplacement Inspection Report

INSPECTION OF THE
WASTE ISOLATION PILOT PLANT
May 14-16, 2019

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

December 2019

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List of Abbreviations

ANL-E	Argonne National Lab – East
BRT	"Big Red Thing" Magnesium Oxide supersack stand
CBFO	Department of Energy Carlsbad Field Office
CCA	Compliance Certification Application
CFR	Code of Federal Regulations
CH	Contact-Handled
CPR	Cellulose, Plastic, and Rubber Material
DOE	United States Department of Energy
EPA	United States Environmental Protection Agency
INL	Idaho National Laboratory
LANL	Los Alamos National Laboratory
MgO	Magnesium Oxide
NWP	Nuclear Waste Partnership
ORIA	Office of Radiation and Indoor Air
ORNL	Oak Ridge National Laboratory
RES	Regulatory and Environmental Services
RH	Remote-Handled
SCA	Shielded Container Assembly
SDDI	Salt Defense Disposal Investigation
SDI	Salt Disposal Investigation
SLB2	Standard Large Box
SNL	Sandia National Laboratories
SRS	Savannah River Site
SCA	Shield Container Assemblies
SWB	Standard Waste Box
TDOP	Ten Drum Overpacks
TRU	Transuranic Waste
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's (DOE) Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico, from May 14 to May 16, 2019, 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 part 191) on May 18, 1998. Attachment A includes the inspection plan.

The WIPP has continued to emplace the waste since the last inspection in October 2017. As scheduled, after the opening meeting, inspectors and observers went through a safety briefing and underground hazard training. During this inspection, the facility was emplacing waste in Room 3 of Panel 7 using emplacement procedures that assure worker safety in a potentially contaminated environment. Due to the extensive training required to enter potentially contaminated areas in Panel 7, the inspection team did not visit the current area of waste emplacement.

The EPA concluded that the DOE's waste 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. As noted above, 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. A review of photographs of emplaced waste provided by the site and available records provided objective evidence that waste emplacement is taking place according to procedure. The EPA additionally reviewed experiments in the WIPP underground and found that two heater tests are currently taking place. The Agency identified two concerns related to these experiments: 1) notification of startup was not provided for either of these experiments, and 2) for the canister heater, due to its location near the salt handling shaft and outside the areas designated for such experiments, explicit prior approval should have been sought by the DOE and granted by the EPA. Additionally, internal approval documents related to the experiments, when requested by the Agency, were not provided by the DOE within the 30 days allowed by §194.21(b). The failure to provide the documents is a finding of this inspection.

2.0 Scope

The purpose of this annual inspection is to verify that contact-handled (CH) and remote-handled (RH) TRU waste sent to WIPP since October 2017 has been emplaced in the underground facility in the manner specified in the DOE's Compliance Certification Application (CCA) (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 the 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 the 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 and RH TRU wastes within the repository. It also involved confirming that the WIPP can emplace the MgO backfill to fulfill certification requirements and other approvals. Finally, the EPA verified that the WIPP can maintain relevant waste handling records, including the electronic Waste Data System (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 EPA inspection team is listed 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
Harry Shah	Inspector	EPA Region 6
Ronnie Crossland	Observer	EPA Region 6
Melissa Smith	Observer	EPA Region 6
Tom Peake	Inspector	ORIA
Ingrid Rosencrantz	Inspector	ORIA
Jay Santillan	Inspector	ORIA
Joe Rustick	Observer	ORIA (Science and Technology Fellow, American Association for the Advancement of Science)

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)
Judy McLemore	RES
Natalie LaClair	RES
Michael Brown	DOE Carlsbad Field Office (CBFO)

Participant	Affiliation
Russ Patterson	CBFO
Anderson Ward	CBFO
Alton Harris	DOE Environmental Management
Becky Brown	Nuclear Waste Partnership (NWP)
Chris Luoma	NWP
Terry Batchelder	NWP
Rey Carrasco	NWP
Ed Lewis	NWP
Rob Watson	RES
Ed Picazo	RES
Ashley Urdiquez	RES
Stewart Jones	RES
Rick Salness	RES
Jerome Hernandez	RES
John Thurston	RES
Ritchie Jemenez	RES
Steve Kouba	RES

The inspection took place from May 14 through 16, 2019, at the DOE's CBFO and the WIPP facility, which is located approximately 26 miles southeast of Carlsbad, New Mexico. The opening meeting with CBFO, RES, and NWP personnel was held on the morning of May 14, 2019. 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 October 2017.

On May 14, the EPA inspectors viewed the Waste Handling Building (WHB) and associated areas, including storage of MgO backfill. On the morning of May 15, the EPA inspectors and observers visited the underground repository. The EPA inspectors viewed the areas of the repository that are accessible without extensive training, including the boundary where waste is transferred from uncontaminated equipment to a contaminated forklift for transport within contaminated areas, bulkheads restricting personnel access to the southern waste panels, mining in Panel 8, and 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.

Inspectors reviewed records documenting that waste emplacement and MgO tracking were conducted in accordance with procedures. NWP personnel answered questions from the inspection team about how waste is handled and emplaced.

Inspectors selected six containers (Table 3), and both paper and electronic records for these containers were examined for complete waste tracking and emplacement information. The inspection team presented preliminary observations at a close-out meeting on the afternoon of May 16, 2019.



Figure 1. The inspection team in the WIPP underground.

Table 3. Waste Containers Information Reviewed During Inspection

Container Number	Emplacement Location	Container Type
LASB02259	Panel 7, Room 3, Row 15, Column 3	SWB
LASB02262	Panel 7, Room 3, Row 15, Column 5	SWB
LASB02264	Panel 7, Room 3, Row 16, Column 6	SWB
LASB02165	Panel 7, Room 3, Row 16, Column 2	SWB
LASB02254	Panel 7, Room 3, Row 15, Column 5	SWB
LASB02261	Panel 7, Room 3, Row 15, Column 5	SWB

4.0 Waste Emplacement/WDS

Wastes received at the repository include CH and RH TRU wastes from Argonne National Laboratory-East (ANL-E), Bettis Atomic Power Laboratory, GE Vallecitos Nuclear Center, Lawrence Livermore National Laboratory, Sandia National Laboratory (SNL), Los Alamos National Laboratory (LANL), 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), Oak Ridge National Laboratory (ORNL), and LANL waste stored at Waste Control Specialists, LLC. CH 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), and standard large boxes (SLB2s). RH wastes from INL, ORNL, ANL-E and SRS have been emplaced in the WIPP using the 72-B canister. Additionally, since 2014, RH wastes from ANL 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.

CH waste containers are stacked in columns (waste stacks) combining SWBs, drum packs, TDOPs and SLB-2s. TDOPs and SLB-2s 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. SCAs consist of an assembly of three shielded containers, and 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 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, with each panel consisting of seven rooms (see Figure 2). At the time of inspection, the drifts leading to Panels 3 through 6 were closed using steel bulkheads. Waste emplacement was being conducted in Room 3 of Panel 7. Room 4 last received waste on 4/1/19, based on the WDS Emplacement History Overview Report for Panel 7.



Figure 2. Underground map showing emplaced waste (as of May 14, 2019) in black.

The EPA team inspected the WHB on the afternoon of May 14. Inspectors observed waste containers being unloaded for downloading and emplacement. Based on photographs provided by the site, the inspection team collected and examined the records created during waste emplacement (Figure 3). Photographs of the selected containers are in Figure 4, while Figure 5 shows the interior of the WHB, where a waste assembly was being prepared to be removed from a TRUPACT-II shipping container.

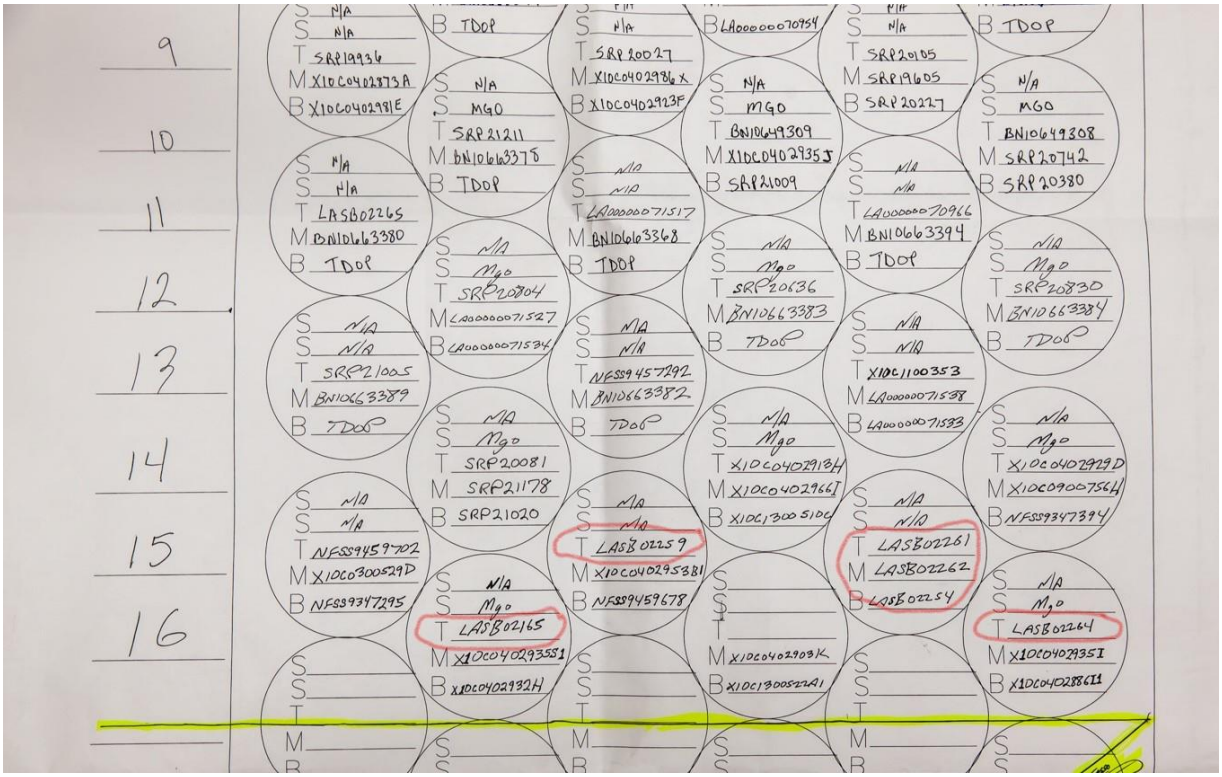

Figure 3. Underground emplacement map with selected waste.

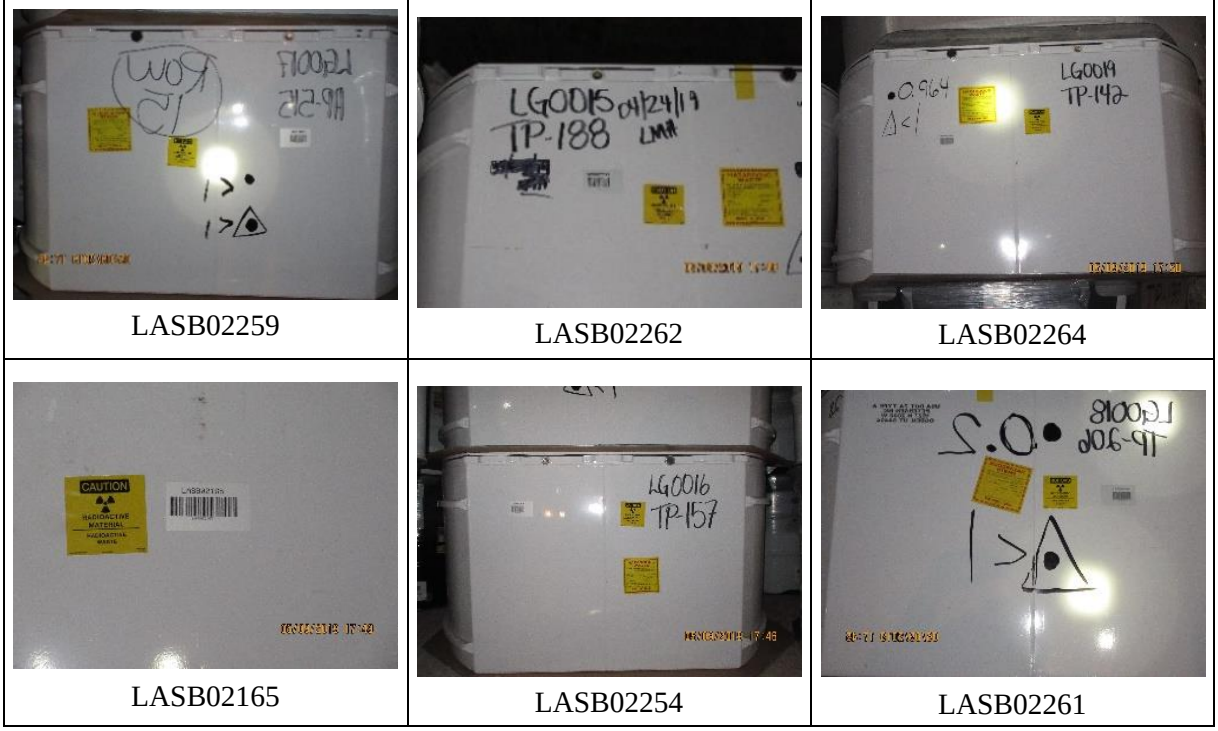

Figure 4. Selected waste containers (see Table 3 for emplacement locations).



Figure 5. The interior of the Waste Handling Building, with TRUPACT-II exterior lid being lifted.

On the afternoon of May 15 at CBFO, inspectors met with Chris Luoma, an administrator of the WDS. Container reports were produced for all six containers. All electronic records were found to contain the required information including waste stream, container contents, and status.

5.0 Magnesium Oxide Backfill

Magnesium oxide is the engineered barrier used in the repository as backfill, specified in the DOE's 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 the EPA's agreement stipulate that the 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 Department maintains an excess factor of 1.2 on a room-by-room basis. Table 4 shows the MgO excess factor for Panel 7 as documented in the WDS Emplacement History Overview Report for All Panels, dated May 15, 2019, and The Summary of Waste Emplacement Inventory Report for all panels and rooms (05/15/2019), both found in Attachment D. Inspectors observed the MgO supersack storage area (Figure 6).

Table 4. MgO-Related Information

Panel	Room	MgO (kg)	Waste (kg)	CPR (kg)	Adjusted CPR (kg)*	Excess Factor
7	3	44,898	115,337	11,774	18,256	1.49
7	4	163,265	445,712	32,442	51,641	2.12
7	5	310,204	934,715	76,159	117,322	1.77
7	6	103,401	111,871	28,853	36,419	1.9
7	7	57,692	127,168	15,900	21,926	1.76

*Adjusted CPR - plastic component multiplied by factor of 1.7



Figure 6. Storage Shed for MgO Super Sacks.

6.0 Comparison with Inventory Limits

The EPA establishes limits for certain waste components at WIPP by approving performance assessment inventory estimates (Table 5). 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 15, 2019, is 28,604,660 kg, which is 143 percent of the minimum. The other established performance limit is a maximum for CPR materials. In the original CCA, the DOE calculated 2.2×10^7 kg of CPR, establishing the EPA's limit. In the subsequent performance assessment baseline calculations, the Department added packaging materials to the calculations, and now the maximum CPR limit for WIPP is 2.4×10^7 kg. The CPR values are tracked per container, and the total CPR (as of May 15, 2019) is 9,060,737 kg, or 37.8 percent of the limiting value.

The Summary of Waste Emplacement Inventory Report for all panels and rooms (Attachment D, as of May 15, 2019) provided data for emplaced waste, including total activities of the ten EPA-tracked radionuclides,[1] total weights of ferrous and non-ferrous metals, and the CPR/MgO balance by room.

Table 5. Emplaced Materials as of May 15, 2019

Material Type	Weight (kg)	Limiting Value (kg)	2019	2017	2014	2013	2012	2011	2010	2009
CPR	9,060,737	24,000,000 (max)	37.8%	37.3%	37.1%	36.3%	34.3%	32.3%	29.9%	26.3%
Ferrous Metal	28,604,660	20,000,000 (min)	143%	139%	138%	132%	123%	113%	87.5%	87.5%
Non-Ferrous Metal	445,076	N/A	-	-	-	-	-	-	-	-
Other Material*	14,622,271	N/A	-	-	-	-	-	-	-	-

* Other Material reflects inorganic material and metal alloy

[1] The radionuclide inventory emplaced at 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 the EPA's Monitoring inspection report.

The WIPP Land Withdrawal Act of 1992 limits the total waste volume to no more than 176,000 cubic meters (6.2 million cubic feet) and the total activity of the RH waste to 5.1 million curies. The emplaced waste as of May 15, 2019, is 67,831.45 cubic meters or 2,393,606 cubic feet. The emplaced waste is 38.6% of the maximum allowed. The RH activity as of May 15, 2019 according to the WDS Nuclide Report is 24,070 curies, which is 0.47% of the maximum RH activity allowed.

7.0 Heater Experiments

The WIPP facility provides opportunities to perform certain scientific experiments that cannot be performed at the surface. The 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 in the underground. A March 11, 2003 letter [Frank Marcinowski (EPA) to Ines Triay, (CBFO)] formally approved a process by which experiments that meet certain criteria may be placed in the underground without explicit prior approval by the EPA. Key requirements of this streamlined process are that the EPA must be provided notification three months before starting an experiment, experiments must not alter ventilation or introduce new hazards, and must take place in designated areas.

Experiments using heaters to study the effects of heat-generating radioactive waste on salt (termed the Salt Disposal Investigations, or SDI) were proposed in 2011. Because of the need to mine dedicated drifts for the experiment, the proposal was submitted as a planned change, and in a November 17, 2011 letter [Jonathan Edwards (EPA) to Ed Ziemianski (CBFO)] the EPA approved the mining phase of experiments involving salt heaters, and stated that "The EPA will provide a decision on the heater tests once we receive and review the final heater test design." Additional correspondence from the DOE in 2012 and 2013 proposed different variations of the test. In early 2014, funding for the experiments was withdrawn.

After learning through publicly available information that heater experiments were taking place in the WIPP underground, the Agency sent a letter dated March 26, 2019 to CBFO, requesting information on any such experiments, and directing that any unapproved experiments be discontinued pending an EPA review. CBFO provided a letter response dated April 30, 2019.

As part of the waste emplacement inspection, the EPA inspection team requested to view the heater experiments in the underground. During the underground portion of the inspection on May 15, SNL/LANL personnel showed the inspectors the set of experiments termed the "small-diameter borehole heating tests" (hereafter, "borehole tests") in the northern experimental area in the vicinity of E-540 and N-940 (and in existing boreholes in E-140). See Figure 7.

Upon return to the surface and reviewing the CBFO April 30, 2019 letter, the EPA inspectors noted that an additional experiment, termed the "Small-scale prototype canister (singular) heating tests" and hereafter referred to as the "canister test" was taking place in the underground at W-620, N-150. During the inspection, the EPA inspectors confirmed with the DOE personnel that the canister test was ongoing in the immediate vicinity of the Air Intake Shaft (see Figure 7). At the closing meeting on May 16, the inspection team indicated that the issues related to the heater experiment remained open, and requested the site's internal experimental approval documents, cited by the 2017 Annual Change Report. When the site contractors provided

documentation requested during the inspection on June 6, 2019, documents related to the experiments were not released by CBFO. These documents were eventually provided via a July 17, 2019 letter from Mike Brown to Tom Peake.

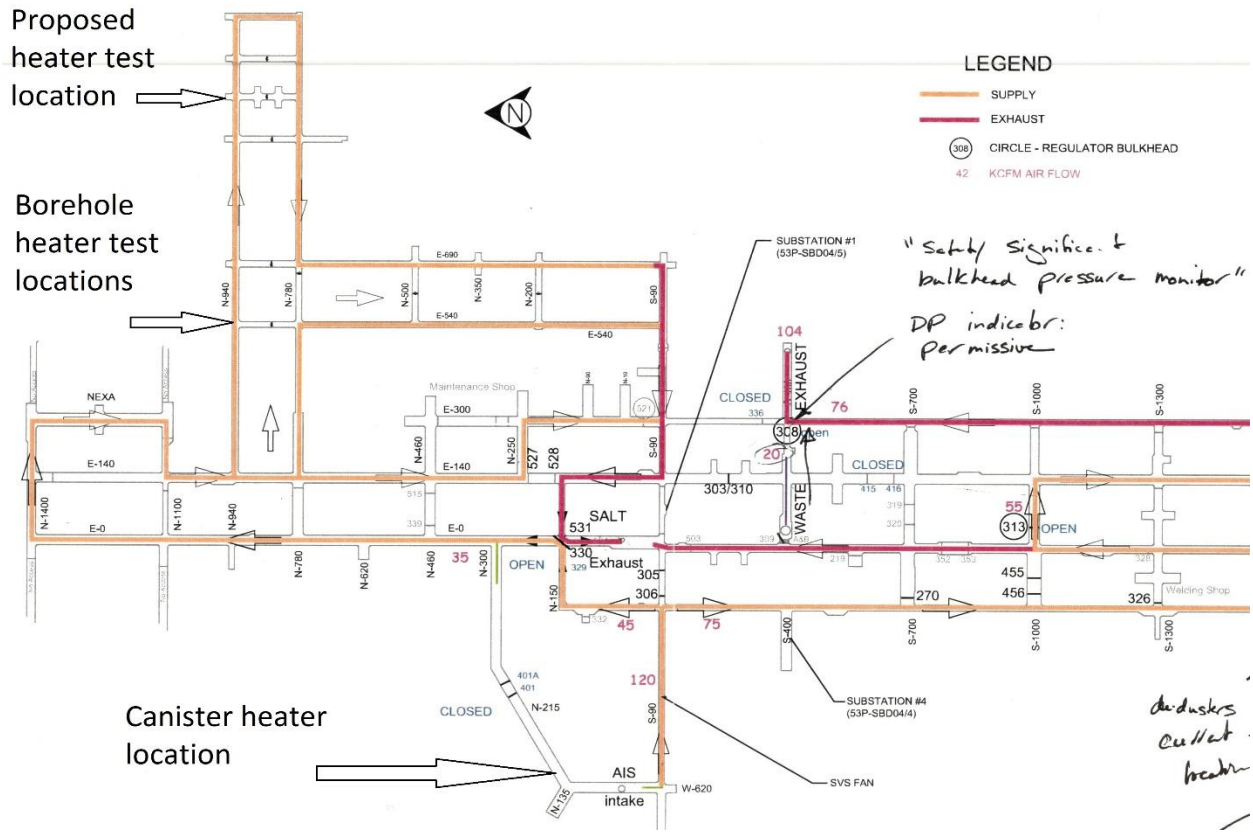

Figure 7. Locations of proposed and actual heater experiments.

The EPA has identified three significant compliance issues related to the heater tests taking place in the WIPP facility.

1) The EPA was not provided notification of startup, contrary to both the requirements of the generic 2003 letter and the 2011 letter from Jon Edwards indicating that the Agency would review and approve specific plans prior to the conduct of heating experiments. Based on the information provided to the EPA as part of the inspection cycle, the Agency agrees that the borehole heater tests qualify for the streamlined process outlined by the 2003 letter, but prior notification was required. The EPA determines that this is an inspection concern, because failure to adhere to the policy of notification set by the 2003 letter could have led to violations under §194.14(b), which requires a complete description of the design of the disposal system.

2) The canister heater test required explicit approval by the EPA, which was neither sought nor granted before the experiment began. Under the policy set by the 2003 letter, experiments only qualify for streamlined approval if they take place in the northern experimental area, Room Q, or the core storage gallery. The canister is located outside of these areas, at the base of the air intake shaft, evidently because access to the areas designated for heater tests had not been restored at the time the experiment began. The April 30, 2019 letter from CBFO cited the December 12,

2013 letter "Notification of Intent to Begin the Salt Defense Disposal Investigation (SDDI)" [Jose Franco (CBFO) to Jonathan Edwards (EPA)] to support the conclusion that the effects of the canister heater test would not affect facility operations, but 2013 test specifications indicated that testing will take place in drifts mined specifically for the purpose, at approximately E-1150 (designated as "Proposed Heater Test Location" on Figure 7). Section 2.3.1 states that "Some of the primary considerations to the exact placement of the test within the WIPP are: a) the test must not interfere with WIPP operations, b) the test should be located to the north, as far from waste handling operations as possible, and outside the shaft pillar area, c) the test should not interfere with other existing scientific testing occurring in the northern part of the facility, and d) the test should be as close to the WIPP exhaust shaft as feasible. All of these criteria are met with the design and current construction of the SDI Research Area and the placement of this test within it." The EPA lacked adequate information to determine whether this experiment was compatible with the design of the disposal system approved in the most recent facility certification. Additional information that addressed the Agency's checklist for experimental approval was provided by CBFO via email on October 2, 2019. Upon reviewing this information, the EPA was able to concur that the experiment is unlikely to interfere with waste emplacement or create a hazard and was able to issue its approval to continue the experiment. Placement of this experiment outside the planned area without EPA approval is a significant concern and could have led to violations under §194.14(b).

3) During the inspection, inspectors verbally requested copies of documents related to the internal approval of these experiments that were cited in the 2017 Annual Change Report and these requests were documented by DOE contractor staff. CBFO did not deliver the documents for two months following their request by the EPA. This is a violation of 194.21(b), which requires that records be available immediately, or within 30 days of a request if they are not immediately available. It is an inspection finding.

A list of the correspondences between the EPA and the DOE regarding the heater tests since 2003 can be found in Attachment D.

8.0 Conclusions

Using the checklist contained in Attachment B, the inspectors reviewed recovery operations, NWP procedures, 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 EPA's review of the documentation associated with the underground heater experiments identified that per EPA's 2003 and 2011 letters, DOE should have sought EPA approval of the canister heater test, resulting in an inspection concern. DOE should have provided notification of each test to the EPA before the experiments commenced, resulting in an additional inspection concern. Requested documents related to the experiments were not provided to the EPA in the amount of time allowed by the regulation, resulting in one inspection finding.

Attachment A: EPA WIPP Waste Emplacement Inspection Plan for 2019

Purpose:
The purpose of this inspection is to verify that waste is emplaced in the WIPP underground disposal facility in the manner specified in the CCA (EPA Air Docket A-93-02, Item II-G-01) and other approvals. The EPA 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 includes the site's ability to receive, process, and emplace transuranic wastes within the repository; the use of MgO backfill in appropriate amounts to fulfill the DOE commitments and requirements; and the maintenance of relevant records including the electronic WIPP 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 WHB, and review waste tracking in the WDS. Prior to the 2014 incidents that restricted access to the underground, the EPA would visually inspect the active waste emplacement face and collect information on recently-emplaced waste containers that could be verified during record reviews. Physically inspecting the waste face is not practical so long as waste emplacement occurs in potentially contaminated areas, but the EPA still must collect objective evidence that waste emplacement is occurring as planned. The site has committed to provide recent, time-stamped photographs of active waste emplacement face with legible container numbers to support this inspection.

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:
The EPA expects to complete the on-site portion of its inspection in three days, with an opening meeting on the first day and a closeout session to complete the inspection.

Expected Dates: May 14-16, 2019.

Documents for Review:
The 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.

Attachment B: Summary Totals Waste Data System Nuclide Report Through May 15, 2019

Panel: ALL Room: ALL

Radionuclide		**Repository Contact-Handled Activity (Ci)**	**Repository Remote-Handled Activity (Ci)**	**Total Repository Activity (Ci)**
AM-241	Americium 241	**2.639E5**	**6.213E2**	**2.645E5**
CS-137	Cesium 137	**1.792E1**	**1.445E4**	**1.447E4**
PU-238	Plutonium 238	**4.847E5**	**7.296E2**	**4.855E5**
PU-239	Plutonium 239	**3.367E5**	**3.842E2**	**3.371E5**
PU-240	Plutonium 240	**8.324E4**	**2.803E2**	**8.352E4**
PU-242	Plutonium 242	**2.775E1**	**3.824E-1**	**2.813E1**
SR-90	Strontium 90	**7.538E1**	**7.605E3**	**7.68E3**
U-233	Uranium 233	**6.647E0**	**3.848E-1**	**7.032E0**
U-234	Uranium 234	**8.73E1**	**1.141E0**	**8.844E1**
U-238	Uranium 238	**1.804E1**	**3.918E-2**	**1.808E1**
Total		**1.169E6**	**2.407E4**	**1.193E6**

Attachment C: EPA Emplacement Inspection Checklist, May 14-16, 2019

	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?	The 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 the 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	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 3 of Panel 7. Photographs, paper emplacement maps, interviews, and Waste Data System (WDS) records provided 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.	Yes. *Transuranic (TRU) Waste Receipt* WP 08-NT3020 (Rev. 28-FR2, dated 03/31/17) describes the process. Records produced are the Uniform Hazardous Waste Manifest, TRU Waste Receipt Checklist, Shipment Summary Report and Radiological Survey Report. The EPA reviewed the records and found them to be adequate. Selected Containers: **CH Waste** Container Numbers: LASB02259 LASB02262 LASB02264 LASB02165 LASB02254 LASB02261	Satisfactory

4	Is the 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 WP 05-WH1025 (Rev. 24-FR1, dated 08/20/18), 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?	Yes. Since the October 2017 inspections, 3.78 cubic meters of RH containers were placed in Shielded Container Assemblies (SCAs) in Room 4 (Emplacement History Overview Report for Panel 7; 6/11/2019). There has been no additional RH waste emplacement in any of the other rooms in Panel 7.	Satisfactory

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? Content of RH canisters. No RH in storage; access to emplaced RH restricted.	Yes. See the *Waste Emplacement Inventory Report for Panel 7, Room 4* (6/11/2019) and *Emplacement History Overview Report for Panel 7* (6/11/2019).	Satisfactory
8	Content of RH canisters.	N/A. No RH in storage; access to emplaced RH restricted. Since the October 2017 inspections, RH waste has only been placed in SCAs, and not RH canisters.	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, *Waste Emplacement Inventory Report for Panel 7, Room 4* (6/11/2019), *and Emplacement History Overview Report for Panel 7* (6/11/2019). Yes.	Satisfactory
10	Are RH boreholes closed properly? (Note: also see Item 9 for tracking of RH waste in the underground.)	N/A. Access to RH waste emplacement restricted. No RH waste has been emplaced in boreholes since 2014, with SCAs used for RH waste in Room 4. Each SCA is placed on the floor of the room, similar to CH waste (*Emplacement History Overview Report for Panel 7*; 6/11/2019).	N/A
11	Is a photographic record made of the RH canister number during emplacement and retained in the permanent record?	N/A.	N/A

	Questions: Procedures	Comments and Objective Evidence	Results
12	Do the DOE procedures reflect an MgO safety factor to 1.2?	Yes. WP 05-WH1025 (Rev. 24-FR1, dated 08/20/18), CH Waste Downloading and Emplacement, 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 (*Emplacement History Overview Report for Panel 7*; 6/11/2019).	Satisfactory
13	Are CPR materials and MgO calculated and tracked on a room-by-room basis?	Yes. WP 05-WH1025 (Rev. 24-FR1, dated 08/20/18), CH Waste Downloading and Emplacement, 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. 6, dated 04/08/19), MgO Sample Records Management set forth analytical and document management procedures to verify that each shipment of MgO maintains a 96 +/- 2% reactivity. Inspector selected a random super sack (E1235) for verification. Inspector received the documentation on analysis of shipment from manufacturer, chain of custody record for verification and generated the EPA MgO Report document.	Satisfactory
15	Is the acceptance of the MgO backfill material from the supplier documented?	Yes. WP 05-WH1105 (Rev. 6, dated 04/08/19), 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, dated 10/04/17), Attachment 1, Special Requirements for Additional MgO. Section 5.3 of WP 05-WH1025 (Rev. 24-FR1, dated 08/20/18) 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. 24-FR1, dated 08/20/18), CH Waste Downloading and Emplacement, Attachment 3, Super Sack/BRT ["big red thing"] Emplacement Data Sheet and WP 05-WH1058 (Rev. 21, dated 01/10/19), 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.	Yes. Emergency procedures include: WP 02-EC3506, Rev. 10, *Environmental Incident Reporting* is the Management Control Procedure for reporting releases and includes statutory requirement charts for notifications and decision flowcharts. WP 05-WH1025 (Rev. 24-FR1, dated 08/20/18), *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." DOE/WIPP-17-3573 (Rev. 0, dated 02/14/18), *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. 6, dated 01/31/19), *Waste Handler Operator Event Response* includes alarm, alert and exit procedures. WP 12-ER3906, (Rev. 19-FR1, dated 06/08/18), *Categorization and Classification of Operational Emergencies* includes tables of procedures for emergency notifications and classification of events. WP 12-HP4000 (Rev. 10-FR2, dated 11/14/16), *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 (Rev. 22, dated 04/30/18).	Satisfactory
	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. The 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.	Satisfactory
22	Review a Container Query. Does this report adequately record the Waste Stream Profile information?	Yes. Inspector found the information in the Overpack data report query.	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 receipt and disposal locations of containers?	Yes. See Item 22.	Satisfactory
25	Is the 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. The Summary of Waste Emplacement Report for all panels and rooms, dated May 15, 2019 shows that the excess factor of minimum 1.2 is maintained on a room-by-room basis. The EPA inspectors verified that the calculated excess factors are reported.	Satisfactory

Attachment D: Documents Reviewed

ID	Document Title	Subject Matter	Source
Referenced Reports			
WP 08-NT3020 (Rev. 28-FR2, 03/31/17)	TRU Waste Receipt	This procedure provides instructions for receipt of mixed or non-mixed TRU waste shipments at the WIPP.	DOE/WIPP
WP 05-WH1025 (Rev. 24-FR1, 08/20/18)	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
D-0101 (Rev. 10, 09/13/17)	Specification for Prepackaged MgO Backfill	Technical specification covering the definition of the pre-packaged 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
WP 05-WH1105 (Rev. 6, 04/08/19)	Magnesium Oxide Sample Records Management	This procedure provides the administrative guidance for NWP Operations personnel to maintain the records associated with MgO sampling activities.	DOE/WIPP
WP 05–WH.02 (Rev. 3, 10/04/17)	WIPP Waste Handling Operations WDS User's Manual	WIPP Waste Handling Operations WWIS Users Manual. For use by Waste Handling Technicians and Waste Handling Engineers.	DOE/WIPP
WP 05-WH1058 (Rev. 21, 01/10/19)	CH Waste Handling Abnormal Operations	This procedure provides instructions for abnormal operations that may be needed for CH Waste Handling.	DOE/WIPP

ID	Document Title	Subject Matter	Source
WP 02-EC3506 (Rev. 10, 10/5/16)	Environmental Incident Reporting - Management Control Procedure	This procedure establishes actions to be performed to ensure that immediate notification and follow-up reports are made to external agencies within required time frames for the following incidents: - Releases or potential releases of hazardous substances or hazardous waste - Releases or potential releases of radionuclides from: • Waste being emplaced or emplaced waste that can lead to exceeding the expected committed doses, per Title 40 *Code of Federal Regulations* (CFR) 191.15 • Waste being emplaced or emplaced waste that causes concentrations of radionuclides or estimated doses due to radionuclides in underground sources of drinking water in the accessible environment to exceed the limits, per 40 CFR Part 191, Subpart C - Polychlorinated Biphenyl (PCB) non-compliance	DOE/WIPP
DOE/WIPP-17-3573 (Rev. 0, 02/14/18)	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

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WP 05-WH4401 (Rev. 6, 01/31/19)	Waste Handling Operator Event Response	Emergency Procedure for CAM alarms, fire, smoke, toxic gas, structural issues, or spill/release.	DOE/WIPP
WP 12-ER3906 (Rev. 19-FR1, 06/08/18)	Categorization and Classification - Emergency Operating Procedure	This procedure provides guidance to the Facility Shift Manager (FSM), Crisis Manager (CM), or designee(s), on how to Categorize and Classify events that occur at the Waste Isolation Pilot Plant (WIPP) Site, Skeen Whitlock Building, Cascades, or the Records Center, in accordance with DOE 151.1C, *Comprehensive Emergency Management.*	DOE/WIPP
WP 12-HP4000 (Rev. 10-FR2, 11/14/16)	Emergency Radiological Control Responses - Alarm Response Procedure	Emergency and Alarm Personnel Response Procedure.	DOE/WIPP
WP 12-5 (Rev. 22, 04/30/18)	Waste Isolation Pilot Plant Radiation Safety Manual	This manual discusses the radiological protection program at the Waste Isolation Pilot Plant.	DOE/WIPP
None	Annual Change Report 2016/2017	The DOE provides an annual report each November of applicable changes. This annual report informs the EPA of changes to information in the most recent compliance application. Significant planned changes must be reported to the EPA prior to implementation by the DOE.	DOE/WIPP

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Generated Documents			
Emplacement History Overview Report for Panel 7 (6/11/2019)	WDS Emplacement History Overview Report for Panel 7		DOE/WIPP
Summary of Waste Emplacement Inventory Report for Panel 7, Room 4 (6/11/2019)	Summary of Waste Emplacement Inventory Report; Panel 7 Room 4		DOE/WIPP
Summary of Waste Emplacement Inventory Report for All Panels and Rooms (5/15/2019)	WDS Emplacement History Overview Report for All Panels		DOE/WIPP
MgO Excess Factor Report, Panel 7 Room 4 (5/1/2019)	MgO Excess Factor Report for Panel 7 Room 4		DOE/WIPP
EPA MgO Report for E1235 (10/15/2018)	EPA MgO Report		DOE/WIPP
Letters			
Frank Marcinowski (EPA) to Ines Triay (CBFO), March 11, 2003		Response to a letter from CBFO in December 2002 requesting general approval to allow experiments at the WIPP if they are not directly related to the disposal of TRU waste and meet certain criteria.	EPA
Ed Ziemianski (CBFO) to Jonathan Edwards (EPA), August 11, 2011	"Notification of Intent to Begin the Salt Disposal Investigations"		DOE

ID	Document Title	Subject Matter	Source
Jonathan Edwards (EPA) to Ed Ziemianski (CBFO), Nov 17, 2011	Response to August 11, 2011 Planned Change Notice to EPA concerning the SDI project	Due to the need to mine dedicated drifts for the SDI experiment, a proposal was submitted by CBFO as a planned change notice. This Letter is a response to the notice.	EPA
Jose Franco (CBFO) to David Martin (New Mexico Environment Department), June 13, 2012	"Conceptual Plan for Salt Defense Disposal Investigations (SDDI) for the Disposal of DOE-EM Managed Waste"		DOE
Jose Franco (CBFO) to Jonathan Edwards (EPA), June 20, 2012	"Notification of Revisions to the Salt Disposal Investigations Testing Concepts"		DOE
Jose Franco (CBFO) to Jonathan Edwards (EPA), December 12, 2013	"Notification of Intent to Begin the Salt Defense Disposal Investigation"		DOE
Lee Veal (EPA) to Todd Shrader (CBFO), March 26, 2019	"Heater Tests Conducted in the Waste Isolation Pilot Plant Underground without Appropriate Notification to the EPA"	Letter requested information on any heater experiments and directed that any unapproved experiments be discontinued pending an EPA review.	EPA
Todd Shrader (CBFO) to Lee Veal (EPA), April 30, 2019	"Response to the EPA Letter dated March 26, 2019 and Status on the Salt Disposal Investigation and Salt Defense Disposal		DOE

ID	Document Title	Subject Matter	Source
	Investigation at the Waste Isolation Pilot Plant"		
Kirk Lachman (CBFO) to Lee Veal (EPA) [email], October 2, 2019	"WIPP experiment follow-up - Completed Checklist and References"		DOE
Lee Veal (EPA) to Kirk Lachman (CBFO), November 4, 2019		The EPA was able to concur after reviewing material provided by CBFO that the current canister heater experiment is unlikely to interfere with waste emplacement or create a hazard and was able to issue its approval to continue the experiment.	EPA