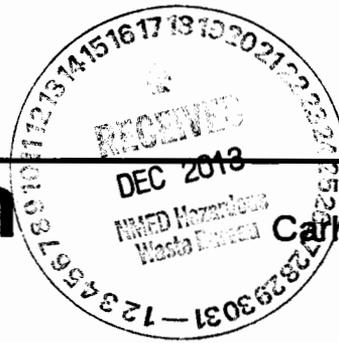


United States Government



Department of Energy

memorandum



Carlsbad Field Office

Carlsbad, New Mexico 88221

DATE: DEC 17 2013
REPLY TO ATTN OF: CBFO:OQA:MPN:MAG:13-2317:UFC 2300.00
SUBJECT: Revised Interim Audit Report A-13-24, ANL/CCP TRU Waste Characterization and Certification
TO: Dale J. Dietzel, DOE-CH

The Carlsbad Field Office (CBFO) conducted Annual Recertification Audit A-13-24, Argonne National Laboratory Central Characterization Program (ANL/CCP) Transuranic (TRU) Waste Characterization and Certification, on August 27-29, 2013. The CBFO has revised the original Interim Audit Report issued on September 17, 2013, and the redline/strikeout revision is attached.

The revision is minor in nature and does not affect the results of Audit A-13-24, nor the audit team's conclusion that, overall, the ANL/CCP programs evaluated are adequate relative to the flow-down of requirements, and the technical activities evaluated are satisfactorily implemented and effective in all areas.

If you have any questions concerning this revised report, please contact me at (575) 234-7483.

Martin P. Navarrete (handwritten signature)

Martin P. Navarrete
Senior Quality Assurance Specialist

Attachment

cc: w/attachment

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G. Knox, CTAC ED
D. Harvill, CTAC ED
G. White, CTAC ED
Site Documents ED
WWIS Database Administrators ED
CBFO QA File
CBFO M&RC
*ED denotes elect



U.S. DEPARTMENT OF ENERGY
CARLSBAD FIELD OFFICE

REVISED INTERIM AUDIT REPORT

OF THE

ARGONNE NATIONAL LABORATORY
CENTRAL CHARACTERIZATION PROJECT

LEMONT, ILLINOIS,
AND CARLSBAD, NEW MEXICO

AUDIT NUMBER A-13-24

August 27 – 29, 2013

CHARACTERIZATION AND CERTIFICATION ACTIVITIES
FOR REMOTE-HANDLED TRANSURANIC WASTE

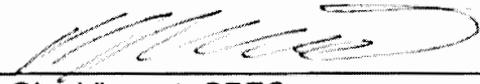


Prepared by:


Greg Knox, CTAC
Audit Team Leader

Date: 4 Dec 2013

Approved by:


Obā Vincent, CBFO
Acting Quality Assurance Director

Date: 12 DEC 2013

1.0 EXECUTIVE SUMMARY

Carlsbad Field Office (CBFO) Recertification Audit A-13-24 was conducted to evaluate the continued adequacy, implementation, and effectiveness of established programs for transuranic (TRU) waste characterization activities performed for the Argonne National Laboratory (ANL) by the Nuclear Waste Partnership LLC (NWP) Central Characterization Program (CCP). Characterization and certification activities for remote-handled (RH) Summary Category Group (SCG) S5000 debris waste were reviewed and evaluated for compliance to the applicable program requirements. The activities were performed consistent with the requirements described in the Waste Isolation Pilot Plant (WIPP) Hazardous Waste Facility Permit (HWFP), the *Remote-Handled TRU Waste Characterization Program Implementation Plan (WCPIP)*, the *CBFO Quality Assurance Program Document (QAPD)*, and the *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant (WAC)*.

The audit was conducted simultaneously at the ANL facilities in Lemont, Illinois, and the Skeen-Whitlock Building in Carlsbad, New Mexico, August 27–29, 2013. Overall, the audit team concluded that the ANL/CCP technical and quality assurance (QA) programs evaluated were adequately established for compliance with applicable upper-tier requirements, effectively implemented, and effective.

The Headspace Gas (HSG) Sampling element was removed from the WIPP HWFP on March 13, 2013. The last ANL/CCP HSG sampling activities were performed in May 2012 and were evaluated during CBFO Recertification Audit A-12-16. No additional samplings have been performed since the previous audit. With no current documentation to review, HSG Sampling was not evaluated during Audit A-13-24.

The audit team identified three concerns, two of which were corrected during the audit (CDA). One concern dealt with the departure from a requirement for the validation of a nonconforming condition by a CCP QA Engineer (CDA-1, see section 6.2). A second concern dealt with a failure to submit removable lid canister (RLC) radiological surveys and loading documentation to National TRU Program Certification (NTPC) Records (CDA-2, see section 6.2). The remaining concern was in the area of Acceptable Knowledge (AK) and was offered as a Recommendation to ANL/CCP management (see section 6.4). These issues are also discussed in the associated sections of this report.

2.0 SCOPE AND PURPOSE

2.1 Scope

The audit team evaluated the following ANL/CCP programs and processes for RH TRU waste characterization and certification activities for RH SCG S5000 debris waste.

The following elements were evaluated:

General Activities

- Results of Previous Audits
- Changes in Programs or Operations
- New Programs or Activities Being Implemented
- Changes in Key Personnel

Quality Assurance Activities

The following QA elements were evaluated only to the extent needed to support the technical elements listed below:

- Control of Nonconforming Items
- Personnel Qualification and Training
- Records
- Container Management

Technical Activities

- Acceptable Knowledge (AK)
- Project Level Data Validation and Verification (PL V&V)
- Visual Examination (VE)
- Dose-to-Curie (DTC)
- Dimensional Measurement (DM)
- Transportation
- WIPP Waste Information System/Waste Data System (WWIS/WDS)

The evaluation of ANL/CCP RH TRU waste activities was based on current revisions of the following documents:

- Waste Isolation Pilot Plant Hazardous Waste Facility Permit, NM4890139088-TSDF, New Mexico Environment Department
- *CBFO Quality Assurance Program Document*, DOE/CBFO-94-1012
- *Remote-Handled TRU Waste Characterization Program Implementation Plan*, DOE/WIPP-02-3214
- *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant*, DOE/WIPP-02-3122
- *CCP Transuranic Waste Characterization Quality Assurance Project Plan*, CCP-PO-001

- *CCP Transuranic Waste Certification Plan, CCP-PO-002*
- *CCP/ANL RH-TRU Waste Interface Document, CCP-PO-500*
- *CCP Remote-Handled Transuranic Waste Authorized Methods for Payload Control (CCP RH-TRAMPAC), CCP-PO-505*
- Related technical and QA implementing procedures

2.2 Purpose

Audit A-13-24 was conducted to assess sustained compliance with requirements applicable to waste characterization and certification activities for RH SCG S5000 debris waste and to determine if these activities are adequately established for compliance with upper-tier requirements, satisfactory in the implementation of those requirements, and effective in achieving the desired results.

3.0 AUDIT TEAM, MANAGEMENT REPRESENTATIVES, AND OBSERVERS

Martin Navarrete	Management Representative, CBFO Office of Quality Assurance
Greg Knox	Audit Team Leader (ATL), CBFO Technical Assistance Contractor (CTAC)
Katie Martin	Auditor, CTAC
Porf Martinez	Auditor, CTAC
Prissy Martinez	Auditor, CTAC
Cindi Castillo	Auditor, CTAC
Dick Blauvelt	Technical Specialist, CTAC
Rhett Bradford	Technical Specialist, CTAC
Paul Gomez	Technical Specialist, CTAC
Jim Oliver	Technical Specialist, CTAC
B.J. Verret	Technical Specialist, CTAC
Joe Willis	Technical Specialist, NWP

OBSERVERS

Oba Vincent	CBFO Office of Quality Assurance, Acting Director
Dennis Miehl	CBFO Office of Quality Assurance
Courtland Fesmire	CBFO Office of the National TRU Program (NTP)
Trais Kliphuis	New Mexico Environment Department (NMED)
Connie Walker	NMED
Lindsey Bender	Environmental Protection Agency (EPA)
Patrick Kelly	EPA
Kira Darlow	EPA

4.0 AUDIT PARTICIPANTS

The ANL/CCP individuals involved in the audit process are identified in Attachment 1. A pre-audit meeting was held at ANL in Lemont, IL, and the Skeen-Whitlock Building in Carlsbad, NM, on August 27, 2013. Daily management briefings were held with ANL/CCP management and staff to discuss issues and potential deficiencies. The audit was concluded with a post-audit meeting held at ANL in Lemont, IL, and the Skeen-Whitlock Building in Carlsbad, NM, on August 29, 2013.

5.0 SUMMARY OF AUDIT RESULTS

5.1 Program Adequacy and Implementation

The audit team concluded that the applicable ANL/CCP TRU waste characterization and certification programs for RH SCG S5000 debris waste are adequately established for compliance with upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

Attachment 2 contains a Summary Table of Audit Results. Audit activities, including objective evidence reviewed, are described below and in checklists and/or objective evidence reviewed forms. Attachment 3 contains a list of documents that were assessed during the audit. Attachment 4 lists the processes and equipment evaluated during the audit.

5.2 General Activities

5.2.1 Results of Previous Audits

There were two Corrective Action Reports (CARs) generated during CBFO Recertification Audit A-12-16. CBFO CAR 12-039 dealt with a concern identified in Dimensional Measurement (DM), which is discussed in detail in section 5.4.5. CBFO CAR 12-040 dealt with HSG Sampling, which was removed as a required constituent from the HWFP on March 13, 2013. Since the last ANL/CCP HSG Sampling was performed in May 2012 and was addressed during CBFO Recertification Audit A-12-16, HSG Sampling was removed from the scope of this audit. Therefore, verification of sustaining corrective action for CBFO CAR 12-040 was not addressed.

5.2.2 Changes in Programs or Operations

Interviews with the ANL/CCP management team indicated that, other than the removal of HSG Sampling from the HWFP on March 13, 2013, there were no significant changes in programs or operations since CBFO Recertification Audit A-12-16.

5.2.3 New Programs or Activities Being Implemented

Interviews with the ANL/CCP management team indicated that no new programs or activities have been implemented since CBFO Recertification Audit A-12-16.

5.2.4 Changes in Key Personnel

Interviews with the ANL/CCP management team indicated there were no significant changes in key personnel since CBFO Recertification Audit A-12-16.

5.3 Quality Assurance Activities

5.3.1 Control of Nonconforming Items

The audit team interviewed the resident QA Engineer and selected all four ANL nonconformance reports (NCRs) generated since the previous recertification audit to confirm that deficiencies are being appropriately documented and tracked through resolution, as required. The NCRs reviewed during the audit were:

NCR-RHANL-0509-13 NCR-RHANL-1521-12 NCR-RHANL-1522-12
NCR-RHANL-1523-12

The audit team confirmed at the time of the audit that there have been no NCRs which require reporting to the Permittee within the 7-day requirement. All NCRs were verified as being managed and tracked in the Integrated Data Center (IDC) and on the 2012-2013 CCP NCR Logs. Further evaluations included reviews of the RHANL NCR Log Reconciliation Reports for 2012.

One concern was identified regarding an NCR with an incomplete signature block. NCR-RHANL-0509-13, Rev. 1, was submitted to NTPC Records with a missing signature in block 14 (CCP QA Engineer or CCP QA Designee validation). The NCR was corrected during the audit and resubmitted to NTPC Records (see CDA-1, section 6.2).

The procedures reviewed and objective evidence assembled and evaluated during the audit provided evidence that the applicable requirements for control of nonconforming items are adequately established for compliance with upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

5.3.2 Personnel Qualification and Training

The audit team conducted interviews with responsible personnel and reviewed implementing procedure CCP-QP-002, Rev. 35, *CCP Training and Qualification Plan*, to determine the degree to which the procedure adequately addresses upper-tier requirements. Personnel training records associated with VE, DTC, AK, Transportation, and Site Project Managers (SPMs) were examined to verify implementation of associated

requirements and to verify that personnel performing characterization activities are appropriately qualified. Record reviews included qualification cards, appointment letters, and other associated qualification documentation, including attendance sheets for required briefings on AK waste stream summary training for VE operators.

Personally identifiable information had been redacted from the documentation before being presented to the audit team.

The procedures reviewed and objective evidence assembled and evaluated during the audit provided evidence that the applicable requirements for personnel training and qualification are adequately established for compliance with upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

5.3.3 QA Records

The audit team conducted interviews and reviewed implementing procedures relative to the control and administration of QA records to determine the degree to which the procedures adequately address upper-tier requirements. The procedure review included CCP-PO-001, Rev. 21, *CCP Transuranic Waste Characterization Quality Assurance Project Plan*; CCP-PO-002, Rev. 27, *CCP Transuranic Waste Certification Plan*; CCP-QP-008, Rev. 21, *CCP Records Management*; and CCP-QP-028, Rev. 15, *Records Filing, Inventorying, Scheduling, and Dispositioning*. Control of QA records was verified through review of the CCP/NTPC RH (All Sites) Records Inventory and Disposition Schedule dated July 23, 2013.

Additional ANL/CCP records retrieved and reviewed during the audit included batch data reports (BDRs) and other documents to support the AK Traceability Exercise. A random selection of AK source documents for CCP-AK-ANLE-500, Rev. 11, *Central Characterization Program Acceptable Knowledge Summary Report for Argonne Remote-Handled Debris Waste*, were verified to be physically located in NTPC Records.

One concern was identified regarding completed quality records. The audit team discovered that three completed radiological surveys and three completed RLC loading forms were not available in NTPC Records. Through interviews with CCP personnel, it was determined that the submittal process for records was changed during the time period that these records were completed and, inadvertently, they were not submitted to NTPC Records. However, they were captured through other means and submitted into NTPC Records during the audit (see CDA-2, section 6.2).

The procedures reviewed and objective evidence assembled and evaluated during the audit provided evidence that the applicable requirements for QA records are adequately established for compliance with upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

5.3.4 Container Management

The audit team conducted interviews with responsible personnel and reviewed implementing procedure CCP-TP-509, Rev. 4, *CCP Remote-Handled Transuranic Container Tracking*, relative to container management activities performed by ANL/CCP, to determine the degree to which CCP procedures adequately address upper-tier requirements. Management of RH containers processed by ANL/CCP was verified by reviewing the container management database and spreadsheet and by field observations of RH containers in Building 331, Radioactive Waste Storage Facility. RH containers are stored in shielded areas on level four; RH containers that have "open" NCRs are physically segregated in a shielded area on level two.

Containers to be loaded and shipped to WIPP are provided to ANL/CCP by ANL personnel. All container movement is performed by ANL personnel. Any container with an NCR is returned to ANL for remediation. ANL/CCP supervises the loading of the RH containers into the RLC as their part of container management. All other activities are performed by ANL personnel.

Auditors toured Building 331 and verified that no NCRs existed on any of the RH containers which have been certified to ship to WIPP.

The procedure reviews, field observations, and document reviews provided evidence that the applicable requirements for container management are adequately established for compliance with upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

5.4 Technical Activities

Each technical area audited is discussed in detail in the following sections. The method used to select objective evidence is discussed, the objective evidence used to assess compliance with the HWFP is cited briefly, and the result of the assessment is provided.

5.4.1 Acceptable Knowledge

The audit team conducted a recertification audit of characterization activities for the RH SCG S5000 debris waste stream, designated as AERHDM, generated in the Alpha Gamma Hot Cell Facility (AGHCF) and K-Wing Hot Cells at ANL. The audit was carried out in accordance with the latest revision to the HWFP Waste Analysis Plan (WAP), the WCPIP, and the RH portion of the WAC, along with CCP implementing procedures. Objective evidence was reviewed and compiled to demonstrate compliance with each of the applicable requirements. Waste stream AERHDM originally consisted of forty-four 30-gallon drums of debris waste from the AGHCF for which CCP reviewed the VE videotapes of packaging done by ANL staff. Subsequently, the waste stream was expanded with the packaging of additional debris drums and fuel examination waste (FEW) from the AGHCF and the K-Wing Hot Cells. The audit team also examined the AK record for solidified liquid waste from the K-Wing operations that was consolidated, sampled, solidified, and then included with debris drums from this facility. The AK record

for all of this waste has been examined to demonstrate that it is assigned to the delineated waste stream AERHDM.

The audit team reviewed CCP-AK-ANLE-500, Rev. 11, *Acceptable Knowledge Summary Report for Argonne Remote-Handled Debris Waste – Waste Stream: AERHDM*, which is the latest revision of the AK Summary Report for waste stream AERHDM, and a copy of the Waste Stream Profile Form (WSPF) and attachments along with an applicable change notice. Additionally, numerous AK source documents were reviewed to establish support for the conclusions noted in the AK Summary Report. The audit team also examined the AK Documentation Checklist, Attachment 1; the AK Information List, Attachment 4; the AK Hazardous Constituents List, Attachment 5; the AK Waste Form, Waste Material Parameters, Prohibited Items and Packaging, Attachment 6, along with the applicable justification memo for waste material parameter weight estimates; and the AK Container List, Attachment 8, including numerous add-container memorandums. The add-container memorandums document the review made by the CCP AK Expert (AKE) of waste containers received from ANL to assure that they are part of the waste stream. Examples of the resolution of AK discrepancies in the AK record, a WAP-compliant AK Accuracy Report, and the most recent internal surveillance were also collected and examined along with screenshots from the IDC database, a copy of the AK Tracking Spreadsheet, and the ANL WMO(Waste Management Operations)-195 waste container input forms.

Requisite training records were reviewed for AKEs and SPMs based upon names identified in the reviewed documents. The WAP-required Traceability Exercise was performed for six of the drums that have advanced completely through the characterization and certification process, including a review of relevant VE BDRs and both DTC and dimensional data packages specifically for the FEW. The reconciliation of characterization data with the AK record, including a review of the AK Characterization Checklists, was completed.

The audit team also examined the AK record and compiled objective evidence that demonstrates compliance with the requirements of the WCPIP, as noted above. Documents reviewed included the AK Summary Report, Radiological Characterization Technical Report CCP-AK-ANLE-501, Rev. 9, a WCPIP-compliant AK Accuracy Report, and characterization reconciliation reports along with the examination of relevant AK source documents.

The audit team issued one recommendation that dealt with suggested changes to the existing AK Summary Report to provide clarification. The details of the recommendation are described later in this report (see section 6.4).

The procedure reviews, field observations, and document reviews provided evidence that the applicable requirements for AK are adequately established for compliance with upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

5.4.2 Project-Level Validation and Verification

The audit team verified procedures and collected objective evidence to assess the PL V&V and data generation-level data review process. The ability of the ANL/CCP to characterize RH SCG S5000 debris waste was evaluated.

The audit team verified a randomly selected set of BDRs for VE of RH SCG S5000 debris waste from containers at the ANL/CCP. The data assembled into the BDRs support one debris waste stream identified as AERHDM. The reports were produced according to CCP-TP-500, Rev. 11, *CCP Remote-Handled Waste Visual Examination*. This procedure has since been revised to reflect the recent management and operating contractor transition from Washington TRU Solutions (WTS) to NWP. For the purposes of this audit the reports were also verified against CCP-TP-500, Rev. 12. The team verified the VE data reviewed in the BDRs were evaluated against the WSPF and waste stream description contained in CCP-AK-ANLE-500, Rev. 11, *CCP Acceptable Knowledge Summary Report for Argonne Remote-Handled Debris Waste – Waste Stream: AERHDM*, dated July 2, 2013. The data recorded in the BDRs matched the waste stream description and the data was complete and accurate. The PL V&V process for VE was evaluated by reviewing the following BDRs:

ANLRHVE12019

ANLRHVE13001

ANLRHVE13007

The BDRs evaluated by the audit team did not contain any NCRs and the team did not find any deficiencies in the VE BDRs reviewed through the Project Level.

The audit team verified the quarterly repeat of permit-related data generation-level reports completed since the previous audit (A-12-16). The quarterly reports examined were for the fourth quarter of 2012, and the first two quarters of 2013. The reports were examined and found to have no discrepancies reported through the re-review process. This re-review process was evaluated utilizing procedure CCP-TP-001, Rev. 21, *CCP Project Level Data Validation and Verification*, Section 4.3.

The audit team verified a randomly selected set of BDRs for DTC of RH SCG S5000 debris waste from containers at the ANL/CCP. The data assembled into the BDRs supported one debris waste stream identified as AERHDM. The data was complete and accurate concerning the details of the reports. The reports were produced according to CCP-TP-504, Rev. 13, *CCP Dose-to-Curie Survey Procedure for Remote-Handled Transuranic Waste*. The procedure has since been revised to reflect the management and operating contractor transition from WTS to NWP. For the purposes of this audit the reports were also verified against CCP-TP-504, Rev. 14. The audit team verified the DTC data reviewed in the BDRs was evaluated against the WSPF and radiological characterization contained in CCP-AK-ANLE-500, Rev. 11, *CCP Acceptable Knowledge Summary Report for Argonne Remote-Handled Debris Waste – Waste Stream:*

AERHDM, dated July 2, 2013. The data recorded in the BDRs supported the radiological information. The PL V&V process for DTC was evaluated by reviewing the following BDRs:

ANLRHDTTC13001 ANLRHDTTC13003 ANLRHDTTC13007

The audit team verified the BDRs for DM of RH SCG S5000 debris waste from containers at the ANL/CCP. The data assembled into the BDRs supported one debris waste stream identified as *AERHDM*. The data was complete and accurate concerning the details of the reports. The reports were produced according to CCP-TP-513, Rev. 2, *CCP Procedure for Dimensional or Gravimetric Measurements for Radiological Characterization of Remote-Handled Transuranic Waste*. The team verified the DM data reviewed in the BDRs was evaluated against the WSPF and radiological characterization contained in CCP-AK-ANLE-500, Rev. 11, *CCP Acceptable Knowledge Summary Report for Argonne Remote-Handled Debris Waste – Waste Stream: AERHDM*, dated July 2, 2013. The PL V&V process for DM was evaluated by reviewing the following BDRs:

RHANLDG12005 RHANLDG13001 ANLE-RH-50-62
ANLE-RH-50-64 ANLE-RH-50-65 ANLE-RH-50-66
ANLE-RH-50-68

The procedures reviewed and objective evidence assembled and evaluated during the audit provided evidence that the applicable requirements for data generation-level and Project Level validation and verification are adequately established for compliance with upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

5.4.3 Visual Examination

The audit team reviewed procedures CCP-TP-500, Rev. 12, *CCP Remote-Handled Waste Visual Examination*, and CCP-QP-002, Rev. 35, *CCP Training and Qualification Plan*, to determine their adequacy in addressing upper-tier requirements. The review determined that the procedures adequately address requirements. Procedures CCP-TP-163, Rev. 4, *CCP Evaluation of Waste Packaging Records for Visual Examination of Records*, and CCP-TP-509, Rev. 4, *CCP Remote-Handled Transuranic Container Tracking*, were also evaluated. The review determined that the procedures adequately address upper-tier documents. ANL/CCP has not performed VE of records in the year since the previous audit (A-12-16).

ANL/CCP uses the two-operator method when performing VE characterization. The audit team interviewed VE operators and VE experts. The audit team also examined VE operational logbooks (RH-ANLE-VE-014) and verified logbook entries were logged correctly and reviewed by the Vendor Project Manager (VPM), as required. The audit team toured the Alpha Gamma Hot Cell Facility in Building 212 and observed the VE being performed on container 1160.

The audit team examined the following RH VE BDRs generated from operations performed in the AGHCF in Building 212 to verify implementation and compliance with the requirements for documenting VE activities:

ANLRHVE12011	ANLRHVE12015	ANLRHVE12016
ANLRHVE12017	ANLRHVE12018	ANLRHVE12019
ANLRHVE13001	ANLRHVE13002	ANLRHVE13003
ANLRHVE13004	ANLRHVE13005	ANLRHVE13006
ANLRHVE13007	RHANLVE100015	

The audit team verified that all containers listed in these BDRs were on the Acceptable Knowledge Tracking Spreadsheet (AKTSS). The AKTSS is used for tracking RH TRU waste containers during the overall characterization activities at ANL/CCP.

The audit team examined training records for five VE operators/independent technical reviewers (ITRs) and confirmed the appointment of two ANL/CCP VE Experts (VEEs). The audit team verified that VE operators, ITRs, and VEEs were appropriately qualified.

The procedure reviews, field observations, and document reviews provided evidence that the applicable requirements for characterizing RH SCG S5000 debris waste using the VE process is adequately established for compliance with upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

5.4.4 Dose-to-Curie

The audit team assessed the continued adequacy, implementation, and effectiveness of the DTC methodologies used at ANL by the CCP to characterize waste stream AERHDM. The team evaluated the actual measurement of the dose rate and the subsequent determination of required waste container data. For DTC, the dose rate is defined as the external exposure rate from gamma-ray emitting radionuclides within the waste matrix, predominately Cesium-137 (Cs-137).

Based on a review of the current revisions of CCP procedures, reports, and waste data provided prior to and during the audit, a checklist was prepared and used to evaluate the following:

- Proper development and documentation of the waste streams as documented in an AK Summary Report (a "500" report)
- Proper development, implementation, and products were produced from a Radiological Characterization Technical Report (a "501" report)
- Waste stream AERHDM is adequately addressed in a Waste Certification Plan for 40 Code of Federal Regulations (CFR) Part 194 Compliance (a "502" report)
- Development of average radionuclide ratios through sampling and/or modeling

- Development of the relationship between the measured dose or exposure rate and the activity of Cs-137
- Calculation of the radionuclide activities and other derived radiological quantities and associated uncertainties
- Any significant program changes or deviation since Audit A-12-16
- Results of applying the DTC to characterize waste since Audit A-12-16
- Determination of the number of containers examined and completed BDRs that had been through project-level review that were generated since Audit A-12-16
- Completed BDRs to ensure data are reported and reviewed as required
- Data storage and retrievability
- Personnel qualification and training
- Continued operability and condition of the equipment used in the DTC since Audit A-12-16

The source of the RH waste at the ANL was the examination of fuel pins and reactor materials in the AGHCF and the K-Wing in the Chemical Technology Building. Scaling factors were developed from information about these fuel pins and reactor materials. This information included the fuel's initial composition and irradiation history. The ORIGEN2.2 computer code was used to model the burn-up of nuclear fuel, including the decay and in-growth of progeny radionuclides to arrive at a radionuclide inventory. This radionuclide inventory was used to estimate the ratios of the activities of all radionuclides present in any appreciable quantity, and particularly any of the 10 WIPP-tracked radionuclides present, to that of Cs-137 in cases where the DTC methodology was applied.

To confirm the ORIGEN2.2 modeling results, radionuclide ratios were calculated for approximately 400 fuel pins that were also examined at the Los Alamos National Laboratory (LANL) using mass spectrometry. The modeled values were compared to the mass spectrometry results. Agreement between the ratios calculated using ORIGEN2.2 and those measured by mass spectrometry demonstrate that ORIGEN2.2 is an appropriate model for calculating the radionuclide ratios for irradiated fuel pins with fuel compositions and irradiation histories similar to those examined at LANL.

The DTC measurement apparatus remained in service in the Building 331 shell for the previous year since Audit A-12-16. In this apparatus the exposure rate, attributed entirely to Cs-137, is measured four times at a distance of 1.0 meter from the waste containers. Auditors interviewed operations personnel about the set-up and calibration of the measurement apparatus for performing DTC and reviewed calibration certification documentation as well as operational logbooks. A Thermo Electron Model RO-7 survey meter, fitted with the appropriate probe (RO-7LD or RO-7BM), is used to gather high-range measurements, and a Model FH 40G, fitted with a FHZ 612 probe, is used to gather low-range measurements. Each container is rotated 90 degrees successively between each of the four measurements. The average measured dose or exposure rate for each 30-gallon waste container and associated scaling factors are used to estimate the activity of individual radionuclides and other derived radiological quantities and associated uncertainties.

The audit team interviewed DTC personnel, and examined electronic and paper copies of reports, records, and results.

Since the previous recertification audit, ten DTC BDRs have been completed through Project Level review:

ANLRHDTTC13005	ANLRHDTTC13006	ANLRHDTTC13004
ANLRHDTTC13007	ANLRHDTTC12008	ANLRHDTTC13003
ANLRHDTTC13001	ANLRHDTTC13002	ANLRHDTTC12009
ANLRHDTTC12007		

Overall, the audit team determined that DTC procedures and activities were adequately established for compliance with upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired result.

5.4.5 Dimensional Measurement

For the application of the dimensional methodology, the length of geometrically uniform RH waste is used in conjunction with a derived concentration of radiological properties expressed as a function of length. The audit team interviewed personnel performing DM, and examined electronic and paper copies of reports, records, and results.

Based on a review of the current revisions of CCP procedures, reports, and waste data provided prior to and during the audit, a checklist was prepared and used to evaluate the following:

- Proper development and documentation of the waste streams AK as documented in an AK Summary Report (a "500" report)
- Proper development, implementation, and products were produced from a Radiological Characterization Technical Report (a "501" report)
- Waste stream AERHDM is adequately addressed in a Waste Certification Plan for 40 CFR Part 194 Compliance (a "502" report)
- Development of average radionuclide ratios through sampling and/or modeling
- Development of the relationship between the measured length and the required radiological properties
- Measurement of the external dose or exposure rate or length of the waste
- Calculation of the radionuclide activities and other derived radiological quantities and associated uncertainties
- Any significant program changes or deviation since Audit A-12-16
- Results of applying the dimensional methodologies to characterize waste since Audit A-12-16
- Determination of the number of containers examined and completed BDRs that had been through project-level review that were generated since Audit A-12-16

- Completed BDRs to ensure data are reported and reviewed as required
- Data storage and retrievability
- Personnel qualification and training
- Continued operability and condition of the equipment used in the dimensional methods since Audit A-12-16

The source of the RH waste at the ANL was the examination of fuel pins and reactor materials in the AGHCF and the K-Wing in the Chemical Technology Building. Scaling factors were developed from information about these fuel pins and reactor materials. This information included the fuel's initial composition and irradiation history. The ORIGEN2.2 computer code was used to model the burn-up of nuclear fuel, including the decay and in-growth of progeny radionuclides to arrive at a radionuclide inventory. This radionuclide inventory was used to estimate the ratios of the activities of all radionuclides present in any appreciable quantity, and particularly any of the 10 WIPP-tracked radionuclides present, as a function of length versus a function of Cs-137 dose rate as in DTC. The dimensional methodology correlates measurements of length with modeling results that express the desired radiological quantities as a function of length to yield the required radiologic quantities. During CBFO Recertification Audit A-12-16, CBFO CAR 12-039 was generated to address references to a non-number-controlled Argonne Intra-Laboratory memorandum used to define the Acceptable Difference limit criteria for differences in FEW segment lengths described in the AK and the actual length derived during the measurement at VE. The team verified the Acceptable Difference limit criteria stated in the memorandum had been included in the current CCP-TP-513 number-controlled, which corrected the issue, and did not identify any related issues. Sustaining corrective action was verified.

The audit team interviewed personnel performing DM, and examined electronic and paper copies of reports, records, and results.

Since the previous recertification audit, 15 BDRs utilizing the DM methodology have been completed through project-level review:

RHNLDG12004	RHNLDG12005	RHNLDG13001
ANLE-RH-50-62	ANLE-RH-50-61	ANLE-RH-50-63
ANLE-RH-50-64	ANLE-RH-50-65	ANLE-RH-50-66
ANLE-RH-50-67	ANLE-RH-50-68	ANLE-RH-50-58
ANLE-RH-50-59	ANLE-RH-50-60	ANLE-RH-50-57

Overall, RH waste characterization using the DM methodology, including all procedures and activities, was determined to be adequately established for compliance with upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired result.

5.4.6 Transportation

The audit team conducted interviews with responsible personnel and reviewed implementing procedures CCP-QP-030, Rev. 8, *CCP Written Practice for the Qualification of CCP Helium Leak Detection Personnel*; CCP-QP-032, Rev. 1, *CCP Written Practice for the Qualification of CCP Pressure Change Leak Detection Personnel*; CCP-TP-055, Rev. 5, *CCP Varian Porta-Test Leak Detector Operations*; CCP-TP-507, Rev. 8, *CCP Shipping of Remote-Handled Transuranic Waste*; and CCP-TP-530, Rev. 11, *CCP RH TRU Waste Certification and WWIS Data Entry*, relative to transportation activities, to determine the degree to which procedures adequately address upper-tier requirements. The results of the review indicate the procedures adequately address upper-tier requirements.

Shipping activities were observed August 26 – 28, 2013. The audit team observed the loading of three drums of RH TRU waste provided to ANL/CCP by ANL into RLC number AE0161, and observed the RLC being closed. Filters for the RLC were verified to be compliant. The RLC was then loaded into shipping cask 00-08 and onto trailer RH001 for ANL shipment AER13023. Helium leak testing was performed on the inner vessel and outer container of the shipping cask to verify shipment integrity. The team observed the receipt of an empty RH TRU 72B shipping container and evaluated the shipping container maintenance activities, shipping container integrity checks, and payload preparation operations being performed by ANL/CCP, and no deficiencies were noted.

The audit team examined shipping documentation and verified that measurement and testing equipment used were appropriately calibrated and used prior to calibration expiration dates. Transportation personnel training and qualification were assessed, including operator qualifications, helium leak testing qualifications, and Transportation Certification Official (TCO) qualification. All qualification requirements applicable to transportation personnel were met.

The audit team verified the procedures ensure accurate identification of container-specific information, and the accurate completion of the U.S. Environmental Protection Agency Uniform Hazardous Waste Shipping Manifests. The audit team reviewed one RH shipping data package, AER13023, which was prepared from the activities observed during Audit A-13-24, and verified that the data required in the C6-1 checklist had been properly included and verified.

No concerns were identified during the audit. The procedures reviewed and objective evidence assembled concluded that the applicable requirements for transportation are adequately established for compliance with upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

5.4.7 WIPP Waste Information System/Waste Data System

The audit team evaluated implementation of CCP-TP-530, Rev. 11, *CCP RH TRU Waste Certification and WWIS/WDS Data Entry*, for data entry using the WWIS/WDS data entry spreadsheet. The evaluation included data population of the spreadsheet, review of data

entry by a Waste Certification Assistant, and waste certification by the Waste Certification Official. Record reviews included CCP data spreadsheet reports, container information summaries, pages from BDRs showing analyses values, WWIS/WDS Container Data Reports, and submittals for WWIS review/approval.

The team reviewed three WWIS/WDS waste certification packages for RH waste. The packages reviewed were for Canister AE0130, which had three internal containers (1121, 1122, and 1123), Canister AE0150, which had three internal containers (1148, 1150, and 1153), and Canister AE0157, which also had three internal containers (1089, 1168, and 1169). The RH WWIS/WDS waste certification packages were for waste stream AERHDM.

Overall, the audit team determined that the WWIS/WDS activities were adequately established for compliance with upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired result.

6.0 CARS, CDAs, OBSERVATIONS, AND RECOMMENDATIONS

6.1 Corrective Action Reports

During the audit, the audit team may identify conditions adverse to quality, as described below, and document such conditions on CARs.

Condition Adverse to Quality (CAQ) – Term used in reference to failures, malfunctions, deficiencies, defective items, and nonconformances.

Significant Condition Adverse to Quality – A condition which, if uncorrected, could have a serious effect on safety, operability, waste confinement, TRU waste site certification, compliance demonstration, or the effective implementation of the QA program.

There were no CARs generated during Audit A-13-24.

6.2 Deficiencies Corrected During the Audit

During the audit, the audit team may identify CAQs. The audit team members and the audit team leader (ATL) evaluate the CAQs to determine if they are significant. Once a determination is made that the CAQ is not significant, the audit team member, in conjunction with the ATL, determines if the CAQ is an isolated case requiring only remedial action and therefore can be corrected during the audit (CDA).

Upon determination that the CAQ is isolated, the audit team member, in conjunction with the ATL, evaluates/verifies any objective evidence/actions submitted or taken by the audited organization and determines if the condition was corrected in an acceptable manner. Once it has been determined that the CAQ has been corrected, the ATL categorizes the condition as a CDA according to the following definition:

CDAs – Isolated deficiencies that do not require a root cause determination or actions to preclude recurrence. Correction of the deficiency can be verified prior to the end of the audit. Examples include one or two minor changes required to correct a procedure (isolated), one or two forms not signed or not dated (isolated), and one or two individuals that have not completed a reading assignment.

There were two CAQs identified and corrected during the audit.

CDA- 1

Condition:

During the review of NCR-RHANL-0509-13, Rev. 1, it was identified that the CCP QA Engineer did not sign the validation block (14) on the NCR. The CCP QA Engineer's printed name and a date appear on the form, but it is not signed, as required by the form and procedure.

Requirement:

CCP-QP-005, *CCP TRU Nonconforming Item Reporting and Control*, Rev. 22, Section 4.2.14 states, "IF the NCR is determined to be valid, THEN validate the NCR by signing concurrence in Block 14."

Upon identification, QA Management personnel corrected the inconsistencies and provided the audit team with a corrected copy of NCR-RHANL-0509-13, which was verified prior to the conclusion of the audit.

CDA-2

Condition:

Three completed radiological surveys and three completed RLC loading forms were not available in NTPC Records at the time of the audit.

Requirement:

CCP-QP-008, *CCP Records Management*, Rev. 21, Section 4.1.10 states, "Send completed QA records (e.g. BDRs) via Attachment 2 to the Records Custodians/Facility Records Custodians."

Investigation of this CAQ identified that ANL/CCP had revised the records submittal process and the cited records packages (generated immediately following the change) had not been submitted as required. Duplicate records were available in related transportation records, which validated that the radiological surveys and the loading forms had been completed as required, but not submitted. Review of the total population of RLC radiological surveys and loading forms generated since Audit A-12-16 identified that

this CAQ was an isolated occurrence. Transmittal of the missing surveys and loading forms to NTPC Records was verified prior to the conclusion of the audit.

6.3 Observations

During the audit, the audit team may identify potential problems that should be communicated to the audited organization. The audit team member, in conjunction with the ATL, evaluates these conditions and classifies them as observations using the following definition:

Observation – A condition that, if not controlled, could result in a CAQ.

There were no observations generated during Audit A-13-24.

6.4 Recommendations

During the audit, the audit team may offer suggestions for improvement that should be communicated to the audited organization. The audit team members, in conjunction with the ATL, evaluate these conditions and classify them as recommendations, using the following definition:

Recommendations – Suggestions that are directed toward identifying opportunities for improvement and enhancing methods of implementing requirements.

The audit team offers the following recommendation to ANL/CCP. These comments identify areas that could be modified or revised to: a) address recent permit modifications, or b) provide clarity.

Recommendation 1

The following changes are for clarification to the current revision of the AK Summary Report:

- P 13, bullet 2-remove "Koroseal," separate "styrene butadiene" with a comma
- P 17, bullet 5-remove parentheses "(Revision 7)"
- P 25, bullet 3-change "liquid water breeder reactor" to "light water breeder reactor"
- P 27, paragraph 1-clarify language and provide a reference that UREX experiments could not generate HLW.
- P 31, Section 4.6.3-clarify the language in this section with regard to the role that the WMO-195 and WMO-195A forms play in the characterization of this waste stream
- P 65, table 6-move "AGHCF, Carbide FEW, 2nd batch, >1/2" Fuel Remnants to Appendix C
- All-address tense issues as feasible, indicating work completed and future activities

7.0 LIST OF ATTACHMENTS

- Attachment 1: Personnel Contacted During Audit A-13-24**
- Attachment 2: Summary Table of Audit A-13-24 Results**
- Attachment 3: Listing of Audited Procedures**
- Attachment 4: Processes and Equipment Evaluated During Audit A-13-24**

PERSONNEL CONTACTED DURING AUDIT A-13-24				
NAME	TITLE/ORG	PRE-AUDIT MEETING	CONTACTED DURING AUDIT	POST-AUDIT MEETING
Amnijo, C.	Rec. Analyst/NTPC		X	
Beallis, P.	DTC Operator/ANL		X	
Billett, M.	Training Coordinator/NTPC		X	
Bond, E.	VEO/NWM		X	
Cooney, J.	Chief HP/ANL		X	
Dietzel, D.	Fed. Prog. Dir./DOE-ASO	X		
Groberg, C.	Operator MLU/CCP		X	
Heston, S.	Div. Dir./DOE-ASO	X		X
Joo, I.	RH Proj. Manager/CCP	X	X	
Kirkes, C.	WCO/CCP		X	
Klosowsle, K	DTC Operator/ANL		X	
Ledford, W.	Auditor/NWP	X		X
Mueller, T	QA Specialists/CCP		X	
Pancake, D.	Proj. Manager/ANL	X		X
Pattee, S.	VEE/CCP	X	X	X
Pearcy, S.	Records Manager/NTPC	X	X	
Peters, K.	AKE/CCP	X	X	X
Redman, G.	VEO/NWM		X	
Rock, C.	Prog. Manager/ANL	X		X
Root, W	SPM-VPM/CCP	X	X	X
Sensibaugh, M.	CCP Ops. Dir./NWP	X		
Tyson, M.	Operator MLU/CCP		X	
Weyerman, C.W.	Manager/CCP-MLU	X	X	
York, R.	TCO-MLU/CCP		X	

SUMMARY TABLE OF AUDIT A-13-24 RESULTS

Program Element	Concern Classification				QA Evaluation		Technical
	CARs	CDAs	Obs.	Rec.	Adequacy	Implementation	Effectiveness
Activity							
Program Status					A	S	E
Acceptable Knowledge (AK)				X	A	S	E
Visual Examination (VE)					A	S	E
Project Level V&V					A	S	E
Dose-to-Curie (DTC)					A	S	E
Dimensional Measurement (DM)					A	S	E
WIPP Waste Information System					A	S	E
Personnel Qualification & Training					A	S	E
Nonconformance Reporting		X			A	S	E
Records		X			A	S	E
RH 72-B Operations/Waste Certification/Transportation					A	S	E
TOTALS		2		1	A	S	E

Definitions

E = Effective
 S = Satisfactory
 I = Indeterminate

CAR = Corrective Action Report
 CDA = Corrected During the Audit
 NE = Not Effective
 Obs. = Observation

Rec. = Recommendation
 A = Adequate
 NA = Not Adequate

Audit A-13-24 LISTING OF AUDITED PROCEDURES

	Document No.	Rev.	Document Title
1.	CCP-PO-001	21	CCP TRU Waste Characterization QAPJP
2.	CCP-PO-002	27	CCP Transuranic Waste Certification Plan
3.	CCP-PO-005	23	CCP Conduct of Operations
4.	CCP-PO-006	4	CCP Conduct of Operations Matrix
5.	CCP-PO-500	6	CCP/ANL RH TRU Waste Interface Document
6.	CCP-PO-505	2	CCP RH Transuranic Authorized Methods For Payload
7.	CCP-QP-001	8	CCP Graded Approach
8.	CCP-QP-002	35	CCP Training and Qualification Plan
9.	CCP-QP-005	23	CCP TRU Nonconforming Item Reporting and Control
10.	CCP-QP-008	21	CCP Records Management
11.	CCP-QP-010	24	CCP Document Preparation, Approval, and Control
12.	CCP-QP-014	6	CCP Trend Analysis and Reporting
13.	CCP-QP-015	12	CCP Procurement
14.	CCP-QP-016	18	CCP Control of Measuring and Testing Equipment
15.	CCP-QP-017	3	CCP Identification And Control Of Items
16.	CCP-QP-018	10	CCP Management Assessment
17.	CCP-QP-019	7	CCP Quality Assurance Reporting to Management
18.	CCP-QP-021	8	CCP Surveillance Program
19.	CCP-QP-022	13	CCP Software Quality Assurance Plan
20.	CCP-QP-023	4	CCP Handling, Storage and Shipping
21.	CCP-QP-026	14	CCP Inspection Control
22.	CCP-QP-027	6	CCP Test Control
23.	CCP-QP-028	15	CCP Records Filing, Inventorying, Scheduling, and Dispositioning
24.	CCP-QP-029	0	CCP Corrective Action Management
25.	CCP-QP-030	8	CCP Written Practice for the Qualification of CCP Helium Leak Detection Personnel
26.	CCP-TP-001	21	CCP Project Level Data Validation and Verification
27.	CCP-TP-002	26	CCP Reconciliation of DQOs and Reporting Characterization Data
28.	CCP-TP-005	25	CCP Acceptable Knowledge Documentation
29.	CCP-TP-055	5	CCP Varian Porta-Test Leak Detector Operations
30.	CCP-TP-082	9	CCP Waste Container Filter Vent Operation
31.	CCP-TP-163	4	CCP Evaluation of Waste Packaging Records for VE of Records
32.	CCP-TP-500	12	CCP RH Waste VE
33.	CCP-TP-504	14	CCP D-T-C Survey Proc. for RH TRU Waste
34.	CCP-TP-505	7	CCP Removable Lid Canister Loading
35.	CCP-TP-506	2	CCP Preparation of the RH TRU Waste AK Characterization Reconciliation Report
36.	CCP-TP-507	8	CCP Shipping of RH TRU Waste
37.	CCP-TP-509	4	CCP RH TRU Container Tracking
38.	CCP-TP-512	6	CCP RH Waste Sampling
39.	CCP-TP-513	2	CCP Procedure for Dimensional or Gravimetric Measurements for Radiological Characterization of RH TRU Waste
40.	CCP-TP-530	11	CCP RH TRU Waste Certification and WWIS/WDS Data Entry
41.	WP 13-QA.03	22	QA Independent Assessment Program

PROCESSES AND EQUIPMENT EVALUATED DURING AUDIT A-13-24

WIPP #	Process/Equipment Description	Applicable to the Following Waste Streams/Groups of Waste Streams	Currently Approved by NMED	Currently Approved by EPA
PREVIOUSLY APPROVED PROCESSES OR EQUIPMENT				
The following were evaluated during Audit A-13-24				
8RHVE1	Visual Examination CCP-TP-500, Remote-Handled Waste Visual Examination CCP-TP-163, CCP Evaluation of Waste Packaging Records for Visual Examination of Records	Debris (S5000)	YES	YES (Records only)
8RHVE2	Visual Examination of Newly Packaged RH Waste Drums CCP-TP-500, Remote-Handled Waste Visual Examination	Debris (S5000)	YES	YES
Not Applicable	Acceptable Knowledge CCP-TP-005, CCP Acceptable Knowledge Documentation	Debris (S5000)	YES	YES
Not Applicable	Data Verification and Validation CCP-TP-001, CCP Project Level Data Validation and Verification CCP-TP-500, Remote-Handled Waste Visual Examination CCP-TP-504, CCP Dose-to-Curie Survey Procedure for RH TRU Waste	Debris (S5000)	YES	YES
8RHGM1	Dimensional Measurement CCP-TP-513, Procedure for Dimensional or Gravimetric Measurements for Radiological Characterization of RH TRU Waste	Debris (S5000)	N/A	YES (Dimensional Only)
8DTC1	Dose-to-Curie CCP-TP-504, CCP Dose-to-Curie Survey Procedure for RH TRU Waste	Debris (S5000)	N/A	YES
Not Applicable	Quality Assurance	N/A	N/A	YES
Not Applicable	WIPP Waste Information System (WWIS)/Waste Data System (WDS)	N/A	YES	YES