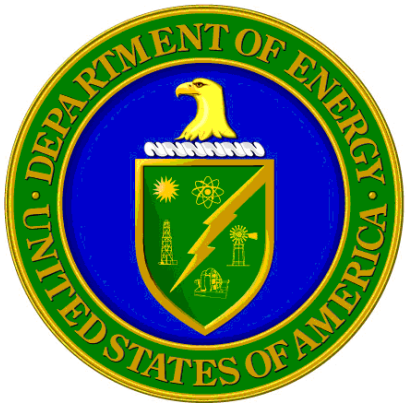
Waste Isolation Pilot Plant
Annual Change Report 2022/2023

DOE/WIPP-23-2500, Rev. 0

July 1, 2022, to June 30, 2023



November 2023

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ACRONYMS AND ABBREVIATIONS

AMWTP	Advanced Mixed Waste Treatment Project
ASME	American Society of Mechanical Engineers
°C	degrees Celsius
CAR	Corrective Action Request
CBFO	Carlsbad Field Office
CCO	criticality control overpack
CCO-EDP	CCO prepared using the Enhanced Dilution Process
CCO-S	CCO prepared using the Sandia Process
CCP	Central Characterization Program
CFR	Code of Federal Regulations
CH	contact-handled
CHTES	CH-TRAMPAC Maintenance Application
CPR	cellulose, plastic, and rubber
CRA	Compliance Recertification Application
CTMA	CH-TRAMPAC Evaluation Software
DOE	U.S. Department of Energy
Eh	redox potential
EPA	U.S. Environmental Protection Agency
ERDA	Energy Research and Development Agency
FY	fiscal year
HPC	high-performance computing
INL	Idaho National Laboratory
kg	kilogram
LANL	Los Alamos National Laboratory
LBRE	Low Background Radiation Experiment
LWA	Land Withdrawal Act
m^3	cubic meters
MgO	magnesium oxide
MOC	Management and Operating Contractor
NDA	non-destructive assay
NMSU	New Mexico State University
NQA	Nuclear Quality Assurance
NWP	Nuclear Waste Partnership, LLC
ORNL	Oak Ridge National Laboratory
ORP	oxidation reduction potential
POC	pipe overpack container
QA	Quality Assurance
QAPD	Quality Assurance Program Document

RH	remote-handled
SNL	Sandia National Laboratories
SRS	Savannah River Site
TRAMPAC	CH-TRU Authorized Methods for Payload Control
TRU	transuranic
UV-Visible/NIR	Ultraviolet-Visible Near Infrared
WDS	Waste Data System
WIPP	Waste Isolation Pilot Plant
WP	WIPP Procedure

1.0 Introduction

Title 40 of the Code of Federal Regulations (CFR) Part 194, *Criteria for the Certification and Re-Certification of the Waste Isolation Pilot Plant's Compliance with 40 CFR Part 191 Disposal Regulations* (EPA 1996), requires the U.S. Department of Energy (DOE) to provide information on changes, both significant and non-significant, in conditions or activities pertaining to the Waste Isolation Pilot Plant (WIPP) disposal system since the most recent compliance recertification application. This report provides the summary of the non-significant changes as pursuant to 40 CFR §194.4(b)(4), which states:

> "Not later than six months after the Administrator issues a certification, and at least annually thereafter, the Department shall report to the Administrator, in writing, any changes in conditions or activities pertaining to the disposal system that were not required to be reported by paragraph (b)(3) of this section and that differ from information contained in the most recent compliance application."

Each November, the DOE provides the U.S. Environmental Protection Agency (EPA) with a report describing relevant changes to information contained in the most recent compliance application (i.e., the 2019 Compliance Recertification Application (DOE 2019)). The reporting period for the annual report is July 1, 2022, to June 30, 2023.

In a June 17, 2002, letter to the DOE, the EPA provided examples of routine operations and maintenance activities for the WIPP facility that are considered to be non-significant to the compliance certification/recertification (Marcinowski 2002c). Examples of these activities include mining a ventilation overcast; installation of equipment/instruments related to geomechanical and ground-water monitoring, as required by the EPA; and installation of ground-control monitoring devices.

Proposed changes in WIPP facility activities or conditions are reviewed to determine if 40 CFR § 194.4(b)(4) reporting is necessary. The annual report summarizes the items identified as requiring reporting under 40 CFR §194.4(b)(4) (EPA 1996). Most of the items reported are inspections, reports, and modifications to written plans and procedures for WIPP facility operations.

Significant planned changes are reported by the DOE to the EPA, via Planned Change Notifications or Planned Change Requests, prior to implementation. Significant changes include those that would result in crucial information contained in the compliance certification/recertification no longer being valid or would result in noncompliance with the requirements of 40 CFR Part 191 and the criteria in 40 CFR Part 194. Planned changes are submitted on an individual basis. Significant unplanned changes are reported to the EPA within 24 hours, or 10 days, in accordance with 40 CFR §194.4(b)(3) (EPA 1996).

This report describes each non-significant change that was made during the reporting period of

July 1, 2022, through June 30, 2023, as well as additional information requested by the EPA, in seven tables described below. Conditions, activities, or information reportable per 40 CFR §194.4(b)(4) are as follows:

- Table 1, *Changes in WIPP Conditions or Activities Reportable Under 40 CFR §194.4(b)(4) during the Reporting Period*, documents EPA and DOE interactions during the reporting period, with a high-level summary of each correspondence.

- Table 2, *Procedure/Plan Revision during the Reporting Period*, documents changes to relevant plans and procedures during the reporting period.

- Table 3, *Waste Emplacement Summary Report during the Reporting Period*, documents the transuranic (TRU) waste disposed inventory for the WIPP waste parameters. The summary provides the total emplaced inventory in the repository as of March 31, 2023.

- Table 4, *Performance Assessment, Software, and Hardware Changes during the Reporting Period*, documents the changes to relevant codes, software, and hardware that have occurred during the reporting period.

This report also includes additional information, not required by regulation, which has been requested by the EPA, as described below:

- Table 5, *Passive Institutional Controls Activity during the Reporting Period*, documents activities applicable to the development of Passive Institutional Controls. This table was added at the request of the EPA (Reyes 2008a).

- Table 6, *EPA Waste Characterization Inspections during the Reporting Period*, documents inspections performed by the EPA pertaining to Tier 1 changes to the baseline approvals at TRU waste generator/storage sites. This table was added to the Annual Change Report at the request of the EPA during the EPA/DOE management meeting held on July 29, 2010.

- Table 7, *Quality Assurance Assessments by Site/Organization during the Reporting Period*, documents assessments (i.e., audits and surveillances) performed to evaluate the adequacy and implementation of WIPP participant organizations' quality assurance programs. This table was added to the Annual Change Report at the request of the EPA during the EPA/DOE management meeting held on July 29, 2010, and has since evolved to include all pertinent assessment information.

In response to the EPA's requests and feedback, this report incorporates suggestions and guidance for capturing the appropriate level of detail and the layout of information with respect to the WIPP certification/recertification criteria. This report does not include

administrative changes to procedures, such as editorial changes, reformatting, correcting references, correcting inconsistency within a procedure, and other changes that do not alter the substance or intent of the document.

2.0 Conditions, Activities, or Information Reportable per 40 CFR §194.4(b)(4)

Table 1. Changes in WIPP Conditions or Activities Reportable Under 40 CFR §194.4(b)(4) during the Reporting Period

Regulatory Requirements	Implementing Document or Activity that Changed	Description of the Change
40 CFR §194.4(b)(3), Conditions of Compliance Certification	Planned Change Notices and Planned Change Requests	EPA to DOE, March 8, 2023 Response to the DOE's June 22, 2018, Planned Change Notice notifying the EPA of a modification to the method used to track the volume of TRU waste destined for emplacement in the WIPP (EPA 2023a). DOE to EPA, April 25, 2023 Planned change notice to the EPA for the addition of four shielded container variants as new payload containers for the emplacement of remote-handled (RH) TRU waste in the WIPP facility (DOE 2023a).
40 CFR §194.4(b)(4), Conditions of Compliance Certification	2020/2021 Annual Change Report	DOE to EPA, November 3, 2022 Transmittal of the 2021/2022 Annual Change Report (DOE 2022a).
40 CFR §194.8, Approval Process for Waste Shipment from Waste Generator Sites for Disposal at the WIPP	Waste Generator Site Certification and Tier 1 Evaluations	See Table 6, *EPA Waste Characterization Inspections during the Reporting Period*
40 CFR §194.8, Approval Process for Waste Shipment from Waste Generator Sites for Disposal at the WIPP	Tier 2 Reports	EPA to DOE, July 29, 2022 Response to Fiscal Year (FY) 2021 4th quarter and FY 2022 1st and 2nd quarter Tier 2 reports (EPA 2022). DOE to EPA, August 23, 2022

Regulatory Requirements	Implementing Document or Activity that Changed	Description of the Change
		Notification of Tier 2 changes for Advanced Mixed Waste Treatment Project (AMWTP) and Central Characterization Program (CCP) activities for FY 2022 3rd quarter (DOE 2022b). DOE to EPA, October 4, 2022 Response to EPA request for documents from the DOE notification of Tier 2 changes for FY 2021 4th quarter and FY 2022 1st and 2nd quarters (DOE 2022c). DOE to EPA, October 31, 2022 Notification of Tier 2 changes for AMWTP and CCP activities for FY 2022 4th quarter (DOE 2022d). EPA to DOE, January 13, 2023 Response to FY 2022 3rd and 4th quarter Tier 2 reports and request for documents (EPA 2023a). DOE to EPA, January 23, 2023 Response to EPA request for documents from the DOE notification of Tier 2 changes for FY 2022 3rd and 4th quarters (DOE 2023b). DOE to EPA, February 22, 2023 Notification of Tier 2 changes for AMWTP and CCP activities for FY 2023 1st quarter (DOE 2023c). EPA to DOE, May 23, 2023

Regulatory Requirements	Implementing Document or Activity that Changed	Description of the Change
		Response to FY 2023 1st quarter Tier 2 report (EPA 2023c).
40 CFR §194.14(b)(4), Design of the Disposal System	Status of Experiments in the WIPP Underground	**Low Background Radiation Experiment (LBRE)** This research (surface and underground) consists of growing, handling, culturing, and testing organisms in a low background radiation environment. July 1, 2022, to September 30, 2022 For quarter one, New Mexico State University (NMSU) conducted LBREs for the biological effects on the bacteria *Escherichia coli*. The experiments started on July 12, 2022, and concluded on September 28, 2022. October 1, 2022, to December 31, 2022 For quarter two, NMSU did not conduct any research at the WIPP facility; NMSU will return in the summer of 2023. January 1, 2023, to March 31, 2023 For quarter three, NMSU did not conduct any research at the WIPP facility; NMSU will return in the summer of 2023. April 1, 2023, to June 30, 2023 For quarter four, NMSU did not conduct any research at the

Regulatory Requirements	Implementing Document or Activity that Changed	Description of the Change
		WIPP facility; NMSU will return in July 2023 to conduct testing. **Salt Disposal Investigations/Salt Defense Disposal Investigations** Brine Availability Test in Salt 2.0 equipment currently operating includes LI-COR gas analyzer, electrical resistivity tomography, fiber optic, linear variable differential transformer, acoustic emission, gas analyzer, Picarro isotopic water analyzer, thermocouples, resistance temperature detectors, temperature and relative humidity probes, strain gages, mass flow controllers, pressure transducers, Drierite™ brine outflow measurement canisters, and environmental monitoring instrumentation. <u>July 1, 2022, to September 30, 2022</u> Brine sampling of the sample borehole was conducted one to two times per month. Permeability and tracer gas testing of the heated deuterium borehole is ongoing. The gas used for the test is argon. Phase 1 heating cycle occurred from July 20, 2022, to August 10, 2022, with a temperature set point of 90 degrees Celsius (°C).

Regulatory Requirements	Implementing Document or Activity that Changed	Description of the Change
		Phase 2 heating cycle occurred from September 4, 2022, to September 28, 2022, with a temperature set point of 115 °C. <u>October 1, 2022, to December 31, 2022</u> Phase 3 heating cycle from October 12, 2022, to November 2, 2022, with a temperature set point of 130 °C. Phase 4 heating cycle from November 16, 2022, to November 17, 2022, with a temperature set point of 145 °C. <u>January 1, 2023, to March 31, 2023</u> Brine sampling of the sample borehole was conducted one to two times per month. Permeability and tracer gas testing of the heated deuterium borehole is ongoing. The gas used for the test is argon. Phase 5 heating cycle occurred from March 8, 2023, to March 29, 2023, with a temperature set point of 140 °C. <u>April 1, 2023, to June 30, 2023</u> Brine sampling of the sample borehole was conducted one to two times per month.

Regulatory Requirements	Implementing Document or Activity that Changed	Description of the Change
		Permeability and tracer gas testing of the heated deuterium borehole is ongoing. No heating cycles were performed during quarter four.
40 CFR §194.21, Inspections	WIPP Facility Inspections	The EPA conducted inspections at the WIPP facility, including both the surface and underground facilities, on May 16–18, 2023.
40 CFR §194.22, Quality Assurance	Quality Assurance Audit	See Table 7: *Quality Assurance Assessments by Site/Organization during the Reporting Period*
40 CFR §194.22(a), Quality Assurance	Carlsbad Field Office (CBFO) Quality Assurance Program Document	None to report
40 CFR §194.23, Models and Computer Codes	Performance Assessment, Software, and Hardware Changes	See Table 4: *Performance Assessment, Software, and Hardware Changes during the Reporting Period*
40 CFR §194.24(a) – (c)	Waste Characterization	See Table 3: *Waste Emplacement Summary during the Reporting Period* Also see: DOE/TRU-22-3425, *Annual Transuranic Waste Inventory Report – 2022* (DOE, 2022e)
40 CFR §194.25	Future State Assumptions	None to report
40 CFR §194.26	Expert Judgement	None to report
40 CFR §194.27	Peer Review	None to report
40 CFR §194.31	Application of Release Limits	None to report
40 CFR §194.32	Scope of Performance Assessments	None to report

Regulatory Requirements	Implementing Document or Activity that Changed	Description of the Change
40 CFR §194.33	Consideration of Drilling Events in Performance Assessments	<u>EPA to DOE, February 24, 2023</u> The EPA found the DOE's proposed changes to the borehole plugging methodology, as outlined in the *Proposed Option for Borehole Plugging Area to be used for Determining Plugging Type Frequency Used in the Waste Isolation Pilot Plant Performance Assessment,* specifically the area over which plugging probabilities are calculated, to be acceptable. The Delaware Basin Drilling and Surveillance Program will be reporting the Nine-Township Area surrounding the WIPP, as truncated on the north by the Delaware Basin boundary.
40 CFR §194.34	Results of Performance Assessments	None to report
40 CFR §194.41	Active Institutional Controls	None to report
40 CFR §194.42(a) - (c)	Monitoring	<u>July 1, 2022, to September 30, 2022</u> Monitoring well Energy Research and Development Agency (ERDA)-9 (the last steel-cased well in the legacy WIPP water-level monitoring network) was plugged on September 22, 2022. September 29, 2022, issuance of DOE/WIPP-22-3591, Rev. 0, *Waste Isolation Pilot Plant Annual Site Environmental Report* for 2021 (DOE 2022f).

Regulatory Requirements	Implementing Document or Activity that Changed	Description of the Change
		October 1, 2022, to December 31, 2022 October 20, 2022, issuance of DOE/ WIPP-22-3526, *Waste Isolation Pilot Plant Biennial Environmental Compliance Report for Reporting Period April 1, 2020, through March 31, 2022* (DOE 2022g). October 22, 2022, issuance of DOE/WIPP-22-3610, *Waste Isolation Pilot Plant Geotechnical Analysis Report for July 2020 – June 2021* (DOE 2022h). April 5, 2023, issuance of DOE/WIPP-22-3697, *Waste Isolation Pilot Plant Subsidence Monument Leveling Survey* 2022 (DOE 2023d). December 14, 2022, issuance of DOE/WIPP-22-2308, Revision 0, *Waste Isolation Pilot Plant Delaware Basin Monitoring Annual Report* (DOE 2022i). January 1, 2023 to March 31, 2023 None to report April 1, 2023 through June 20, 2023 None to report
40 CFR §194.42(d)	Post-closure Monitoring	None to report
40 CFR §194.42(e)	Pre-closure and Post-closure Monitoring Plans	None to report

Regulatory Requirements	Implementing Document or Activity that Changed	Description of the Change
40 CFR §194.43	Passive Institutional Controls	See Table 5: *Passive Institutional Controls Activity during the Reporting Period*
40 CFR §194.44	Engineered Barriers	None to report
40 CFR §194.45	Consideration of the Presence of Resources	None to report
40 CFR §194.46	Removal of Waste	None to report
40 CFR §§194.51 – 194.55	Individual and Ground-water Protection Requirements	January 31, 2023, issuance of WBS 4.3.1. ERMS 578677, *Sandia National Laboratories Compliance Monitoring Parameter Assessment for 2022* (Kicker et.al. 2023).

Table 2. Procedure/Plan Revisions during the Reporting Period

Procedure / Plan	Revision Effective Date	Description of Change
D-0101, *Specification for Prepackaged MgO Backfill*	Revision 13 2/28/2023	Revised Attachments B and C; reformatted entire document into current template.
DOE/WIPP-02-3122, *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant*	Revision 11 11/4/2022	Clarified the pipe overpack container (POC) and criticality control overpack (CCO) payload limits in relation to plastic content for non-machine compacted and machine-compacted waste; added three additional fissile gram equivalent payload compliance options with limits on boron carbide, hydrogenous content, and filler material for the CCO (directly related to long-term repository criticality evaluation); added POC outer drum filter vent model requirements for combustible waste; revised and added plutonium-239 equivalent curie limits for the CCO as specific to the CCO prepared using the Sandia process (CCO-S) and CCO prepared using the Enhanced Dilution Process (CCO-EDP) waste form generation processes used for dispositioned plutonium waste at the Savannah River Site.
DOE/WIPP-99-2194, *Waste Isolation Pilot Plant Environmental Monitoring Plan*	Revision 13 12/20/2022	Updated acronym and reference lists; updated table of figures; and clarifications made throughout the document. Editorial updates were also made.
DOE/WIPP-99-3119, *Compliance Monitoring Implementation Plan for 40 CFR §194.14(b), Assurance Requirement*	Revision 9 05/25/2023	Updated to align with the Appendix MON of the 2019 Compliance Recertification Application. The major changes include the alignment of references and an update to the ground water monitoring figure, Figure 1.
WP 02-EM1012, *Airborne Particulate Sampling*	Revision 24 9/19/2022	Added note between 5.1.4 and 5.1.5; editorial changes.

Procedure / Plan	Revision Effective Date	Description of Change
WP 05-WH1010, *Container Overpacking*	Revision 15 06/12/2023	Minor revision to roll up the prior field revision.
WP 05-WH1011, *CH Waste Processing*	Revision 68-FR2 05/03/2023	Field revision to clarify swipes taken during hold points and when payload can be moved.
WP 05-WH1025, *CH Waste Downloading and Emplacement*	Revision 31 7/19/2022	Addressed CAR 22-012.
	Revision 33 12/1/2022	Added tampering with payload warning.
WP 05-WH1058, *CH Waste Handling Abnormal Operations*	Revision 31 9/30/2022	*Documented Safety Analysis*, Rev. 8: Page Change 001 implementation; general revision.
	Revision 32 03/27/2023	Clarified reference to pre-engineered lift plan.
WP 05-WH1105, *Magnesium Oxide Sample Records Management*	Revision 7 7/19/2022	Addressed Corrective Action Request (CAR) 22-012.
WP 07-EU1303, *Geomechanical Instrument Data Processing*	Revision 12 05/10/2023	Minor revision to change referenced document WP 02-RC.06 to WP 02-RC3001; replaced Nuclear Waste Partnership, LLC (NWP) reference with WIPP.
WP 08-NT3020, *TRU Waste Receipt*	Revision 31 12/19/2022	Added step to check for tamper-indicating devices on Type-B packages at the time of receipt, updated Precautions/Limitations, added steps for Transport Remotely Monitored Sealing Array shipments and editorial corrections throughout.
WP 09-ES4001, *Subsidence Survey Data Acquisition Report*	Revision 7 11/4/2022	Edits were made throughout to use new survey equipment and new level processing software.
WP 12-ER4926, *CMR Expanded Staffing Operations*	Revision 11 05/16/2023	Minor editorial changes were made during the process of transferring document ownership to the new WIPP Management and Operating Contractor (MOC).

Procedure / Plan	Revision Effective Date	Description of Change
WP 12-HP1500, *Radiological Posting and Access Control*	Revision 27 7/20/2022	Updated Section 5.4, Posting Radiation Areas; Steps 5.4.1 and 5.4.2: Changed 2 mrem/hr to 5 mrem/hr. Updated Attachment 5 to align with Section 5.4.
WP 12-HP2001, *Abnormal Radiological Conditions*	Revision 14 9/30/2022	DSA, Rev. 8: Page Change 001 implementation.
WP 12-RL.01, *Radiochemistry Quality Assurance Plan*	Revision 27 11/9/2022	Updated to include new training requirements for the qualification programs for the WIPP site counting room. Added to Section 3.3.3, Performance Evaluation Studies, the wording "Any sample analyzed after the first failure will be assessed to determine if there were any adverse impacts on those analysis results." Updated Radiochemistry Laboratory Procedure table.
WP 13-1, Nuclear Waste Partnership LLC *Quality Assurance Program Description*	Revision 41 8/15/2022	Annual update to reflect current NWP Organization. Added clarification verbiage in Section 3.1.
	Revision 42 11/21/2022	Removed the CBFO Quality Assurance Director line from the cover page.
	Revision 43 06/29/2023	Revised title from "Nuclear Waste Partnership LLC Quality Assurance Program Plan" to "Waste Isolation Pilot Plant Quality Assurance Program Description" and to reflect document ownership of the new WIPP MOC; minor editorial changes were made.
WP 15-SE.01, *Science Experiment Support Plan*	Revision 9 05/02/2023	Minor editorial changes were made during the process of transferring document ownership to the new WIPP MOC.
WP 16-2, *Software Screening and Control*	Revision 18 08/18/2022	Added Carlsbad Field Office (CBFO) Quality Assurance (QA) Division Director

Procedure / Plan	Revision Effective Date	Description of Change
		Approval, required per WIPP Form 19-312. Added Configuration Status Accounting required per CAR 21-019. Added clarification for Safety Software documentation required by WP 13-1, Nuclear Waste Partnership LLC *Quality Assurance Program Description*, and DOE/CBFO-94-1012, DOE CBFO *Quality Assurance Program Document*, required per WIPP-Issue-22-0706. Canceled EA16-2-2-0, *Software Quality Assurance Items Checklist*.
NP 9-2, *Parameters*, Revision 3	03/07/2023	Added Section 2.7, "Analysis to Parameter Version Mapping" and associated Form NP 9-2-4. This section outlines the process that documents which parameter version is used for each analysis. Minor editorial corrections were also made.
NP 20-1, *Tests Plans*, Revision 7	05/10/2023	This procedure was revised to remove the DOE review and approval step, as there is no formal requirement in the Quality Assurance Program Document (QAPD) nor from DOE. Minor editorial changes were also made.
SP 9-12, *Well Video Logging*, Revision 4	03/23/2023	This revision is intended to eliminate two previous video logging systems and procedures (Laval DC-5150 Borehole Logging System and Mt. Sopris Optical Televiewer Geophysical Logging System) and to add the new Aries Water Well Inspection System and its procedures.
SP 12-2, *Use and Maintenance of the UIC, Inc. Model CM5015 CO2 Coulometer, CMS130 Acidification Module, CM5300 Furnace Apparatus*	04/26/2023	This procedure was retired. Reason for Recall: No longer have this instrument.

Procedure / Plan	Revision Effective Date	Description of Change
and CM5390 Automated Boat Inlet, Revision 3		
SP 12-17, *Scanning Electron Microscope Imaging and Energy Dispersive Spectroscopy*, Revision 4	04/20/2023	This revision details use of the new Hitachi SU8230 scanning electron microscope.
SP 12-21, *Temperature Measurements*, Revision 3	01/18/2023	This revision reflects the changes in procedure and frequency of temperature measurements in lab and experimental test equipment. This revision also removes all mention of mercury thermometers since these devices are no longer used on the premises.
SP 12-25, *Calibration, Use, and Maintenance of the Cary 300 Conc UV-Visible Spectrophotometer*, Revision 3	02/20/2023	This procedure has been retired. Reason for recall: Instrument is no longer in use.
SP 12-32, *Pressure Transducer Calibration Using the Mensor CPC 6000*, Revision 3	05/24/2023	Two editorial changes were made to this procedure: • Page 5 Section 2.7 – Added the following statement to (3) "and/or replacement of batteries (if applicable)," • Page 8 Section 2.7.11 – Added the following sentence "If the transducer requires that new batteries be installed, then an As-Left calibration must be performed."
SP 12-34, *Imaging Using the Vertical Scanning Interferometer*, Revision 2	03/21/2023	A training guide was added in Appendix A of this procedure to be used in connection with Form NP 2-1-2 for on-the-job training. Format updates and editorial clarifications were also made.
SP 12-37, *Use of the Horiba Scientific XploRA Confocal*	03/27/2023	The calibration section of this procedure was updated based on the new calibration objective for this instrument. Other sections were revised for clarity.

Procedure / Plan	Revision Effective Date	Description of Change
Raman Microscope, Revision 1		
SP 12-44, *Calibration, Use, and Maintenance of the Jasco V-780 UV-Visible/NIR Spectrophotometer*, Revision 0	06/06/2023	This procedure prescribes the Sandia National Laboratories (SNL) process for the calibration, operation, and maintenance of the Jasco V-780 UV-Visible/NIR (Ultraviolet-Visible Near Infrared) spectrophotometer.
SP 12-50, *ORP and Eh Measurements*, Revision 0	05/22/2023	This document describes the SNL procedure for oxidation-reduction potential (ORP) and redox potential (Eh) measurements. Check of function and operation guidelines are included in the procedure.

*Note: These procedural changes relate only to programs that are important to the demonstration of compliance with EPA's long-term disposal standards at 40 CFR Part 191, Subparts B and C. Changes to operational procedures that are unrelated to long-term compliance are not considered in this report.

Table 3. Waste Emplacement Summary Report during the Reporting Period*

*Notes can be found at the end of this table, on page 28.

TRU Waste Inventory		
	Reporting Period[1] Emplaced Volume (m^3)	Cumulative[3] Emplaced Volume (m^3)
RH TRU	2.97 (LWA TRU Waste Volume)[2]	364.70 (LWA TRU Waste Volume)[2]
CH TRU	2,282.59 (LWA TRU Waste Volume)[2]	73,410.10 (LWA TRU Waste Volume)[2]

Waste Components Inventory				
	Reporting Period[1] Emplaced Mass (kg)	Cumulative[3] Emplaced Mass (kg)	Maximum Emplaced Limiting Value[4] (kg)	Percent of Limiting Value[4] Emplaced
Cellulose, Plastic, Rubber Materials[5]	210,247	9,667,794	22,000,000	43.94%
Fe-Metals[6]	956,878	31,790,942	20,000,000	Minimum met
Non-Fe Metals	14,301	482,377	2,000	Minimum met

Emplaced Radiological Activity Inventory (curies)				
Radionuclide	**Cumulative Activity in Fiscal Year 2022/2023 Annual Change Report**	**CH Repository Reporting Period Activity[7]**	**RH Repository Reporting Period Activity[7]**	**Total Activity as of June 30, 2023[7]**
^{241}Am	7.993E+03	7.992E+03	7.741E-01	2.838E+05
^{137}Cs	1.561E+01	2.092E+00	1.352E+01	1.450E+04
^{238}Pu	1.497E+04	1.497E+04	1.022E+00	5.370E+05
^{239}Pu	1.203E+04	1.203E+04	3.225E-01	3.614E+05
^{240}Pu	2.944E+03	2.944E+03	2.214E-01	8.949E+04
^{242}Pu	8.579E-01	8.573E-01	5.395E-04	3.032E+01
^{90}Sr	2.155E+01	1.303E+01	8.516E+00	7.753E+03
^{233}U	1.492E+01	1.492E+01	4.650E-08	2.304E+01
^{234}U	2.799E+00	2.798E+00	1.163E-03	9.725E+01
^{238}U	1.356E+00	1.356E+00	4.165E-05	2.007E+01
Total	3.799E+04	3.796E+04	2.438E+01	1.294E+06

Table 3. Waste Emplacement Summary Report during the Reporting Period*
Continued

Magnesium Oxide (MgO)[8] and Cellulose, Plastic, and Rubber (CPR) Mass Emplaced Per Waste Panel					
Panel	**Room**	**MgO (kg)**	**CPR (kg)**	**Excess Factor[8]**	**Weighted Average Excess Factor**
1	7	1,127,526	276,990	2.01	1.87
	6	222,885	86,116	1.44[9]	
	5	222,885	79,213	1.56[9]	
	4	228,600	85,525	1.51[9]	
	3	1,034,415	342,069	1.67	
	2	1,028,825	229,442	2.17	
	1	617,220	138,330	2.14	
2	7	1,028,700	236,830	2.09	2.19
	6	982,980	209,305	2.20	
	5	988,820	197,979	2.28	
	4	977,265	220,912	2.17	
	3	1,028,700	211,841	2.27	
	2	965,835	165,412	2.62	
	1	691,515	186,469	1.71	
3	7	960,120	109,685	3.83	2.00
	6	954,405	229,646	1.93	
	5	1,022,985	284,651	1.70	
	4	960,120	255,172	1.79	
	3	931,545	243,860	1.89	
	2	942,975	228,067	2.02	
	1	662,940	183,088	1.76	
4	7	942,975	248,903	1.90	1.58
	6	925,830	267,494	1.71	
	5	948,690	265,302	1.71	
	4	1,049,655	290,739	1.76	
	3	1,015,365	285,755	1.70	
	2	931,545	374,327	1.22[8]	
	1	668,655	265,884	1.23	

Table 3. Waste Emplacement Summary Report during the Reporting Period* Continued

Magnesium Oxide (MgO)[8] and Cellulose, Plastic, and Rubber (CPR) Mass Emplaced Per Waste Panel					
Panel	**Room**	**MgO (kg)**	**CPR (kg)**	**Excess Factor[8]**	**Weighted Average Excess Factor**
5	7	937,260	353,286	1.28	1.63
	6	875,477	140,033	2.85	
	5	782,346	298,832	1.24	
	4	737,167	225,449	1.64	
	3	714,286	215,961	1.61	
	2	730,612	194,069	1.84	
	1	485,714	135,766	1.75	
6	7	744,218	167,605	2.11	1.48
	6	666,667	189,775	1.74	
	5	474,294	203,497	1.24	
	4	471,586	202,434	1.25	
	3	406,533	171,330	1.25	
	2	291,716	121,710	1.22	
	1	235,107	80,223	1.46	
7	7	57,692	15,900	1.76	1.43
	6	99,320	28,832	1.83	
	5	315,646	76,186	1.80	
	4	161,905	32,351	2.10	
	3	321,088	110,790	1.30	
	2	555,112	218,582	1.26	
	1	370,098	149,116	1.27	
8	7	415,003	136,793	1.45	1.45

Table 3 Notes
1. Reporting Period is July 1, 2022, through June 30, 2023.
2. Pursuant to the January 16, 2019, CBFO memorandum entitled *Tracking and Reporting the Defense-Related Transuranic Waste Volume Against the Waste Isolation Pilot Plant Land Withdrawal Act (LWA) Total Capacity Limit for Defense-Related Transuranic Waste*, LWA volumes will now be reported.
3. Cumulative period includes from the beginning of emplacement until June 30, 2023.
4. Limiting Value—Values from Compliance Recertification Application (CRA) 2019 Section 24 (DOE 2019). These values are based on inventory assumptions.
5. CPR materials include the waste, container materials, emplacement materials, and non-containerized waste.
6. Fe-Metals include both materials in the waste and containers in total.
7. There is no decay correction for the listed isotope activities. Isotopic activities reported are from the time of the original assay. It is understood that some isotopes may have reached secular equilibrium after disposal.
8. New minimum value for excess factor of MgO to be implemented as approved by EPA (Reyes 2008b) reduces excess factor from 1.67 to 1.20 and ensures minimum reactivity of 94%.
9. Rooms 4, 5, and 6 of Panel 1 were abandoned, and waste was only emplaced in the access drifts of these rooms.

Table 4. Software and Hardware Changes during the Reporting Period

WIPP Codes/Software and Code Version	New Version	Date of Change	Description of Change
CCDFGF 7.05	CCDFGF 8.0	7/05/2022	This code was updated to add variability and options regarding Culebra release points. Also modified to read-in data in formats consistent with supporting codes.
PRECCDFGF 2.02	PRECCDFGF 3.00	7/05/2022	This code was updated to require an additional command line argument that specifies the number of Culebra release points.
MODFLOW 6.2.2	N/A	8/17/2022	This is a new code for simulation of transient and steady state, single-phase ground-water flow in the Culebra.
PRECCDFGF 3.00	PRECCDFGF 3.01	8/30/2022	This code was migrated from the Oracle Solaris computer cluster to the new High-Performance Computing (HPC) Linux cluster running CentOS 7.
CCDFGF 8.00	CCDFGF 8.01	9/12/2022	This code was migrated from the Oracle Solaris computer cluster to the new HPC Linux cluster running CentOS 7.
PEST++5.1.6	N/A	9/12/2022	This is a new code used for calibrating Culebra transmissivity, storage, and recharge parameter fields to water level and drawdown observations.
PANEL 5.01	PANEL 5.02	11/21/2022	The PANEL code was modified to add the ability to calculate microbial colloid concentration by using one of two models (biomass-based microbial colloid model and toxicity-based microbial colloid model) to be selected by an input parameter. The ability for PANEL to read individual oxidation state values for plutonium, uranium, and neptunium from an input file was also added.
N/A	Sierra/Solid Mechanics Version 5.4.1	02/08/2023	Qualified new code for rock mechanics.

WIPP Codes/Software and Code Version	New Version	Date of Change	Description of Change
PRESECOTP2D 1.24	PRESECOTP 2D 1.25	03/07/2023	Modified code to read MODFLOW6 files.
Waste Data System (WDS)	3.1	09/09/2022	A new methodology was implemented for assigning Drum Age Criterion Concentration Multipliers and Prediction Factors in the CH-TRU Waste Content Codes Maintenance Application (CTMA) and CH-TRU Authorized Methods for Payload Control (CH-TRAMPAC) Evaluation Software (CHTES). New edit/limit checks were implemented for CCOs and Pipe Overpacks related to CH-TRAMPAC, Revision 5.
	3.2	05/03/2023	This release was primarily a WDS, Web Service, Barcode, and CTMA maintenance release, but also included an additional Pipe-Overpack component and contents weight limit check and a volatile organic compound threshold logic change in CHTES.
	3.3	06/15/2023	The purpose of this release was to bring WDS and all supporting applications up-to-date with the latest system configuration updates. In addition, most libraries integrated into the WDS and its supporting applications, including JasperReports, were upgraded to their most current compatible versions.
	3.4	06/15/2023	This release is a WDS and Web Service maintenance release. Software modifications to accommodate Waste Acceptance Criteria, Revision 11, were also included in this release as well as the resolution of one minor CH-TRAMPAC issue.

3.0 Additional Information Requested by the EPA

Table 5. Passive Institutional Controls Activity during the Reporting Period

Date	Description of Activity
06/30/2023	Nothing to report for this reporting period.

Table 6. EPA Waste Characterization Inspections during the Reporting Period

Generator Site	Date of Inspection	EPA Inspection No./ Tier 1 Evaluation	Docket Number/ Approval Date
Advanced Mixed Waste Treatment Project/ Accelerated Retrieval Project			None to report
Argonne National Laboratory-Illinois			None to report
Hanford			None to report
Idaho National Laboratory (INL)	February 10, 2021, the CBFO requested the EPA's approval of a Tier 1 change.	EPA approved a Tier 1 change to add containers of waste stream ID-TRA660-S5100.	DOCKET NO: A-98-49; II-A4-244, November 8, 2022
	October 17, 2022	EPA approved a Tier 1 change to add one container of waste stream ID-Bettis-Pu8Li14B to waste characterization program.	DOCKET NO: A-98-49; II-A4-246, December 28, 2022
	October 31, 2022, the CBFO requested the EPA's approval of a Tier 1 change.	EPA approved a Tier 1 change to add one single container of INL-CCP RH waste stream ID-TRA661-S5400-RH.	DOCKET NO: A-98-49; II-A4-247, EPA AIR E-DOCKET NO: EPA-HQ-OAR-2001-0012-0770, January 24, 2023
Lawrence Livermore National Laboratory			None to report
Los Alamos National Laboratory (LANL)	June 26-30, 2022	Continued compliance inspection confirmed the CCP at Los Alamos National Laboratory was technically adequate and complies with 40 CFR 194.24.	EPA DOCKET NO: A-98-49; II-A4-243, November 9, 2022

Generator Site	Date of Inspection	EPA Inspection No./ Tier 1 Evaluation	Docket Number/ Approval Date
Oak Ridge National Laboratory (ORNL)	CBFO requested EPA approve a Tier 1 change on August 20, 2020. EPA conducted a desktop inspection.	EPA approved Tier 1 change to add Waste Stream OR-WC14-RH-HET to the EPA-approved ORNL-CCP RH TRU waste characterization program.	DOCKET NO: A-98-49; II-A4-245, December 20, 2022
Sandia National Laboratories			None to report
Savannah River Site (SRS)	On August 24, 2022, SRS-CCP requested that EPA evaluate Subfamily 1B for inclusion in the list of approved waste materials from Waste Stream SR-KAC-PuOx.	EPA approved the addition of Criticality Control Overpacks from Subfamily 1B from Waste Stream SRS-KAC-PuOx.	DOCKET NO: A-98-49; II-A4-242, October 13, 2022
	February 16, 2023, the CBFO requested the EPA's approval of a Tier 1 change to evaluate Subfamily 2D for inclusion in the list of approved waste materials from the Savannah River Site Central Characterization Program (SRS-CCP) Waste Stream SR-KAC-PuOx.	EPA approved the addition of waste containers from Subfamily 2D of SRS-CCP Waste Stream SR-KAC-PuOx to the list of approved measurement geometries for the HENC 4 and HENC 5 non-destructive assay (NDA) systems.	DOCKET NO: A-98-49; II-A4-248, EPA AIR E-DOCKET NO: EPA-HQ-OAR-2001-0012-0771, February 28, 2023.

Table 7. Quality Assurance Assessments by Site/Organization during the Reporting Period

Site/Organization	Assessment Date	Purpose
Advanced Mixed Waste Treatment Project	October 10–13, 2022	Recertification Audit (QAD-A-23-01)
Argonne National Laboratory - East–CCP	July 26–28, 2022	Recertification Audit (QAD-A-22-16)
CCP (All Sites)		None to report
Carlsbad Field Office	January 24–26, 2023	The purpose of this audit was to verify that the CBFO QA program continues to properly implement elements of the American Society of Mechanical Engineers Nuclear Quality Assurance (ASME NQA)-1-1989 and to ensure compliance with EPA regulations at 40 CFR §194.22.
Hanford–CCP		None to report
Idaho National Laboratory–CCP	March 14–16, 2023	Recertification Audit (QAD-A-23-12)
Lawrence Livermore National Laboratory	August 16–18, 2022	Recertification Audit (QAD-A-22-18)
Los Alamos National Laboratory–CCP	May 16–18, 2023	Recertification Audit (QAD-A-23-14)
Los Alamos National Laboratory–Carlsbad Operations		None to report
Nuclear Waste Partnership LLC	November 15–17, 2022	Audit of NWP Integrated Contractor Assurance System (QAD-A-23-04)
Salado Isolation Mining Contractors, LLC	March 28–30, 2023	Evaluated the adequacy, implementation, and effectiveness of the Salado Isolation Mining Contractors, LLC, Maintenance Management and Calibration Programs.
Oak Ridge National Laboratory–CCP	April 11–13,2023	Recertification Audit (QAD-A-23-13)

Site/Organization	Assessment Date	Purpose
Savannah River Site–CCP	November 29 – December 1, 2022	Recertification Audit (QAD-A-23-7)
Sandia National Laboratories–CCP		None to report
Sandia National Laboratories–Carlsbad Office	Week of December 5, 2022	The EPA performed an onsite review of Sandia National Laboratory's technical investigation practices.
Suppliers	October 25–27, 2022	CAST Transportation Audit (A-23-05)
	October 31 – November 7, 2022	Surveillance of NWP's Assessment of Triad's Quality Suppliers List (S-23-20)
	August 9–11, 2022	Surveillance of Nuclear Filter Technology – Engineered Products Division compliance with the Statement of Work elements from DOE 13, Purchase Order 510930 (S-22-20)

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