

Annual Change Report 2006/2007

From July 1, 2006, to June 30, 2007

November 16, 2007



Prepared for:

The Department of Energy

Prepared by:

**Washington Regulatory and Environmental Services
an affiliate of
Washington TRU Solutions LLC**

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Introduction

As part of continuing compliance, the U.S. Environmental Protection Agency (EPA) requires the U.S. Department of Energy (DOE) to provide information on any change in conditions or activities pertaining to the disposal system since the most recent compliance application. This requirement is identified in Title 40 Code of Federal Regulations (CFR), Section 194.4(b)(4), which states:

“No 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.”

In meeting the requirement, the DOE provides an annual report each November of all applicable changes under the above requirement. This annual report informs the EPA of changes to information in the most recent compliance recertification (the 2004 Compliance Recertification). Significant planned changes must be reported to the EPA prior to implementation by the DOE. In addition, Title 40 CFR, Section 194.4(b)(3) requires that significant unplanned changes be reported to the EPA within 24 hours or ten days, depending on the severity of the activity or condition. To date, there have been no significant unplanned changes to the certification basis. Planned changes have been submitted on an individual basis. All other changes are reported annually.

Changes in activities or conditions are reviewed to determine if 40 CFR Section 194.4(b)(3) reporting is necessary. As indicated above, no significant unplanned changes were identified for the time period covered by this report. The enclosed tables list those items identified for reporting under 40 CFR Section 194.4(b)(4). The majority of the items described in this report are inspections, reports, and modifications to written plans and procedures for WIPP operations.

This report captures the summary of each change within four tables:

1. Table 1: Changes in WIPP Conditions or Activities Reportable under Title 40 CFR Section 194.4(b)(4)
2. Table 2: Document Revisions documents changes to relevant plans and procedures during the reporting period
3. Table 3: Waste Emplacement Summary Report documents the TRU waste inventory for the waste parameters identified in Table 4-10 of the CCA. The summary provides the total emplaced inventory in the repository as of June 30, 2007, and the inventory that was emplaced during the reporting period (July 1, 2006 to June 30, 2007)
4. Table 4: Performance Assessment Software and Hardware Changes documents the changes to relevant codes, software, and hardware that have occurred during the current reporting period

In accordance with the EPA's requests and feedback over the past eight years, this report incorporates many of the suggestions and guidance for capturing the appropriate level of detail and the layout of information with respect to the WIPP certification criteria. This report does not include all administrative changes to procedures. Examples of administrative changes to procedures that were not included are editorial changes, reformatting, correcting the title of references, correcting inconsistency within a procedure, and other changes that do not change the substance or intent of the document.

Also requested by the EPA is the identification of any references previously entered into the EPA Docket system. This change is visible within the information in Table 1. Applicable references identify the EPA Docket Item Number (where available) for the specific information and add a general sentence identifying the change.

Summary

The DOE believes the changes reported in this version of the WIPP Annual Change Report do not represent significant changes in conditions or activities pertaining to the disposal system.

**Table 1: Changes in WIPP Conditions or Activities
Reportable under Title 40 CFR Section 194.4(b)(4)**

July 1, 2006, through June 30, 2007

**Table 1: Changes in WIPP Conditions or Activities Reportable under Title 40 CFR Section 194.4(b)(4)
July 1, 2006, through June 30, 2007**

Certification Criteria	Implementing Document or Activity that Changed	Description of the Change and DOE Assessment of the Impact of the Change
194.4	Annual Change Report	Letter from Department of Energy (DOE) to Environmental Protection Agency (EPA) (December 11, 2006) resolving comments from the EPA in response to the 2005/2006 Annual Change Report. Letter from DOE to EPA (March 12, 2007) identifying a change in the 2005/2006 Annual Change Report.
194.8 Approval process for Waste Generator Sites for Disposal	Approval process for Waste Generator Sites for Disposal	The EPA announced the availability of, and soliciting public comments for 45 days on, the proposed approvals of the radioactive, remote-handled (RH), transuranic (TRU) waste characterization programs implemented by the Central Characterization Project (CCP) at Idaho National Laboratory (INL) and Argonne National Laboratory (ANL). This waste is intended for disposal at the Waste Isolation Pilot Plant (WIPP) in New Mexico. These are the first proposed approvals for the characterization of RH waste. The EPA evaluated the characterization of RH TRU debris waste from INL-CCP and ANL-CCP during inspections conducted the weeks of June 12, 2006, and September 11, 2006, respectively.
194.8 Approval process for Waste Generator Sites for Disposal	Approval process for Waste Generator Sites for Disposal	Docket number EPA-HQ-OAR-2006-0597-0001. Proposed annual approval of the Advanced Mixed Waste Treatment Projects (AMWTP) TRU Waste Characterization program at INL. Posted July 31, 2006.
194.8 Approval process for Waste Generator Sites for Disposal	Approval process for Waste Generator Sites for Disposal	The EPA conducted Baseline Inspection No. EPA-INL-CCP-RH-6.06-8 of the CCP waste characterization (WC) program for RH TRU waste at the DOE INL. EPA conducted a baseline inspection of the site's program to characterize RH TRU wastes proposed for disposal in the WIPP. Follow-up inspection on August 9, 2006 for the purpose of assessing mass spectrometry data used to support one element of the INL RH WC program. Follow-up inspection on August 29, 2006 for the purpose of resolving open issues from the previous two inspections. EPA approved the disposal of retrievably stored, RH TRU, debris waste.
194.8 Approval process for Waste Generator Sites for Disposal	Recertification of Hanford Program	Letter from DOE to EPA (January 9, 2007) pertaining to the review and concurrence of the DOE recertification letter for the Hanford site based on the results from audits A-06-18 and A-06-019.

**Table 1: Changes in WIPP Conditions or Activities Reportable under Title 40 CFR Section 194.4(b)(4)
July 1, 2006, through June 30, 2007**

Certification Criteria	Implementing Document or Activity that Changed	Description of the Change and DOE Assessment of the Impact of the Change
194.8 Approval process for Waste Generator Sites for Disposal	Recertification of INL Program	Letter from EPA to DOE (January 12, 2007) approving the disposal of retrievably stored, RH TRU, debris waste by INL-CCP. EPA Docket No: A-98-49, Item II-A4-72.
194.8 Approval process for Waste Generator Sites for Disposal	Modified Visual Examination (VE) Process for CCP at INL	Letter from EPA to DOE (January 25, 2007). Results of the EPA evaluation of a modified Visual Examination process that the CCP used to characterize RH TRU waste at INL. Docket A-98-49, II-A4-75.
194.8 Approval process for Waste Generator Sites for Disposal	Approval for CCP Real-Time Radiography (RTR) at INL	Letter from EPA to DOE (February 12, 2007) stating that the baseline inspection previously performed at INL did not include the RTR process, a follow-up inspection reviewed that process and approval was given by EPA. Docket A-98-49, II-A4-80.
194.8 Approval process for Waste Generator Sites for Disposal	WWIS	Letter from EPA to DOE (February 21, 2007) giving approval to an amendment to the Tier 1 change to INL's CCP amendment for RH debris waste. (Docket A-98-49, II-A4-80). EPA has designated these changes as Tier 1 and 2 for the input of characterization data into the WWIS at the generator sites. (40 CFR 194.8(b)(iii))
194.8 Approval process for Waste Generator Sites for Disposal	Approval process for Waste Generator Sites for Disposal	Letter from EPA to DOE (February 21, 2007) stating that after review of additional information requested, the EPA approved the Tier 2 changes CCP instituted in the 3 rd and 4 th quarters of 2006 at SRS and INL.
194.8 Approval process for Waste Generator Sites for Disposal	Concurrence on Draft Recertification for CCP at SRS	Letter from EPA to DOE (April 10, 2007). EPA concurs that the waste characterization equipment, procedures and waste streams encompassed in DOE's draft recertification letter comport with all of EPA's existing approvals for contact handled (CH) waste at Savannah River Site (SRS)-CCP.
194.8 Approval process for Waste Generator Sites for Disposal	Amendment to DOE Request to Add SuperHENC Tier 1 Change	Letter from EPA to DOE (April 18, 2007). The EPA concurs that the waste characterization equipment, procedures and waste streams encompassed in DOE's draft amended certification letter comport with all of EPA's existing approvals for CH and RH waste at INL-CCP. The EPA approved Super High Efficiency Neutron Counter as a Tier 1 change.

**Table 1: Changes in WIPP Conditions or Activities Reportable under Title 40 CFR Section 194.4(b)(4)
July 1, 2006, through June 30, 2007**

Certification Criteria	Implementing Document or Activity that Changed	Description of the Change and DOE Assessment of the Impact of the Change
194.8 Approval process for Waste Generator Sites for Disposal	First Quarter 2007 Tier Report	Letter from DOE to EPA (April 19, 2007) with responses to EPA questions regarding the First Quarter 2007 Tier Report.
194.8 Approval process for Waste Generator Sites for Disposal	Inspection of the QA Program of the CCP at LANL	On April 24-27, 2007 the EPA inspected the quality assurance (QA) program of the CCP at the Los Alamos National Laboratory (LANL). EPA found no non-conformance with the LANL CCP QA program and provided the results via letter on June 12, 2007. Docket No: A-98-49, II-A1-94.
194.8 Approval process for Waste Generator Sites for Disposal	Approval of Tier 2 Changes at SRS, INL and AMWTP	Letter from EPA to DOE (April 30, 2007) determining that the Tier 2 changes to the CH TRU waste characterization program that CCP implemented at INL and SRS and the AMWTP during the first quarter of Fiscal Year 2007 are appropriate and are within the parameters of the baseline approvals for those sites.
194.8 Approval process for Waste Generator Sites for Disposal	Tier 1 Change Proposal	Letter from DOE to EPA (May 3, 2007) requesting the EPA to approve a change for the CCP program at SRS. EPA has identified the change as a Tier 1 level change to approve an RTR unit.
194.8 Approval process for Waste Generator Sites for Disposal	Notification of Tier 2 Changes	Letter from DOE to EPA (May 3, 2007) reporting changes in specific characterization and certification activities for the AMWTP and CCP at INL and SRS as based upon EPA's baseline inspection of ANL.
194.8 Approval process for Waste Generator Sites for Disposal	AMWTP Surveillance	Letter from DOE to EPA (May 16, 2007) requesting EPA's review and concurrence of the draft expansion certification letter for the AMWTP surveillance S-07-21.
194.8 Approval process for Waste Generator Sites for Disposal	Draft Certification of CEMRC CCP	Letter from DOE to EPA (May 29, 2007) requesting EPA review and concurrence of the CCP TRU waste laboratory analysis program at the Carlsbad Environmental Monitoring and Research Center (CEMRC).

**Table 1: Changes in WIPP Conditions or Activities Reportable under Title 40 CFR Section 194.4(b)(4)
July 1, 2006, through June 30, 2007**

Certification Criteria	Implementing Document or Activity that Changed	Description of the Change and DOE Assessment of the Impact of the Change
194.8 Approval process for Waste Generator Sites for Disposal	Audit of INL CCP QA Program	Letter from EPA to DOE (June 12, 2007) providing the results of the EPA inspection of the INL CCP QA program. The EPA found no non-conformance with the INL CCP QA program.
194.8 Approval process for Waste Generator Sites for Disposal	WWIS Proposed Tier 1 Change at ANL	Letter from DOE to EPA (June 20, 2007) requesting approval of changes to the CCP waste characterization program at ANL.
194.14(b) Design of the Disposal System	Status of Experiments in the WIPP Underground	<p>SEGA and MEGA</p> <p>Collaborating scientists operate their detector, which required frequent exchanges of bottles filled with liquid nitrogen to cool the apparatus. The experimenters also began preparations for starting electroforming, anticipated by late-2007.</p> <p>EXO</p> <p>Several pallets of lead shielding for the experiment were received and stored underground. Experimental modules continued to be assembled and tested in California. Planning and preparations continued for transportation and emplacement of the modules in the WIPP underground, anticipated in late 2007 or early 2008.</p>
194.15 Content of Compliance Recertification Applications	Annotated Outline	Letter from DOE to EPA (March 5, 2007) transmitting the Certification Reapplication (CRA)-2009 Annotated Outline for comment.
194.15 Content of Compliance Recertification Applications	Proposed Structure for the 2009 Compliance Recertification Application	Letter from DOE to EPA (June 11, 2007) describing and providing an example section of the proposed structure for the 2009 Compliance Recertification Application for comment.

**Table 1: Changes in WIPP Conditions or Activities Reportable under Title 40 CFR Section 194.4(b)(4)
July 1, 2006, through June 30, 2007**

Certification Criteria	Implementing Document or Activity that Changed	Description of the Change and DOE Assessment of the Impact of the Change
194.21 Inspections	Docket Follow-up Inspection	<p>EPA-HQ-OAR-2006-0881-0002 EPA Docket A-98-49, II-A4-69, August 9, 2006 and August 29, 2006. The EPA conducted Baseline Inspection No. EPA-INL-CCP-RH-6.06-8 of the CCP WC program for RH TRU waste at the DOE INL. EPA conducted a baseline inspection of the site's program to characterize RH TRU wastes proposed for disposal in the WIPP.</p> <ul style="list-style-type: none"> Follow-up inspection on August 9, 2006 at DOE's Carlsbad Area Field Office for the purpose of assessing mass spectrometry data used to support one element of the INL RH WC program. Follow-up inspection at DOE on August 29, 2006, for the purpose of resolving open issues from the previous two inspections.
194.21 Inspections	Baseline Inspection	EPA Baseline Inspection No. EPA-INL-CCP-RH-6.06-8 comment period closed September 14, 2006. The EPA conducted Baseline Inspection No. EPA-INL-CCP-RH-6.06-8 of the CCP WC program for RH TRU waste at the DOE INL.
194.21 Inspections	Baseline Inspection	EPA-HQ-OAR-2006-0881-0003 Docket A-98-49, II-A4-70 Waste Characterization Inspection report, September 12-14, 2006. EPA Baseline Inspection No. EPA-ANL-CCP-RH-9.06-8. The EPA conducted Baseline Inspection No. EPA-ANL-CCP-RH-9.06-8 of the CCP WC program for RH TRU waste at the DOE's ANL site. EPA conducted a baseline inspection of the CCP's program to characterize RH TRU wastes proposed for disposal in the WIPP.
194.21 Inspections	Baseline Inspection	EPA-HQ-OAR-2006-0597-0002 EPA Proposed Baseline Inspection No. EPA-AMWTP-03.06-8 of the AMWTP facility at INL. EPA-HQ-OAR-2006-0006. Supporting and related materials for EPA-AMWTP-03.06-08. EPA-HQ-OAR-2006-0005. Letter of 11/09/2006 to DOE for final approval.
194.21 Inspections	Baseline Inspection	Letter from EPA to DOE (January 12, 2007) describing the results of the EPA baseline inspection of the RH TRU waste characterization program implemented by CCP at INL. Inspection number EPA-INL-RH-CCP-06.06-08. Docket number A-98-49, II-A4-72.
194.21 Inspections	Baseline Inspection	Letter from EPA to DOE (January 16, 2007) describing the results of the EPA baseline inspection of the RH TRU waste characterization program implemented by CCP at ANL. Inspection number EPA-ANL-CCP-RH-09.06-08. Docket number A-98-49, II-A4-73.

**Table 1: Changes in WIPP Conditions or Activities Reportable under Title 40 CFR Section 194.4(b)(4)
July 1, 2006, through June 30, 2007**

Certification Criteria	Implementing Document or Activity that Changed	Description of the Change and DOE Assessment of the Impact of the Change
194.21 Inspections	RH Waste Disposal	Letter from EPA to DOE (February 8, 2007) with results of EPA's inspection at WIPP for approval to manage, store and emplace RH waste at the WIPP. Approval was given. EPA docket A-98-49, II-B3-101.
194.21 Inspections	Follow-up Inspection	Letter from EPA to DOE (February 8, 2007) transmitting the scope of the EPA's follow-up inspection of the CCP at LANL.
194.21 Inspections	Baseline Inspection	Letter from EPA to DOE (April 17, 2007) transmitting the scope of the baseline inspection (EPA-HAN-06.07-8) of the Hanford Site in Richland, WA.
194.21 Inspections	Baseline Inspection	Letter from DOE to EPA (May 3, 2007) pertaining to submittal of Hanford documents for the EPA Docket. Recertification Audit A-07-11 and A-07-10.
194.21 Inspections	Baseline Inspection	Letter from EPA to DOE (May 18, 2007) responding to DOE's request for concurrence on the DOE draft expansion certification letter authorizing the AMWTP to perform manual drum coring of TRU CH, solid and soil/gravel waste. The EPA determined that concurrence with the draft expansion certification letter is not necessary since it will not alter the contents of EPA's baseline approval (A-98-49, II-A4-66) or EPA's concurrence of February 22, 2007.
194.21 Inspections	Baseline Inspection	Letter from DOE to EPA (May 18, 2007) with comments pertaining to LANL-CCP-05.06-8 EPA docket EPA-HQ-OAR-2007-0326.
194.21 Inspections	Baseline Inspection	Letter from DOE to EPA (June 7, 2007) responding to concerns (LANL-CCP-RH-AK-07-001, LANL-CCP-RH-RC-07-002) raised during the EPA baseline inspection of the CCP at LANL (EPA-LANL-RH-CCP-05.07-8)
194.21 Inspections	Baseline Inspection	Letter from EPA to DOE (June 20, 2007) transmitting the scope of the EPA baseline inspection (No. EPA-SRS-CCP-RH. 07.07-8) of the CCP at SRS.
194.22(a) Quality Assurance	Table 2: Management and Operating Contractor Procedure Revisions Table 4: Scientific Advisor Performance Assessment Software and Hardware Changes	The changes to Washington TRU Solutions LLC (WTS) plans and procedures listed in Table 2 were deemed minor changes and improvements to the program during this reporting period. The changes to Sandia National Laboratories' (SNL) program documents are listed in Table 4 were deemed minor changes and improvements to the program during this reporting period.

**Table 1: Changes in WIPP Conditions or Activities Reportable under Title 40 CFR Section 194.4(b)(4)
July 1, 2006, through June 30, 2007**

Certification Criteria	Implementing Document or Activity that Changed	Description of the Change and DOE Assessment of the Impact of the Change
194.22(a) Quality Assurance	Inspection of DOE Audit of SRS QA for CCP	Letter from EPA to DOE (February 22, 2007) had no findings pertaining to the EPA's review of DOE's audit at SRS of the QA program for CCP. Docket A-98-49, II-A1-89.
194.22(a) Quality Assurance	Audit of DOE QA Program	Letter from EPA to DOE (February 22, 2007) stating that EPA found that the QA program continues to be properly established and implemented. Docket A-98-49, II- A1-90.
194.22(a) Quality Assurance	Inspection of WTS QA Program	Letter from EPA to DOE (April 25, 2007) showing that WTS has properly maintained its QA program since the previous audit of the activities selected for EPA's audit sample. Docket No: A-98-49, II-A1-92.
194.22(a) Quality Assurance	Change in CCP Audits	Letter from DOE to EPA (June 8, 2007) informing the EPA that there will be a change in the approach to the DOE QA audits of the CCP.
194.22(a) Quality Assurance	EPA Inspection of DOE Audit of CCP QA at INL	Letter from EPA to DOE (June 12, 2007) finding no non-conformance with the INL CCP QA program.
194.22(a) Quality Assurance	Submittal of CCP Documents for Docket	Letter from DOE to EPA (June 14, 2007) for the submittal of CCP documents, DOE Audit A-07-24, for the Battelle Columbus RH waste at SRS to be included in the EPA docket for the baseline inspection.
194.23 Models and Computer Codes	Table 4: Scientific Advisor Performance Assessment Software and Hardware Changes	The changes to PA software and hardware have been compiled and are located in Table 4 and were deemed minor changes and improvements to the program during this reporting period.
194.24(c) Waste Characterization	CH-WAC, Contact Handled Waste Acceptance Criteria	Letter from EPA to DOE (February 28, 2007) responding to DOE's request for approval of a Super HENC, Non-Destructive Analysis (NDA) system for CH TRU waste used by CCP at INL. Approval was given. Docket: A-98-49, II-A4-86.
194.24(c) Waste Characterization	RH-WAC, Contact Handled Waste Acceptance Criteria	Letter from EPA to DOE (August 3, 2006). After review of the Waste Acceptance Criteria (WAC) Revision 5.0, the EPA expectations are that each RH TRU waste site will develop its waste characterization plans based on the DOE's RH TRU Waste Characterization Program Implementation Plan (WCPiP).
194.24(c) Waste Characterization	RH-WAC, Contact Handled Waste Acceptance Criteria	Letter from EPA to DOE (January 17, 2007) responding to DOE request for approval of WIPP Waste Information System (WWIS) for tracking of RH waste characterization by CCP at INL and ANL. Docket number A-98-49, II- A4- 74.

**Table 1: Changes in WIPP Conditions or Activities Reportable under Title 40 CFR Section 194.4(b)(4)
July 1, 2006, through June 30, 2007**

Certification Criteria	Implementing Document or Activity that Changed	Description of the Change and DOE Assessment of the Impact of the Change
194.24(c) Waste Characterization	RH-WAC, Remote Handled Waste Acceptance Criteria	Letter from DOE to EPA (January 23, 2007) notifying the EPA of the first shipment of RH waste to the WIPP.
194.24(c) Waste Characterization	RH Debris Waste Characterization at LANL by CCP	Letter from EPA to DOE (February 21, 2007) giving approval to begin characterization of retrievably stored RH debris waste while awaiting the baseline inspection scheduled in March of 2007.
194.24(c) Waste Characterization	AMWTP	Letter from EPA to DOE (January 31, 2007) granting the authority for specific characterization and certification activities for the AMWTP.
194.24(c) Waste Characterization and Appendix A to Part 194, Conditions 2 and 3	Waste Generator Site - Idaho National Engineering and Environmental Laboratory (INL)	Letter from EPA to DOE (January 17, 2007) responding to DOE's January 16, 2007 request for EPA's concurrence on the DOE's draft recertification to expand the certification of CCP program at INL to include RH waste. Concurrence was given by EPA.
194.24(c) Waste Characterization and Appendix A to Part 194, Conditions 2 and 3	Waste Generator Site - Idaho National Engineering and Environmental Laboratory (INL)	Letter from EPA to DOE (February 5, 2007) responding to DOE's request for EPA's concurrence on the draft recertification of the CCP TRU waste characterization plan at INL to include the modified Visual Examination process. EPA concurred.
194.24(c) Waste Characterization and Appendix A to Part 194, Conditions 2 and 3	Waste Generator Site -SRS	Letter from DOE to EPA (March 28, 2007) for review and concurrence of the Draft Recertification for CCP TRU Waste Program at the SRS A-07-01 and A-07-02.
194.42 Monitoring	Table 3: Waste Emplacement Summary Report	A summary of the TRU waste inventory that has been emplaced in the repository is presented in Table 3 of this report. The inventory includes waste volume and radiological activity (curie content) of waste that has been emplaced in the repository as of June 30, 2007.
194.43 Passive Institutional Controls	Request for Schedule Extension	Letter from DOE to EPA (January 11, 2007) requesting an extension in Passive Institutional Controls design and implementation schedule.

**Table 1: Changes in WIPP Conditions or Activities Reportable under Title 40 CFR Section 194.4(b)(4)
July 1, 2006, through June 30, 2007**

Certification Criteria	Implementing Document or Activity that Changed	Description of the Change and DOE Assessment of the Impact of the Change
194.44 Engineered Barriers	Proposed Change to the Design of the Panel Closures	Letter from DOE to EPA (January 11, 2007) requesting approval of proposed change to the design of the Panel Closures at the WIPP. Letter from EPA to DOE (February 22, 2007) approving a delay in the panel closure process, but did not approve a change in the design or deferment of the design approval to the State of New Mexico.
194.44 Engineered Barriers	Magnesium Oxide Plan Change Request Magnesium Oxide Analysis	Letter from DOE to EPA (April 24, 2007) transmitted the proposed WIPP fact sheet on MgO planned change request for possible public use. Letter from DOE to EPA (May 18, 2007) transmitted DOE response to EPA's informal request for information on the reactivity testing and analysis of MgO. Letter from DOE to EPA (May 30, 2007) withdrawing the uncertainty analysis, Brush et al. (2006).

Table 2: Document Revisions
July 1, 2006, through June 30, 2007

Table 2: Document Revisions

Procedure	Rev. & Effective Date	Description of Changes from July 1, 2006, through June 30, 2007
Washington TRU Solutions (WTS) WP 02-EC3002	Rev.#2, 07/20/06	Delaware Basin Drilling Upgrade Process. The procedure was revised to allow the collection of drilling data for wells in the Delaware Basin in an electronic format rather than a paper copy.
WP 05-WH1036	Rev. #5, 07/13/06	Site-Derived Mixed Waste Handling. Updated equipment and precautions and limitations sections.
WP 08-NT.01	Rev. #13, 07/31/06	WIPP Waste Information System Program and Data Management Plan. Updated protocols and data collection process.
WP 08-NT.06	Rev. #4, 09/21/06	WIPP Waste Information System Software Requirements Specification. Updated WWIS software requirements.
WP 08-NT.07	Rev. #4, 09/21/06	WWIS Software Design Description. This revision is a total rewrite to change the procedure from a detailed step by step guide on the WWIS Software Design to a procedure that only provides a top-level summary of information about software design.
WP 08-NT3020	Rev. #12, 09/05/06	TRU Waste Receipt. Updated instructions for receipt of mixed or non-mixed TRU waste shipments at the WIPP and added a new attachment with a discrepancy checklist.
WP 12-9	Rev. #24, 07/17/06	WIPP Emergency Management Program. Updated emergency analysis for response to emergency situations at the WIPP.
WP 12-ER4903	Rev. #11, 08/01/06	Radiological Event Response. Addition of remote-handled (RH) waste receipt process.
WP 02-EM1012	Rev. #8, 11/13/2006	Airborne Particulate Sampling. Added sampling locations to attachment 2.
WP 05-WH.01	Rev. # 2, 10/05/2006	WIPP Waste Handling Operations WWIS User's Manual. Updated Attachment 1 "Special Requirements for Additional MgO".
WP 05-WH1101	Rev. # 9, 11/27/2006	Surface Transuranic Mixed Waste Handling Area Inspections. Added surface storage area capacities.
WP 05-WH1810	Rev. # 10, 11/27/2006	Underground Transuranic Mixed Waste Disposal Area Inspections. Added a requirement to Attachment 2 – Preoperational Waste Handling Mode Checklist, to complete Form EAO4AD3001-2-0, Facility TSR Administrative Controls Checklist CH Waste Handling Mode, for delivery to Central Monitoring Room requesting mode.

Table 2: Document Revisions

Procedure	Rev. & Effective Date	Description of Changes from July 1, 2006, through June 30, 2007
WP 08-NT.01	Rev. # 14, 10/18/2006	WWIS Program and Data Management Plan. Section 3.2 Summary of Hazardous Waste Facility Permit Requirements, was expanded to better identify how the WWIS tracks information required by the Waste Analysis Plan. Identified the public access link to the WWIS.
WP 08-NT.03	Rev. # 8, 10/18/2006	Waste Stream Profile Form Review and Approval Program. An Acronyms and Abbreviations list was added. Section 3.0, Conducting the Waste Stream Profile Form, was deleted along with two figures that were no longer required.
WP 08-NT3020	Rev. # 13, 11/16/2006	TRU Waste Receipt. Added information and attachment pertaining to RH waste.
WP 12-ER4902	Rev. # 10, 12/04/2006	Hazardous Material Spill and Release Response. Updated Immediate and Subsequent Actions sections.
WP 12-ER4903	Rev. # 12, 10/25/2006	Radiological Event Response. Updated for RH process.
WP 05-WH1710	Rev # 6, 01/05/2007	72-B RH Processing. Added warnings and notes throughout procedure for personnel working with RH waste.
WP 05-WH1758	Rev # 3, 01/05/2007	RH Waste Handling Abnormal Operations. Added notes to procedure to identify steps in the procedure so "Limiting Conditions of Operations (LCO) 3.3.2" may be entered.
WP 08-NT3020	Rev. # 14 02/14/2007	TRU Waste receipt. Combined the CH TRU Waste Receipt Checklist and the RH TRU Waste Receipt Checklist into one checklist titled TRU Waste Receipt Checklist.
WP 02-1	Rev # 7, 03/09/2007	WIPP Groundwater Monitoring Program Plan. Added the requirements of DOE Orders 450.1, Chg. 3, <i>Environmental Protection Program</i> .

Table 2: Document Revisions

Procedure	Rev. & Effective Date	Description of Changes from July 1, 2006, through June 30, 2007
WP 13-1	Rev # 26, 03/23/2007	Washington TRU Solutions LLC Quality Assurance Program. This revision incorporates new order DOE O 226.1, Implementation of Department of Energy Oversight Policy, requirements; DOE Order 414.1C, Quality Assurance, changes; and DOE QAPD, revision 8, changes. The revised DOE QAPD, revised QA Order, and new order DOE O 226.1 are the primary drivers for this revision. The QA requirements, per O 414.1C and 10 CFR 830 Subpart A, are not adversely impacted by changes made in this revision and continue to be satisfied.
WP 08-NT3020	Rev #15, 04/13/2007	TRU Waste Receipt. Added fissile excepted notation UN2917 shipping name to Attachment 1.
CAO/WIPP 01-3199	Rev # 3, 04/20/2007	Recertification Project Plan. Update lessons learned and organizational changes since issuing the 2004-CRA.
E-I-473	Rev # 0, 05/11/2007	Specification for the Fabrication of RH Steel/Concrete Shield. The purpose of this specification is to convey fabrication requirements and testing and acceptance criteria for the RH Steel/Concrete Shield Plug, unless otherwise specified on the drawings or in procurement documentation.
CAO/WIPP 02-3184	Rev # 5, 05/18/2007	CH Packaging Operations Manual. New revision to encompass numerous procedure updates.
WP 02-PC3002	Rev # 7, 05/18/2007	WIPP Hazardous Waste Facility Permit Change Request and Modification Processing. New revision for updates to the Permit Modification Request process.
WP 05-WH1706	Rev # 7, 05/18/2007	Preparation of an Empty RH-TRU 72-B Cask for Shipment. New revision.
WP 05-WH1707	Rev # 7, 05/18/2007	RH-TRU 72-B Trailer Loading. New revision to update trailer loading process.
WP 05-WH1709	Rev #10, 05/18/2007	RH-TRU 72-B Trailer Unloading. New revision to update trailer unloading process.
WP 05-WH1710	Rev # 8, 05/18/2007	72-B RH Processing. New revision for updates in RH 72-B handling process.
WP 05-WH1758	Rev # 4, 05/18/2007	RH Waste Handling Abnormal Operations. New revision adding Section 21.0 Reposition 72-B Cask to Position X.

Table 2: Document Revisions

Procedure	Rev. & Effective Date	Description of Changes from July 1, 2006, through June 30, 2007
WP 08-NT.01	Rev #16, 05/18/2007	WIPP Waste Information System Program and Data Management Plan. Implementation of new TRAMPAC evaluation software.
WP 02-PC.06	Rev # 1, 06/01/2007	Recertification Strategy and Project Execution Plan. Update lessons learned and organizational changes since issuing the 2004-CRA. Revised to be consistent with DOE Recertification Plan.
WP 12-ER4902	Rev #11, 06/29/2007	Hazardous Material Spill and Release Response. Removal of exempted small quantity spills section.
NP 2-1, Qualification and Training	Rev. 9 09/29/06	NP 2-1 was revised as follows: <ul style="list-style-type: none"> • To require Initial WIPP QA Program Training only for new personnel and removed requirement for Annual WIPP QA Program Training. • Revised the External Reviewer process.
NP 6-1, Document Review Process	Rev. 6 09/20/06	NP 6-1 was revised as follows: <ul style="list-style-type: none"> • To align with changes implemented in other procedures.
NP 9-1, Analyses	Rev. 6, 08/29/06	NP 9-1 was changed to interface with a change in NP 9-2, Parameters, and to accommodate EPA and DOE Analysis requests. Specific changes include: <ul style="list-style-type: none"> • Changed the scope with a new Section 2.3 to include EPA/DOE Analyses/Information Requests and DOE Planned Change Requests. • Added requirements for parameter justifications to develop a table of parameters that will be attached to the parameter data entry form in NP 9-2. • Created a requirement for the capture of outside DOE qualified data (WTS, LANL, etc.) • Clarified when and what a Routine Calculation could be used for.

Table 2: Document Revisions

Procedure	Rev. & Effective Date	Description of Changes from July 1, 2006, through June 30, 2007
NP 9-2, Parameters	Rev. 1, 08/29/06	<p>NP 9-2 was changed to accommodate a new requirement in NP 5-1 for reviewing procedures every three years. The major changes include:</p> <ul style="list-style-type: none">• Allow a table of parameter values to be attached to the Data Entry Form rather than the previous one to one relationship of form to parameters.• Eliminated the Tech review of the data entry form. The technical review is part of the NP 9-1 Analysis Parameter Justification process.• Ordered the procedure steps rather than the previous narrative instructions to help the process flow.• Added an Analysis definition process to enhance the traceability between the software and parameters used for a calculation.• Removed the Definitions section. Definitions will be in the Glossary.
SP 12-9, Calibration, Use, and Maintenance of the Perkin Elmer Optima 3000 Dual View (DV) ICP-AES	Rev. 1, 07/12/06	<p>In this revision, the acceptance level of an internal standard in a high concentration check standard has been revised to account for interference.</p>
SP 12-14, Use of pH Meters and Electrodes	Rev. 1, 07/26/06	<p>Changed Section 2.6.5 to state that the performance test will be performed immediately after calibration and then again if the analysis lasts more than two hours. In addition, the start and stop time of the analysis must be recorded in the scientific notebook.</p>

Table 2: Document Revisions

Procedure	Rev. & Effective Date	Description of Changes from July 1, 2006, through June 30, 2007
NP 17-1, Records	Rev. 6, 12/22/06	<p>NP 17-1 was revised as follows:</p> <ul style="list-style-type: none"> • Section 2.1, editorial changes. Deleted 2nd bulleted item (no longer a valid statement). 4th paragraph, deleted 2nd sentence because any method is good as long as the record is paginated. Also, deleted last sentence, (not needed.) • Section 2.3.1, had to change this paragraph to reflect changes on form. • Section 2.4, 3rd paragraph, change "...a memorandum of correction should..." to "...a memorandum of correction will...". Changed wording to reflect program requirement. • Section 3.0, deleted columns "Preparer" and "Records Submitter" as suggested by DOE/DOE. • Form NP 17-1-1, Changes were made to reflect current activities and clarification. Minor editorial changes were made as well. Combined Sections I and II and deleted page 3.
NP 18-1, Audits and Surveillances	Rev. 6, 11/17/06	<p>NP 18-1 was revised as follows:</p> <ul style="list-style-type: none"> • To meet the commitment to review NP and SP procedures on a three year cycle to assure procedures remain current (DOE CAR 06-010, identified in Audit A-06-05.) • To address an Observation (Observation 1) identified during the Internal/External QA Audit IA 05-01 on the confusion of identifying "Records Preparer" and "Records Submitter" in the Records Section of the procedure. This information was deleted from the procedure and is not a requirement. • To make the procedure more consistent with the SNL QAPD in the areas of "Scheduling" and "Surveillances." • To add a distribution section to the surveillance report form (Form NP 18-1-4) and to make other editorial changes to the procedure.

Table 2: Document Revisions

Procedure	Rev. & Effective Date	Description of Changes from July 1, 2006, through June 30, 2007
SP 9-5, Parameter Data Entry	Rev. 1, 10/04/06	<p>SP 9-5 was revised as follows:</p> <ul style="list-style-type: none"> • To match NP 9-2, Parameters. • Rearranged the order of the sections so that some duplicate steps could be eliminated. • Renamed some sections for consistency. • Add two appendices: <ul style="list-style-type: none"> A) Flowchart & Worksheet--showing graphical representation of the Parameter Data Entry process, and B) Hierarchical Worksheet--for recording needed record ID numbers during Parameter Data Entry.
SP 13-2, Core Sample Logging and Management	Rev. 4, 12/14/06	<p>SP 13-2 was revised to update the methodology for core disposal, core storage requirements, and core management/tracking. The terminology/formatting were also updated.</p>
NP 1-1, Organization and QA Program, Rev. 6.	01/08/07	<p>NP 1-1 was revised as follows:</p> <ul style="list-style-type: none"> • Modified text to more closely align with the QAPD requirement. • Removed Organizational Structure Description from the records section. The organizational chart is referred to in the Program Description document and is available on the SNL WIPP Online Documents web site.
SP 9-7, WIPP Well Water-Level Monitoring, Rev. 2.	03/06/07	<p>SP 9-7 was revised to reflect changes in the TROLL installation and test setup procedures, which included:</p> <ul style="list-style-type: none"> • Modification of acceptance criteria for the pressure transducer. • Addition of steps to be completed if the pressure transducer is outside of acceptance criteria. • Addition of more detailed TROLL user-instructions (Appendices A and B.)

Table 2: Document Revisions

Procedure	Rev. & Effective Date	Description of Changes from July 1, 2006, through June 30, 2007
SP 12-5, Depth-to-Water Measurement Using a Solinst Brand Electric Sounder, Rev. 1.	03/15/07	SP 12-5 was revised as follows: <ul style="list-style-type: none">• Minor editorial changes were made to this procedure in order to reflect the current condition under which this procedure is used.
SP 20-4, Preparing Synthetic Brines for Geochemical Experiments, Rev. 1.	01/18/07	SP 20-4 was revised so that the user can make large quantities of brines based on the recipes on molality scale.
NP 4-1, Procurement Revision 8	05/14/07	Changes were made to NP 4-1 for clarification, detail of the process description, and editorial changes, including: <ul style="list-style-type: none">• No purchase of QL-1 or QL-2 items or services with personal or corporate credit cards is allowed. See section 2.1.1.• Addressed in more detail the use of the documenting the annual evaluation of service suppliers through the period of the contract. See section 2.5.• Added item identification from the Procurement Review (Form NP 4-1-1, section 1) to the Receipt Inspection (Form NP 4-1-2, section 1) and included a copy of receipt documentation. See section 2.5.2 for details.• Made changes to Form NP 4-1-1, Procurement Review, in sections 2 and 3 for clarification.• Deleted the "Annual" QA Training in Procurement Review Form, section 3, item 1, of Appendix C.

Table 2: Document Revisions

Procedure	Rev. & Effective Date	Description of Changes from July 1, 2006, through June 30, 2007
NP 16-1, Corrective Action Revision 6	06/19/07	NP 16-1 was revised as follows: <ul style="list-style-type: none">• Removed the note on page 3, limiting the number of extension requests to three (3). This information is contained in the 4th paragraph on page three and was redundant.• Deleted redundant information on Significant Condition Adverse to Quality (SCAQ) in last paragraph of section 2.2.2.• Added text in section 2.3 to clarify that Corrective Action Requests (CARs) are not issued for ES&H issues as follow-up to Stop Work.• Deleted the information on "Preparer" and "Records Submitter" on page 6, in section 3.0 Records, to be consistent with all procedures.• Deleted the term "Refresher" from page 10, Appendix D, "Causal Codes", in item 5d. Annual QA Refresher Training will no longer be given, only QA Training to new employees.
NP 20-2, Scientific Notebooks Revision 7	05/21/07	NP 20-2 was revised to add a requirement that logbooks that record quality affecting data (either daily or prior to use) will receive a QA review will occur at a minimum of every 6 months.
SP 17-1 Records Center Operations Revision 7	04/10/07	SP 17-1 was revised to incorporate editorial changes.
194.42 Monitoring	Delaware Basin Monitoring Annual Report DOE/WIPP- 99-2308	DOE/WIPP-99-2308, Rev. 7, issued in September 2006. The time period for which this report covers is September 1, 2005, through August 31, 2006.

Table 2: Document Revisions

Procedure	Rev. & Effective Date	Description of Changes from July 1, 2006, through June 30, 2007
194.42 Monitoring	WIPP Site Environmental Report Calendar Year 2005 DOE/WIPP 2006-2225	DOE/WIPP 2006-2225, WIPP CY2005 Site Environmental Report, submitted September 2006. This report provides information and data on groundwater and meteorological monitoring.
194.42 Monitoring	WIPP Subsidence Monument Leveling Survey DOE/WIPP-2007-2293	DOE/WIPP-2007-2293, WIPP Subsidence Monument Leveling Survey, was issued in December, 2006. Subsidence information obtained from surveys conducted September through December, 2006 is included in the report.
INV-AP-01	Rev.2, 10/23/2006	Analysis Plan for Transuranic Waste Inventory
INV-SP-01	Rev. 4, 1/30/2007	Data Collection, Data Management and Control for the Comprehensive Inventory
INV-SP-02	Rev. 6, 8/2/2007	Entry, Verification and Validation of Inventory Information in the Comprehensive Inventory Database
INV-SP-03	Rev. 3, 10/23/2006	Responding to Requests for Quality Level 1 Inventory Information
LCO-QP6-1	Rev. 3, 1/26/2007	Controlled Document Development, Change and Revision
LCO-QP17-1	Rev. 3, 1/26/2007	Record Management
LCO-QP19-1	Rev. 1, 6/29/2007	Software Quality Assurance
LCO-QPD-02	Rev. 2, 6/26/2007	LANL-CO Software Quality Assurance Plan
LCO-QPD-05	Rev. 1, 5/10/2007	WIPP Compliance and Recertification Program Strategy Plan

Table 3: Waste Emplacement Summary Report

July 1, 2006, through June 30, 2007

Table 3: Waste Emplacement Summary Report

TRU Waste Inventory				
	Reporting Period ¹ Emplaced Container Volume (m ³)		Cumulative ² Emplaced Container Volume (m ³)	
RH TRU	12		12	
CH TRU	2,454		49,404	
Waste Components Inventory				
	Reporting Period ¹ Emplaced Mass (kg)	Cumulative ² Emplaced Mass (kg)	Maximum Emplacement Limiting Value ³ (kg)	Percent of Limiting Value ³ Emplaced
Cellulose, Plastic, Rubber Materials ⁴	250,033	4,569,766	22,000,000	20.77%
	Reporting Period ¹ Emplaced Mass (kg)	Cumulative ² Emplaced Mass (kg)	Minimum Emplacement Limiting Value ³ (kg)	Percent of Limiting Value ³ Emplaced
Fe-Metals ⁵	725,385	13,817,793	20,000,000	69.09%
Non-Fe Metals	7,659	301,117	2,000	Minimum met
Residual Liquids	Liquid waste is prohibited at WIPP. The total residual liquid in any payload container shall not exceed one percent by volume of that payload container.			

Emplaced Radiological Activity Inventory (curies)				
Radionuclide	Cumulative ² Activity in FY 2005/2006 Annual Change Report ⁶	CH Reporting Period Activity ⁶	RH Reporting Period Activity ⁶	Total Activity as of June 30, 2007 ⁶
²⁴¹ Am	1.71E+05	1.17E+04	4.251E+00	1.827E+05
¹³⁷ Cs	1.40E+00	9.52E+01	9.536E+01	9.662E+01
²³⁸ Pu	5.29E+04	4.69E+04	2.419E+00	9.978E+04
²³⁹ Pu	2.52E+05	1.32E+04	8.760E+00	2.652E+05
²⁴⁰ Pu	6.05E+04	3.66E+03	4.611E+00	6.416E+04
²⁴² Pu	8.63E+00	1.03E+00	1.454E-03	9.660E+00
⁹⁰ Sr	1.56E+00	7.21E+01	7.060E+01	7.365E+01
²³³ U	1.85E+00	0.81E+00	1.570E-02	2.656E+00
²³⁴ U	9.69E+00	7.16E+00	2.841E-02	1.685E+01
²³⁸ U	1.02E+01	0.03E+01	1.684E-04	1.053E+01
Total	5.36E+05	7.61E+04	1.860E+02	6.121E+05

1. Reporting Period includes emplacement that occurred between July 1, 2006, and June 30, 2007
2. Cumulative period includes emplacement from the beginning until June 30, 2007
3. Limiting Value—Values from CRA Table 4-11. These values are based on inventory assumptions.
4. Cellulose, Plastic, Rubber Materials (CPR) includes CPR within the waste, container materials and emplacement materials.
5. Fe-Metals include both materials in the waste and containers in total.

Table 3: Waste Emplacement Summary Report

6. There is no decay correction for the listed isotope activities.					
MgO and Cellulose, Plastic & Rubber (CPR) Mass Emplaced Per Waste Panel	Panel	Room	MgO (kg)	CPR* (kg)	Excess Factor
	1	all	4,482,356	1,237,685	1.79
	2	2-7	5,972,300	1,241,909	2.23
	2	1	691,515	186,200	1.71
	3	7	960,120	104,831	4.03
	3	6	954,405	228,033	1.95
	3	5	1,022,985	284,651	1.70
	3	4	960,120	255,054	1.79
	3	3	931,545	243,860	1.89
	3	2	944,880	227,889	2.03
	3	1	662,940	183,072	1.76
	4	7	948,690	248,924	1.91
	4	6	457,200	125,282	1.83
	4	5	0*	2,313	.00
* As of June 30, 2007, only RH Waste has been emplaced in Room 5 of Panel 4.					

**Table 4: Performance Assessment, Software,
and Hardware Changes**

July 1, 2006, through June 30, 2007

Table 4: Performance Assessment, Software, and Hardware Changes

WIPP Use Codes/Software, Procedure and Code Version	Version Date	Description of Changes	Replacement Code Version/Use
PHREEQCI Version 2.12.5-669	9/21/06	New Code	Well Monitoring Analysis
EQ 3/6 Version 8.0	9/19/06	New Code Version	Replaces EQ3/6 7.2c
JAS3D Version 2.2.A	8/28/06	New Code Version	Replaces JAS3D 2.0F
nSIGHTS	2/5/06	Version update (replaces Version 2.00).	Version 2.40. Used to calculate Culebra transmissivity.
NONLIN 2.0	01/12/07	Regression tested and installed on VMS 8.2	NONLIN 2.0 Update
NUMBERS 1.19	01/12/07	New version of code to remove unused variables, expand input character width and coordinate names.	NUMBERS 1.22
PREBRAG 7.00	03/20/07	New version of code to work with new version of BRAGFLO.	PREBRAG 8.00
BRAGFLO 4.10	02/06/07	Retired per NP 19-1	BRAGFLO 6.0
CCD2STEP 1.08	02/06/07	Retired and removed from system.	N/A
CCDFGF 5.01A	02/06/07	Retired per NP 19-1	CCDFGF 5.02
CUTTINGS_S 6.01	02/06/07	Retired per NP 19-1	CUTTINGS_S 6.02
CUTTINGS_S 5.10	02/06/07	Retired per NP 19-1	CUTTINGS_S 6.02
DRSPALL 1.0	02/06/07	Retired per NP 19-1	DRSPALL 1.10
EPAUNI 1.15	02/06/07	Retired per NP 19-1	EPAUNI 1.15A
GENII-A 2.10	02/06/07	Retired and removed from system.	N/A
JAS3D 2.0F	02/06/07	Retired per NP 19-1	JAS3D 2.2.A
LHS 2.41	02/06/07	Retired per NP 19-1	LHS 2.42
nSIGHTS 2.0	02/06/07	Retired per NP 19-1	NSIGHTS 2.4

Table 4: Performance Assessment, Software, and Hardware Changes

WIPP Use Codes/Software, Procedure and Code Version	Version Date	Description of Changes	Replacement Code Version/Use
NUCLOT 1.20	02/06/07	Retired and removed from system.	N/A
NUTS 2.05B	02/06/07	Retired per NP 19-1	NUTS 2.05C
PANEL 4.02	02/06/07	Retired per NP 19-1	PANEL 4.03
PATTRN 1.00	02/06/07	Retired and removed from system.	N/A
POSTGENII 4.20	02/06/07	Retired and removed from system.	N/A
POSTLHS 4.07	02/06/07	Retired per NP 19-1	POSTLHS 4.07A
PREBRAG 6.00	02/06/07	Retired per NP 19-1	PREBRAG 7.00
PREBRAG 6.40	02/06/07	Retired per NP 19-1	PREBRAG 7.00
PRECCDFGF 1.00D	02/06/07	Retired per NP 19-1	PRECCDFGF 1.01
PREGENII 6.30	02/06/07	Retired and removed from system.	N/A
QA ONLINE ALPHA	02/06/07	Retired and removed from system.	N/A
SECOTP2D 1.41	02/06/07	Retired per NP 19-1	SECOTP2D 1.41A
SUMMARIZE 2.20	02/06/07	Retired per NP 19-1	SUMMARIZE 3.01
CAMCON_LIB 2.20	02/06/07	Retired per NP 19-1	CAMCON_LIB 2.21
CAMDAT_LIB 1.25	02/06/07	Retired per NP 19-1	CAMDAT_LIB 1.26
BRAGFLO 5.0	04/05/07	New Version of Code: Modified to include water budget and solids production. Code robustness was improved.	BRAGFLO 6.0
POSTBRAG 4.00	04/09/07	New Version of Code: A one-line change to correctly size an array was made.	POSTBRAG 4.00A

Conclusion

The DOE believes the changes reported in this version of the WIPP Annual Change Report do not represent significant changes pertaining to the disposal system.

References

Delaware Basin Monitoring Annual Report, DOE/WIPP 99-2308, Revision #7, September, 2006.

Brush et al. 2006, Consumption of Carbon Dioxide by Precipitation of Carbonate Minerals Resulting from Dissolution of Sulfate Minerals in the Salado Formation in Response to Microbial Sulfate Reduction in the WIPP.

Waste Isolation Pilot Plant 2005 Site Environmental Report, DOE/WIPP 2005-2225, September, 2006.

WIPP Subsidence Monument Leveling Survey, DOE/WIPP 07-2293, December, 2006.