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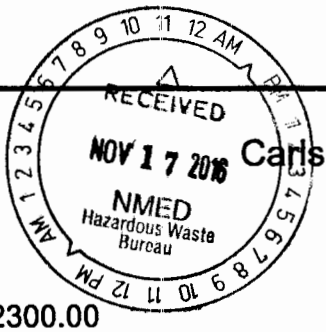

memorandum

Carlsbad Field Office
Carlsbad, New Mexico 88221

DATE: NOV 17 2016

REPLY TO ATTN OF: CBFO:OQA:MPN:BA:16-3504:UFC 2300.00

SUBJECT: Interim Audit Report A-17-08, ANL/CCP TRU Waste Characterization and Certification

TO: Mr. Dan Misch, DOE-ASO

The Carlsbad Field Office (CBFO) conducted annual Recertification Audit A-17-08, Argonne National Laboratory Central Characterization Program (ANL/CCP) Transuranic (TRU) Waste Characterization and Certification, November 1 – 3, 2016. The interim audit report is attached.

The audit team concluded 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.

As a result of the audit, one observation was identified and one recommendation was offered to ANL/CCP management for consideration.

If you have any questions or comments concerning the interim audit report, please contact me at (575) 234-7483.

Martin P. Navarrete
Senior Quality Assurance Specialist

Attachment

161119

cc: w/attachment

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U.S. DEPARTMENT OF ENERGY
CARLSBAD FIELD OFFICE

INTERIM AUDIT REPORT

OF THE

ARGONNE NATIONAL LABORATORY
CENTRAL CHARACTERIZATION PROGRAM

FOR

CHARACTERIZATION AND CERTIFICATION ACTIVITIES
FOR REMOTE-HANDLED TRANSURANIC WASTE
AT
LEMONT, ILLINOIS
AND CARLSBAD, NEW MEXICO

AUDIT NUMBER A-17-08

NOVEMBER 1 – 3, 2016

Prepared by: Katie D. Chester Date: 11-17-2016
Katie D. Chester, CTAC
Audit Team Leader

Approved by: Michael R. Brown Date: 11/17/2016
Michael R. Brown, CBFO
Director, Office of Quality Assurance

1.0 EXECUTIVE SUMMARY

Carlsbad Field Office (CBFO) Recertification Audit A-17-08 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), and the *CBFO Quality Assurance Program Document* (QAPD). The audit also evaluated the newly implemented requirements in Revision 8 of DOE/WIPP-02-3122, *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant* (hereafter called the WIPP WAC).

The audit was conducted simultaneously at the ANL facilities in Lemont, Illinois, and the Skeen-Whitlock Building in Carlsbad, New Mexico, November 1 – 3, 2016. 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, satisfactorily implemented, and effective. The audit team was unable to completely evaluate the enhanced Acceptable Knowledge (AK) processes; therefore, implementation and effectiveness of enhanced AK could not be verified and was deemed indeterminate. Also, CBFO has not provided the required Basis of Knowledge Document specifying when waste with oxidizing chemicals is acceptable; therefore, it was not available for evaluation during the audit.

The audit identified two concerns in the area of ANL/CCP Program Interface. One concern was determined to be an observation (see section 6.3, Observations) and the other resulted in a recommendation (see section 6.4, Recommendations).

The identified concerns are further 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

Technical Activities

- Acceptable Knowledge (AK)
- Project Level Data Validation and Verification (PL V&V)
- Visual Examination (VE)
- Dose-to-Curie (DTC)
- Dimensional Measurement (DM)
- 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:

- WIPP HWFP, 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
- Related technical and QA implementing procedures

2.2 Purpose

Audit A-17-08 was conducted to assess ANL/CCP's sustained compliance with requirements applicable to waste characterization and certification activities for RH SCG S5000 debris waste and to determine if these requirements are adequately established and effectively implemented.

3.0 AUDIT TEAM, MANAGEMENT REPRESENTATIVES, AND OBSERVERS

Martin Navarrete	Management Representative, CBFO Office of Quality Assurance
Katie Chester	Audit Team Leader (ATL), CBFO Technical Assistance Contractor (CTAC)
Cindi Castillo	Auditor, CTAC
Rick Castillo	Auditor, CTAC
Greg Knox	Auditor, CTAC
Charlie Riggs	Auditor, CTAC
Jim Schuetz	Auditor, CTAC
Ricardo Chavez	Auditor-in-Training, CTAC
Dick Blauvelt	Technical Specialist, CTAC
Rhett Bradford	Technical Specialist, CTAC
Randy Fitzgerald	Technical Specialist, CTAC
Jim Oliver	Technical Specialist, CTAC
Jim Vernon	Technical Specialist, CTAC

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 the ANL in Lemont, Illinois, and the Skeen-Whitlock Building in Carlsbad, New Mexico, on November 1, 2016. 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 the ANL in Lemont, Illinois, and the Skeen-Whitlock Building in Carlsbad, New Mexico, on November 3, 2016.

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. The audit team was unable to completely evaluate the enhanced AK processes; therefore, implementation and effectiveness of enhanced AK could not be verified and was deemed indeterminate.

A summary table of audit results is provided in Attachment 2. Audit activities, including objective evidence reviewed, are described below and in checklists and/or forms for objective evidence reviewed. 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

The audit team examined the results of the previous CBFO recertification audit (A-15-24) of the ANL/CCP. Audit A-15-24 identified one condition adverse to quality (CAQ), which resulted in the issuance of corrective action report (CAR) 16-001. According to procedure CCP-TP-500, Rev. 15, section 4.2.5[B.2], Attachment 1 is to be signed and dated to annotate that visual examination had been completed; however, indirect load containers 1348 and 1379 from batch data report (BDR) ANLRHVE14004 were completed and then characterized again using the same Attachment 1 (i.e., removing items from the waste description, striking the first instance of the operators' signatures, and operators re-signing the form). There was no procedural instruction to perform this process.

During the performance of this audit, the audit team did not observe any instances similar to the conditions identified in the previous audit, suggesting that the corrective actions taken to address the CAQ were adequate in precluding recurrence.

5.2.2 Changes in Programs or Operations

The audit team determined through interviews with the CCP RH Operations Manager that there were no significant changes in ANL/CCP programs or operations since the previous recertification audit. During the audit, DTC and VE field activities/operations were verified.

5.2.3 New Programs or Activities Being Implemented

The audit team determined through interviews with the CCP RH Operations Manager that there were no new ANL/CCP programs or activities implemented since the previous recertification audit.

5.2.4 Changes in Key Personnel

Interviews with the ANL/CCP management team concluded that there were no significant changes in key personnel since CBFO Recertification Audit A-15-24.

5.2.5 ANL/CCP Program Interface

The audit team reviewed the current revisions of CCP-PO-500, *CCP/ANL RH TRU Waste Interface Document*, CCP-PO-001, *CCP Transuranic Waste Characterization Quality Assurance Project Plan* (QAPjP); and CCP-PO-002, *CCP Transuranic Waste Certification Plan*, to verify the documents address the requirements in the WIPP HWFP Waste Analysis Plan (WAP) and DOE/WIPP 02-3122, *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant.* The audit team also verified that CCP-PO-500 addresses flow-down requirements of CCP-PO-043, *CCP Interface Document Preparation.* The results of this review indicate that the documents adequately address the associated requirements.

The audit team interviewed the CCP RH Operations Manager, the CCP Vendor Project Manager (VPM), and the Host Site Management Representative (SMR) responsible for ANL waste characterization activities. The audit team reviewed objective evidence to confirm requirements were met as specified in the ANL/CCP Interface Document, CCP-PO-500, Revision 7, dated January 14, 2016, for RH TRU waste characterization activities. Requirements and implementation for the following elements were examined:

- ANL-provided radiological controls
- ANL site-specific training
- AK summary report provisions
- QA validation of nonconformance reports (NCRs)
- QA receipt inspections
- Program document review coordination
- Host-site performance of QA assessments
- Certified container segregation/container management
- VPM daily pre-operational briefings
- Measuring & test equipment (M&TE) recall notifications
- Site-provided bioassay participation
- Project Control via weekly status meetings
- Interface Waste Management Documents List (IWMDL)
- CCP QA surveillances

The audit team evaluated Department of Energy (DOE)-Argonne Site Office (ASO) Management Assessment (MA) Report NWM-FY16-MA-007, which is noteworthy. The purpose of the MA was to evaluate the Argonne TRU waste management processes to ensure that the necessary program elements exist and to ensure that all TRU waste containers generated by Argonne are compliant with the WAC, CBFO technical expectations, and emerging technical direction provided by the CBFO Office of the National TRU Program (NTP) to generating/host sites. The assessment was conducted in January 2016.

Elements of the new AK enhancements were evaluated during the audit. The audit team verified that an IWMDL was developed for waste stream AERHDM. The team reviewed an IWMDL dated June 10, 2016, and the current one dated August 11, 2016,

to verify they included the facility processes, plans, and procedures that control the waste management activities, as required. The audit team was not able to verify implementation of the AK Assessment, as it is still in draft form. Please refer to the AK section of this report for further details.

Two concerns related to the interface document were identified. The first concern regarded CCP QA surveillances conducted at ANL. After review of objective evidence provided, the audit team observed that it has been over four years since a CCP QA surveillance was conducted at ANL. Section 4.14.2 of CCP-PO-500 instructs CCP to conduct periodic QA surveillances to assess compliance with applicable WIPP requirements. The last QA surveillance conducted by CCP at ANL was in August 2012 (Ref. SU-RHANL-0001-12). (See Observation 1 in section 6.3.)

The second concern regarded the ANL/CCP Radiological Characterization Technical Lead's indoctrination training on the WAC. Currently, the ANL/CCP RH Technical Lead is qualified to the RH Waste Radiological Characterization Technical Staff Qualification Card (RH-TS-01, Rev. 1). This is a one-time qualification that does not include indoctrination training on the WAC or CCP's implementing procedure CCP-PO-002, *CCP Transuranic Waste Certification Plan.* During the audit, objective evidence (a read and sign form) was provided to demonstrate that the RH Technical Lead completed required reading of CCP-PO-002 on July 28, 2016.

CBFO intends to revise the WAC, Rev. 8, to include the WCPIP requirements and then the WCPIP will be obsolete. Once this occurs, the audit team recommends that CCP revise the RH Waste Radiological Characterization Technical Staff Qualification Card to include indoctrination training on the WAC and CCP-PO-002. (See Recommendation 1 in section 6.4.)

With the exception of the two concerns identified, the requirements specified in the interface document were determined to be adequate, satisfactorily implemented, and effective.

5.3 Quality Assurance Activities

5.3.1 Control of Nonconforming Items

The audit team reviewed implementing procedure CCP-QP-005, Rev. 25, *CCP TRU Nonconforming Item Reporting and Control*, to determine the degree to which the procedure adequately addresses upper-tier requirements. Results of the review indicate that the procedure adequately addresses upper-tier requirements. The audit team interviewed the CCP NCR Coordinator, reviewed the project-level and data generation-level NCR logs, and selected three of the NCRs generated since the previous audit for review:

NCR-RHANL-0216-15, Rev. 0
NCR-RHANL-0164-16, Rev. 0 and Rev. 1
NCR-RHANL-0165-16, Rev. 0 (in process)

The team concluded that deficiencies are being appropriately documented and tracked through resolution as required. There were no NCRs generated that required reporting to the Permittee within seven days, as prescribed by the WIPP HWFP. All of the NCRs examined were verified to have been entered, managed, and tracked in the CCP Integrated Data Center (IDC)/Nonconformance Report Log, and through the required reconciliation reporting mechanism.

The procedures reviewed and objective evidence assembled provided evidence to confirm that the applicable requirements for nonconformance reporting are adequately established for compliance with upper-tier requirements, effectively implemented, and satisfactory in achieving the desired results. No concerns were identified.

5.3.2 Personnel Qualification and Training

The audit team conducted interviews with responsible personnel and reviewed implementing procedure CCP-QP-002, Rev. 41, *CCP Training and Qualification Plan*, to determine compliance with upper-tier requirements of the CBFO QAPD. Personnel training record packages that are associated with VE, DTC, AK Experts (AKEs), RH technical staff, and Site Program Manager (SPM) positions were examined to verify implementation of associated requirements and to verify that personnel performing characterization activities are appropriately qualified. Training record packages were determined to be adequate and included appropriate qualification cards, appointment letters, and other associated qualification documentation. Packages included attendance sheets for required briefings on AK waste stream summary training for VE operators.

The procedure reviewed and objective evidence assembled provided evidence to confirm that the applicable requirements for personnel qualification and training are adequately established for compliance with upper-tier requirements, effectively implemented, and satisfactory in achieving the desired results. No concerns were identified.

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 audit team reviewed the following CCP procedures:

- CCP-PO-001, Rev. 22, *CCP Transuranic Waste Characterization Quality Assurance Project Plan*
- CCP-PO-002, Rev. 29, *CCP Transuranic Waste Certification Plan*
- CCP-QP-008, Rev. 26, *CCP Records Management*
- CCP-QP-028, Rev. 16, *CCP Records Filing, Inventorying, Scheduling, and Dispositioning*

Details for control of QA records were verified by review of the Records Inventory and Disposition Schedule dated July 15, 2016, for NWP/CCP RH (All Sites).

The procedures reviewed and objective evidence assembled provided evidence that the applicable requirements for records are adequately established for compliance with upper-tier requirements, effectively implemented, and satisfactory in achieving the desired results. No concerns were identified.

5.3.4 Container Management

The audit team reviewed implementing procedure CCP-TP-509, Rev. 6, *CCP Remote-Handled Transuranic Container Tracking*, to determine the degree to which it adequately addresses applicable upper-tier requirements. The results of this review confirmed that the procedure continues to adequately address upper-tier requirements.

The audit team observed container management activities in Building #331-Shell. The audit team verified containers are being stored in the facility, where appropriate, and adequate inventory controls are in place to manage the containers. Verification activities included confirmation that administrative controls are used to track containers and characterization status to comply with As Low As Reasonably Achievable requirements. At the time of the audit, there were no NCRs associated with the containers in Building #331-Shell. The audit team also verified that the scale used to weigh containers was appropriately calibrated, and that the current procedure revision was being utilized.

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. No concerns were identified.

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 WIPP HWFP is cited briefly, and the result of the assessment is provided.

5.4.1 Acceptable Knowledge

The audit team reviewed the following CCP documents/procedures as they relate to AK to determine the degree to which they adequately address applicable upper-tier requirements:

- CCP-PO-001, Rev. 22, *CCP Transuranic Waste Characterization Quality Assurance Project Plan*

- CCP-QP-005, Rev. 25, *CCP TRU Nonconforming Item Reporting and Control*
- CCP-TP-001, Rev. 21, *CCP Project Level Data Validation and Verification*
- CCP-TP-002, Rev. 26, *CCP Reconciliation of DQOs and Reporting Characterization Data*
- CCP-TP-005, Rev. 28, *CCP Acceptable Knowledge Documentation*
- WP 13-QA.03, Rev. 26, *Quality Assurance Independent Assessment Program*

Results of the review indicate that the procedures adequately address upper-tier requirements.

The audit team examined AK summary reports and approved waste stream profile forms (WSPFs) for waste stream AERHDM, SGC S5000 debris associated with activities in the ANL AGHCF and the K-Wing Hot Cells at ANL.

The AK portion of this recertification audit was based upon the requirements contained in the WIPP HWFP, specifically the WAP, and the WIPP WAC. The audit team reviewed documentation to support all applicable AK requirements, completing WAP C6-2 and C6-1 checklists and applicable WAC checklists, and compiling and reviewing objective evidence to demonstrate compliance.

The stream designated as AERHDM originally consisted of 44 30-gallon drums of debris waste from the AGHCF, for which VE tapes of packaging done by ANL staff were reviewed by CCP personnel. 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, along with solidified liquid waste in the K-Wing that was consolidated, sampled, and incorporated into K-Wing debris waste containers. Documentation of the most recent projections was reviewed during this audit and indicates a total waste stream population of 81 55-gallon drums from the K-Wing (complete) and 621 30-gallon drums from the AGHCF. The AK record for all aspects of this waste stream was examined to demonstrate that the waste stream has been properly delineated and populated. The audit team also verified that applicable parameters, including the assignment of hazardous waste numbers, the waste stream physical characteristics, the estimate of waste material parameter weights, and the characterization of the radiological properties of this waste stream have been completed in accordance with all applicable requirements.

The AK auditors reviewed the latest revision to the AK Summary Report for this waste stream, CCP-AK-ANLE-500, Rev. 13, and a copy of the WSPF (Rev. 1) and attachments, in addition to numerous AK source documents to establish support, as noted above, for the conclusions noted in the AK summary.

The audit team also examined the following completed procedure attachments for the waste stream, as required by CCP procedure CCP-TP-005: Attachment 1, *AK Documentation Checklist*; Attachment 4, *AK Information List*; Attachment 5, *Hazardous*

Constituents; Attachment 6, *Waste Form, Waste Material Parameters, Prohibited Items, and Packaging*, along with the attached justification memorandum for waste material parameter weight estimates; and Attachment 8, *Waste Containers List*, with memoranda supporting the addition of containers to the waste stream as applicable. Examples of the resolution of AK discrepancies in the AK record, WAP-compliant AK Accuracy Report, and the most recent internal surveillance were also collected and examined. The audit team also reviewed CCP-AK-ANLE-501, Rev. 11, *CCP Remote-Handled Transuranic Radiological Characterization Technical Report for Remote-Handled Transuranic Debris Waste from Argonne National Laboratory – East*, a WCPIP-compliant AK Accuracy Report, and Characterization Reconciliation Reports, along with the examination of relevant AK source documents.

The audit team reviewed screenshots from the IDC database, a copy of the AK Container Tracking Spreadsheet (AKTS), VE BDRs, DTC and DM data packages, and ANL WMO-195 and WMO-195A waste container input forms for three drums that have been completed through the characterization and certification process. The reconciliation of characterization data with the AK record, including a review of the applicable Waste Stream Characterization Checklists, was completed. The following three documents were reviewed as a result of the most recent revisions to CCP-TP-005 and WIPP WAC: Interface Waste Management Documents List (IWMDL), Acceptable Knowledge Assessment (AKA), and Chemical Compatibility Evaluation Memorandum (CCEM). The IWMDL (CCP-TP-005 Attachment 9) has been prepared for waste stream AERHDM and is in the AK record. This review included verification that a quarterly review of the IWMDL is being performed by the SMR and necessary revisions to the IWMDL have been completed. The AKA will be performed for each new waste stream and existing waste streams with unshipped containers. The AKA for waste stream AERHDM is in process and was not available for review. AK source document C6001 was reviewed during the previous audit and is a precursor to an AKA and is included in the objective evidence as an example of the intent of this process. The Chemical Compatibility Evaluation (CCE) and accompanying CCEM are in process. The AK auditors examined all elements of the CCE and CCEM, including documentation of the CCP internal review process and resolution of comments. A copy of the draft CCEM has been submitted to CBFO for approval and has been included as objective evidence for this audit.

The audit team verified that nonconforming data and discrepancies between AK documentation and characterization results are being appropriately identified, reported, and documented on NCRs, and the affected waste containers associated with the discrepant conditions are controlled, as required, until resolution of the deficient conditions is completed. It was noted that for the NCRs reviewed, administrative controls had been used rather than tagging to maintain segregation of the containers due to accessibility considerations. Training records for AKEs and SPMs were reviewed and found to be in compliance with the requirements of the training program.

The audit team verified that AK documentation is developed and maintained in accordance with controlled implementing procedures. Additionally, the audit team

verified that the records generated while developing AK documentation are identified in the records section of each procedure and located in the CCP Records Center as required. The audit team verified that record copies of the BDRs selected for verification of the traceability exercise were legible, accurate, complete, and properly numbered. The audit team verified that corrections to the selected BDRs and associated forms were made according to procedural requirements. Further, the audit team verified that NWP QA conducts annual independent assessments of the CCP program, which includes evaluation of the AK program. The audit team examined the most recent audit report relevant to AK, I15-14 completed October 8, 2015, and surveillance SUR-RHANL-0001-12 completed August 8, 2012, which specifically addressed ANL/CCP activities.

The procedure reviews, field observations, and document reviews provided evidence that the applicable requirements for acceptable knowledge 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 reviewed the following CCP procedures and determined the procedures adequately address upper-tier requirements:

- CCP-TP-001, Rev. 21, *CCP Project Level Data Validation and Verification*
- CCP-TP-002, Rev. 26, *CCP Reconciliation of DQOs and Reporting Characterization Data*
- CCP-TP-005, Rev. 28, *CCP Acceptable Knowledge Documentation*
- CCP-TP-500, Rev. 15, *CCP Remote-Handled Waste Visual Examination*
- CCP-TP-504, Rev. 18, *CCP Dose-to-Curie Survey Procedure for Remote-Handled Transuranic Waste*
- CCP-TP-513, Rev. 3, *CCP Procedure for Dimensional or Gravimetric Measurements for Radiological Characterization of Remote-Handled Transuranic Waste*

The following WSPF/Characterization Information Summaries (CIS) and associated BDRs were reviewed:

WSPF AERHDM with CIS Lot 57 and Lot 58

VE BDRs
ANLRHVE15004 ANLRHVE15005 ANLRHVE16001

DM BDR
RHANLDG15001

DTC BDR
ANLRHDTC15008

The BDRs were examined to verify compliance with PL V&V per CCP-TP-001 for quarterly evaluations; CCP-TP-500 for VE; CCP-TP-504 for DTC; and CCP-TP-513 for DM.

The waste stream AERHDM was reviewed, along with the quarterly repeat of data-generation level reviews for VE (fourth quarter of calendar year 2015). This process was determined to be compliant with project-level requirements. Training records for SPMs identified in selected BDRs were reviewed to verify required qualifications and training.

The procedures reviewed and objective evidence assembled and evaluated during the audit provided evidence that the applicable requirements for generation-level and project-level data 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 evaluated the adequacy, implementation, and effectiveness of the ANL/CCP VE characterization process for RH SCG S5000 debris waste. The audit team reviewed the following CCP procedures and determined that the procedures adequately address upper-tier requirements:

- CCP-TP-500, Rev. 15, *CCP Remote-Handled Waste Visual Examination*
- CCP-QP-002, Rev. 41, *CCP Training and Qualification Plan*
- CCP-TP-163, Rev. 4, *CCP Evaluation of Waste Packaging Records for Visual Examination of Records*

ANL/CCP has not performed VE of records since the previous recertification audit, A-15-24. ANL/CCP uses the two-operator method when performing RH VE characterization activities. The two qualified operators visually examine the waste and place it into containers. The audit team interviewed VE operators and the VE Expert (VEE). The audit team also examined the VE operational logbook and verified logbook entries were logged correctly and reviewed by the VPM as required. During the audit, the audit team toured the AGHCF in Building 212. The team interviewed two VE operators and observed the characterization of inner 7-gallon container number 1515.

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, as stipulated in CCP-TP-500:

ANLRHVE15004 ANLRHVE15005 ANLRHVE16001

The audit team examined training records for seven VE operators/independent technical reviewers (ITRs), and confirmed the appointment of two ANL/CCP VEEs. The audit

team verified that VE operators, ITRs, and the VEEs were appropriately qualified as required.

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/Dimensional Measurement

The audit team assessed the continued adequacy, implementation, and effectiveness of the DTC method and dimensional/gravimetric (DG) measurement used at ANL by the CCP to characterize waste stream AERHDM. The audit team evaluated the actual measurement of the dose rate and measurement of the length of segments of FEW 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), and for DG, the length (or mass) of a segment of FEW is measured to confirm AK information about the fuel segment. The application of the DTC/DG methodology at ANL to characterize RH TRU waste was previously evaluated by CBFO as part of Audit A-15-24.

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

- Proper development and documentation of the waste stream's AK as documented in an Acceptable Knowledge 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 radionuclide quantities as a function of length (or mass) through modeling
- Development of the relationship between the measured dose or exposure rate and the activity of Cs-137
- Measurement of the external dose, exposure rate, or length (or mass), of the waste/fuel segments
- Calculation of the radionuclide activities and other derived radiological quantities and associated uncertainties
- Any significant program changes or deviation since Audit A-15-24

- Results of applying the DTC methodology/DG measurements to characterize waste or confirm AK information about fuel segments since Audit A-15-24
- Determination of the number of containers examined, completed BDRs and BDRs that had been through project-level review that were generated since Audit A-15-24
- 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 method/DG measurement since Audit A-15-24

The following procedures were reviewed to verify compliance with applicable upper-tier requirements:

- CCP-TP-504, Rev. 18, *CCP Dose-to-Curie Survey Procedure for Remote-Handled Transuranic Waste*
- CCP-TP-513, Rev. 3, *CCP Procedure for Dimensional or Gravimetric Measurements for Radiological Characterization of Remote-Handled Transuranic Waste*
- CCP-AK-ANLE-500, Rev. 13, *CCP Acceptable Knowledge Summary Report*
- CCP-AK-ANLE-501, Rev. 11, *CCP RH TRU Radiological Characterization Technical Report*
- CCP-AK-ANLE-502, Rev. 7, *CCP RH TRU Waste Certification Plan for 40 CFR Part 194 Compliance*
- CCP-AK-ANL-505C, Rev. 1, *CCP Fuel Weight Confirmation Test Program for Argonne Remote-Handled K-Wing Fuel Examination Waste, Waste Stream: AERHDM 2/6/2013*

The results of the review confirmed that the procedures are adequately established for compliance with upper-tier requirements.

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 and functions that express the radionuclide content relative to the length or mass of a fuel pin were developed from information about these fuel pins and reactor materials in the AK record. 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 and the known dimensions of the fuel segments from the AK record were used to establish functions of length or mass to 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.

In the past, 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 Building #331-Shell for the previous year since Audit A-15-24. 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 operations 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 DG measurement equipment (ruler or scale) remained in service in Building 212 (AGHCF) since Audit A-15-24. In this building, VE of the fuel segments is performed in a hot cell. CCP operators use a calibrated ruler or scale to verify the length or mass respectively of a fuel segment and confirm that the AK information does apply to that segment. Auditors interviewed operations personnel about the set-up and calibration of the measurement equipment for performing DG and reviewed calibration certification documentation as well as operations logbooks

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

Since Audit A-15-24, one DTC and one DM BDR have been completed through project-level review:

- ANLRHDTC15008 which consisted of 12 waste containers
- RHANLDG15001 which consisted of 2 containers – one containing 15 FEW segments (container 8345) and the other containing 14 FEW segments (container 8346)

RH waste characterization utilizing DTC/DG, 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 results.

5.4.5 Transportation

Transportation was not evaluated during this audit.

5.4.6 WIPP Waste Information System/Waste Data System

The audit team reviewed CCP procedure CCP-TP-530, Rev. 12, *CCP RH TRU Waste Certification and WWIS/WDS Data Entry*, to determine the degree to which it adequately addresses upper-tier requirements. Results of the review indicate that the procedure adequately addresses upper-tier requirements.

The audit team interviewed responsible personnel and examined related data. Record reviews included CCP data spreadsheet reports, evidence of verification of resolution of NCRs associated with a container, container information summaries, pages from BDRs showing analyses values, WWIS/WDS Container Data Reports, and submittals for WWIS review/approval.

The team reviewed one WWIS/WDS waste certification package for RH waste containers. The package reviewed involved three internal containers (1269, 1343, and 1355). Data for the three containers has been certified in WWIS/WDS, but the containers have not yet been built into a canister. The RH WWIS/WDS waste certification package was for the one currently active waste stream at ANL (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 non-conformances.
>
> 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 CAQs identified during the audit.

6.2 Deficiencies Corrected During the Audit

During the audit, the audit team may identify CAQs. The audit team members and the 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 no CAQs corrected during 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.

Observation 1

After review of objective evidence provided, the audit team observed or noted that it has been over four years since a CCP QA surveillance was conducted at ANL. Section 4.14.2 of CCP-PO-500 instructs CCP to conduct periodic QA surveillances to assess compliance with applicable WIPP requirements. The last QA surveillance conducted by CCP at ANL was in August 2012 (Ref. SU-RHANL-0001-12).

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.

Recommendation 1

Currently, the ANL/CCP RH Technical Lead is qualified to the RH Waste Radiological Characterization Technical Staff Qualification Card (RH-TS-01, Rev. 1). This is a one-time qualification that does not include indoctrination training on the WAC or CCP's implementing procedure CCP-PO-002, *CCP Transuranic Waste Certification Plan.* During the audit, objective evidence (a read & sign form) was provided to demonstrate that the RH Technical Lead completed required reading of CCP-PO-002 on July 28, 2016.

CBFO intends to revise the WAC, Rev. 8, to include the WCPIP requirements and then the WCPIP will be obsolete. Once this occurs, the audit team recommends that CCP revise the RH Waste Radiological Characterization Technical Staff Qualification Card to include indoctrination training on the WIPP WAC and CCP-PO-002.

7.0 LIST OF ATTACHMENTS

Attachment 1: Personnel Contacted During Audit A-17-08
Attachment 2: Summary Table of Audit A-17-08 Results
Attachment 3: List of Audited Procedures
Attachment 4: Processes and Equipment Evaluated During Audit A-17-08

PERSONNEL CONTACTED DURING AUDIT A-17-08				
NAME	**TITLE/ORG**	**PRE-AUDIT MEETING**	**CONTACTED DURING AUDIT**	**POST-AUDIT MEETING**
Lisa Acosta	Imaging Production Supervisor/Iron Mountain		X	
Cheryl Armijo	Training Records Analyst CCP/TFE		X	
Veronica Waldram-Ballew	QA/NWP		X	X
Pat Beallis	VE Operator/CCP/WMO		X	
Michele Billett	CCP Training Coordinator/CCP/TFE		X	
Dan Dilday	WM Manager/NWM			X
A.J. Fisher	Support Services Manager/CCP/NWP			X
Ariana Gonzalez	NWP Technical Training Administrator/CCP/NWP		X	
Ed Gulbransen	CCP Manager/NWP	X	X	X
Monterey Harris	VE Operator/CCP/WMO		X	
Irene Joo	RH Operations Manager CCP/NWP	X	X	X
Rich Kantrowitz	SPM CCP/NWP	X	X	
Creta Kirkes	WCA/WCO CCP/NWP		X	
Ronnie Lee	Operations Manager/CCP/NWP			X
Ricardo Maestas	NMED			X
Stu Meredith	Oversight and Assessment Manager ANL PMA	X		X
Dan Misch	Federal Project Director DOE Argonne Site Office	X		X
Martin Navarrete	Senior QA Specialist/DOE/CBFO	X		
Berry Pace	Programs Support/NTP	X	X	X
Dan Pancake	ANL STR-PM FMS-Deactivation Projects Manager	X	X	X
Spencer Pattee	VPM-VEE CCP/NWP	X	X	X
Sheila Pearcy	CCP Records CCP/TFE	X	X	X
Kevin Peters	AKE CCP/NWP	X	X	X

PERSONNEL CONTACTED DURING AUDIT A-17-08				
NAME	**TITLE/ORG**	**PRE-AUDIT MEETING**	**CONTACTED DURING AUDIT**	**POST-AUDIT MEETING**
Sheri Punchios	QA/NWP			X
John Quintana	Deputy COO/ANL	X		
Mike Ramirez	Manager/CCP/NWP			X
Willis Ray	Project Specialist/NWM	X		X
Cindy Rock	Program Manager FMS	X		
Michael Romero	Nuclear Ops Manager/NWM/NOFS			X
Wesley Root	VPM CCP/NWP	X	X	X
Steve Schafer	AKE CCP/NWP	X	X	X
Farok Sharif	Manager/NTP/NWP	X	X	X
Daniel Wade	NWP/CCP		X	

SUMMARY TABLE OF AUDIT A-17-08 RESULTS

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

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-17-08
LIST OF AUDITED PROCEDURES

	Document No.	Rev.	Document Title
1.	CCP-PO-001	22	CCP Transuranic Waste Characterization Quality Assurance Project Plan
2.	CCP-PO-002	29	CCP Transuranic Waste Certification Plan
3.	CCP-PO-005	27	CCP Conduct of Operations
4.	CCP-PO-045	1	CCP Waste Management Field Observation
5.	CCP-PO-500	7	CCP/ANL RH-TRU Waste Interface Document
6.	CCP-PO-505	3	CCP Remote-Handled Transuranic Waste Authorized Methods For Payload Control (CCP RH-TRAMPAC)
7.	CCP-QP-002	41	CCP Training and Qualification Plan
8.	CCP-QP-005	25	CCP TRU Nonconforming Item Reporting and Control
9.	CCP-QP-008	26	CCP Records Management
10.	CCP-QP-010	25	CCP Document Preparation, Approval, and Control
11.	CCP-QP-016	22	CCP Control of Measuring and Testing Equipment
12.	CCP-QP-017	4	CCP Identification and Control of Items
13.	CCP-QP-022	17	CCP Software Quality Assurance Plan
14.	CCP-QP-028	16	CCP Records Filing, Inventorying, Scheduling, and Dispositioning
15.	CCP-TP-001	21	CCP Project Level Data Validation and Verification
16.	CCP-TP-002	26	CCP Reconciliation of DQOs and Reporting Characterization Data
17.	CCP-TP-005	28	CCP Acceptable Knowledge Documentation
18.	CCP-TP-163	4	CCP Evaluation of Waste Packaging Records for VE of Records
19.	CCP-TP-200	0	SPM Chemical Compatibility Evaluation Memorandum and Acceptable Knowledge Assessment Review
20.	CCP-TP-500	15	CCP Remote-Handled Waste Visual Examination
21.	CCP-TP-504	18	CCP Dose-to-Curie Survey Procedure for Remote-Handled Transuranic Waste
22.	CCP-TP-506	5	CCP Preparation of the Remote-Handled Transuranic Waste Acceptable Knowledge Characterization Reconciliation Report
23.	CCP-TP-507	8	CCP Shipping of Remote-Handled Transuranic Waste
24.	CCP-TP-509	6	CCP Remote-Handled Transuranic Container Tracking
25.	CCP-TP-512	6	CCP Remote-Handled Waste Sampling
26.	CCP-TP-513	3	CCP Procedure for Dimensional or Gravimetric Measurements for Radiological Characterization of Remote-Handled Transuranic Waste
27.	CCP-TP-530	12	CCP RH TRU Waste Certification and WWIS/WDS Data Entry
28.	WP 13-QA.03	26	NWP Quality Assurance Independent Assessment Program

PROCESSES AND EQUIPMENT EVALUATED DURING AUDIT A-17-08

WIPP #	Process/Equipment Description	Applicable to the Following Summary Category Groups	Currently Approved by NMED	Currently Approved by EPA
PREVIOUSLY APPROVED PROCESSES OR EQUIPMENT				
The following were reevaluated during CBFO Audit A-17-08				
8RHVE1	Visual Examination CCP-TP-500, CCP 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, CCP Remote-Handled Waste Visual Examination	Debris (S5000)	YES	YES
N/A	Acceptable Knowledge CCP-TP-005, CCP Acceptable Knowledge Documentation	Debris (S5000)	YES	YES
N/A	Data Verification and Validation CCP-TP-001, CCP Project Level Data Validation and Verification CCP-TP-500, CCP Remote-Handled Waste Visual Examination CCP-TP-504, CCP Dose-to-Curie Survey Procedure for Remote-Handled Transuranic Waste	Debris (S5000)	YES	YES
8DTC1	Dose-to-Curie CCP-TP-504, CCP Dose-to-Curie Survey Procedure for Remote-Handled Transuranic Waste	Debris (S5000)	N/A	YES

WIPP #	Process/Equipment Description	Applicable to the Following Summary Category Groups	Currently Approved by NMED	Currently Approved by EPA
8RHGM1	Dimensional Measurement CCP-TP-513, CCP Procedure for Dimensional or Gravimetric Measurements for Radiological Characterization of Remote-Handled Transuranic Waste	Debris (S5000)	N/A	YES
N/A	Quality Assurance	N/A	N/A	YES
N/A	WIPP Waste Information System (WWIS)/Waste Data System (WDS)	NA	YES	YES