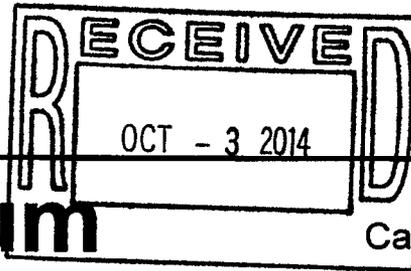


United States Government

**memorandum** ENTERED

Department of Energy

Carlsbad Field Office  
Carlsbad, New Mexico 88221

DATE: OCT - 3 2014

REPLY TO  
ATTN OF: CBFO:QAD:MPN:RMS:14-1343:UFC 2300.00

SUBJECT: Interim Audit Report A-14-20, ANL/CCP TRU Waste Characterization and Certification

TO: Dale J. Dietzel, DOE-CH

The Carlsbad Field Office (CBFO) conducted annual Recertification Audit A-14-20, Argonne National Laboratory Central Characterization Program (ANL/CCP) Transuranic (TRU) Waste Characterization and Certification, September 16-18, 2014. Attached is the interim audit report.

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.

The CBFO identified two conditions adverse to quality as a result of the audit. The audit team identified and offered one recommendation to ANL/CCP management for consideration.

If you have any questions or comments concerning the interim audit, I can be reached at (575) 234-7483.

A handwritten signature in black ink that reads "Martin P. Navarrete".

Martin P. Navarrete  
Senior Quality Assurance Specialist

Attachment

141012



Dale J. Dietzel

-2-

cc: w/attachment

J. Franco, CBFO	* ED
D. Bryson, CBFO	ED
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M. Walker, NWP/CCP	ED
W. Ledford, NWP/CCP	ED
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J. Hoff, NWP/QA	ED
B. Allen, NWP/QA	ED
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L. Bender, EPA	ED
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Site Documents	ED
WWIS Database Administrators	ED
CBFO QA File	
CBFO M&RC	

\* ED Denotes Electronic Distribution

**U.S. DEPARTMENT OF ENERGY  
CARLSBAD FIELD OFFICE**

**INTERIM AUDIT REPORT**

**OF THE**

**ARGONNE NATIONAL LABORATORY  
CENTRAL CHARACTERIZATION PROGRAM**

**LEMONT, ILLINOIS,  
AND CARLSBAD, NEW MEXICO**

**AUDIT NUMBER A-14-20**

**SEPTEMBER 16 – 18, 2014**

**CHARACTERIZATION AND CERTIFICATION ACTIVITIES  
FOR REMOTE-HANDLED TRANSURANIC WASTE**



Prepared by: \_\_\_\_\_

*Greg Knox*  
Greg Knox, CTAC  
Audit Team Leader

Date: *29 SEP 2014*

Approved by: \_\_\_\_\_

*Michael R. Brown*  
Michael R. Brown, CBFO FOR  
Quality Assurance Division Director

Date: *10-3-14*

## 1.0 EXECUTIVE SUMMARY

Carlsbad Field Office (CBFO) Recertification Audit A-14-20 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, September 16 – 18, 2014. 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.

Three concerns were identified during Audit A-14-20, two of which were determined to be conditions adverse to quality (CAQs) resulting in issuance of corrective action reports (CARs). The first CAQ was identified in the area of dose-to-curie (DTC)/dimensional measurement (DM). During the review of calculation package ANLE-RH-50-69, it was noted that one of the statements on Attachment 5, *Remote-Handled Waste Technical Staff ITR Checklist* (from procedure CCP-TP-513), read: "Calculations have been verified." That statement in batch data report (BDR) ANLE-RH-50-69 was annotated to change the word "verified" to "reviewed," which is consistent with the language describing the Independent Technical Reviewer (ITR) review at step 4.3 in procedure CCP-TP-513, *CCP Procedure for Dimensional or Gravimetric Measurements for Radiological Characterization of Remote-Handled Transuranic Waste*. However, making annotations to correct language in a technical procedure contradicts the requirement in CCP-PO-005, *CCP Conduct of Operations*, which requires a revision to the procedure when the procedure cannot be performed as written. This annotated change is reflected in all the BDRs selected for review, i.e., ANLE-RH-50-69 through ANLE-RH-50-90 dating back to October 2013 (see section 6.1, CAR 14-061).

The second CAQ was identified in the area of project-level validation and verification (PL V&V) involving the radiological documentation package in support of dimensional results of ANLE-RH-50-82, Attachment 6, *SPM Checklist* (from procedure CCP-TP-513), for container 1229. The Site Project Manager (SPM) did not complete any of the checkbox portion of the checklist during the BDR review. The audit team therefore deemed that there was no objective evidence that the data had been reviewed by the

The remaining concern was identified in the area of acceptable knowledge (AK) and resulted in a recommendation to ANL/CCP management (see section 6.4).

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:

- 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*
- Related technical and QA implementing procedures

## **2.2 Purpose**

Audit A-14-20 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 Quality Assurance Division
Greg Knox	Audit Team Leader (ATL), CBFO Technical Assistance Contractor (CTAC)
Katie Martin	Lead Auditor-in-Training, CTAC
Jim Schuetz	Auditor, CTAC
Tammy Ackman	Auditor, CTAC
Rick Castillo	Auditor, CTAC
Berry Pace	Auditor, CTAC
Dick Blauvelt	Technical Specialist, CTAC
Porf Martinez	Technical Specialist, CTAC
Paul Gomez	Technical Specialist, CTAC
Jim Oliver	Technical Specialist, CTAC

### **OBSERVERS**

Tom Morgan	CBFO TRU Sites and Transportation Division (TSTD)
Coleman Smith	New Mexico Environment Department (NMED)

## **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 September 16, 2014. 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 September 18, 2014.

## **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.

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 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 no CARs generated during the previous CBFO Recertification Audit A-13-24. Therefore, verification of sustaining corrective action was not addressed.

#### **5.2.2 Changes in Programs or Operations**

Interviews with the ANL/CCP management team indicated that there were no significant changes in programs or operations since CBFO Recertification Audit A-13-24.

#### **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-13-24.

#### **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-13-24.

### **5.3 Quality Assurance Activities**

#### **5.3.1 Control of Nonconforming Items**

The audit team reviewed implementing procedure CCP-QP-005, Rev. 24, *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 Nonconformance Report (NCR) Coordinator and selected all of the NCRs generated since the previous audit for review. One NCR referenced containers that were included in a previous NCR. The referenced NCR was included in the documents reviewed during this audit listed below:

NCR-RHANL-0317-14, Rev. 2, Rev. 1, and Rev. 0  
NCR-RHANL-0318-14, Rev. 0  
NCR-RHANL-0319-14, Rev. 0  
NCR-RHANL-0510-13, Rev. 0

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 directed by the Permit. All 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. 38, *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, acceptable knowledge experts (AKEs), SPMs, and RH technical staff 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 and AKE and SPM personnel.

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. 21, *CCP Transuranic Waste Characterization Quality Assurance Project Plan*
- CCP-PO-002, Rev. 27, *CCP Transuranic Waste Certification Plan*
- CCP-QP-008, Rev. 23, *CCP Records Management*
- CCP-QP-028, Rev. 15, *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 17, 2014 for CCP/NTPC 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**

Container management was not evaluated during this audit.

## **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 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. 21, *CCP Transuranic Waste Characterization Quality Assurance Project Plan*
- CCP-QP-005, Rev. 24, *CCP TRU Nonconforming Item Reporting and Control*
- CCP-QP-021, Rev. 10, *CCP Surveillance Program*

- 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. 26, *CCP Acceptable Knowledge Documentation*
- WP 13-QA.03, Rev. 23, *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 Alpha Gamma Hot Cell Facility (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 Resource Conservation and Recovery Act permit and described in the Waste Analysis Plan (WAP), and also based upon requirements of 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.

This waste stream originally consisted of 44 30-gallon drums of debris waste from the AGHCF for which CCP reviewed the VE tapes 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 along with solidified liquid waste that was sampled, solidified, 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 K-Wing (complete) and 621 30-gallon drums from AGHCF. The AK record for all of this waste, including numerous AK source documents, has been examined to demonstrate that the waste stream has been properly delineated and populated and that significant waste stream parameters, including the assignment of hazardous waste numbers, the estimate of waste material parameter weights, and the characterization of the radiological properties of this waste stream have been done 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. 12, and a copy of the WSPF 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 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. These memoranda document the CCP AKE's review of waste containers received from ANL to assure that they are part of this waste stream. Examples of the resolution of AK discrepancies in the AK record, WAP-compliant AK Accuracy Report, and the most recent internal audit/surveillance were also collected and examined along with screenshots from the IDC database, a copy of the AK Tracking Spreadsheet, and ANL WMO-195 waste container input forms.

The WAP-required traceability exercise was performed for four of the drums (1262, 1252, 1265, and 1266) that have been completely through the characterization and certification process, including a review of relevant VE BDRs and both DTC and gravimetric/dimensional data packages specifically for the FEW. The reconciliation of characterization data with the AK record, including a review of the applicable Waste Stream Characterization Checklists, was completed.

The AK auditors 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 (CCP-AK-ANLE-500, Rev. 12) the Radiological Characterization Technical Report (CCP-AK-ANLE-501, Rev. 11), a WCPIP-compliant AK Accuracy Report, and Characterization Reconciliation Reports, along with the examination of relevant AK source documents.

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 tagged and held until resolution of the deficient conditions is completed. 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 and 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 AK audit team identified one AK-related concern. This concern involved a recommendation that CCP identify in the AK Summary Report specific documentation in the AK record that provides additional information regarding absorbent materials, their properties, and appropriate use. References will include identification of the AK source

document listing MSDS forms, information referred to in the AK Summary Report Chemical Table, and AK source documents that describe processes utilizing absorbent materials (see section 6.4, Recommendation 1).

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 to determine the degree to which they adequately address PL V&V upper-tier requirements:

- CCP-PO-001, Rev. 21, *CCP Transuranic Waste Characterization Quality Assurance Project Plan*
- 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. 26, *CCP Acceptable Knowledge Documentation*
- CCP-TP-500, Rev. 13, *CCP Remote-Handled Waste Visual Examination*
- CCP-TP-504, Rev. 16, *CCP Dose-to-Curie Survey Procedure for Remote-Handled Transuranic Waste*
- CCP-TP-513, Rev. 2, *CCP Procedure for Dimensional or Gravimetric Measurements for Radiological Characterization of Remote-Handled Transuranic Waste*

The review of documented procedures indicates that the procedures adequately address upper-tier requirements.

The waste stream AERHDM was reviewed, along with the quarterly repeat of data-generation level reviews for VE. Both were 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 following WSPF/Characterization Information Summaries (CIS) and associated BDRs were reviewed:

WSPF AERHDM with CIS Lot 47 and Lot 54

BDRs:

VE

ANLRHVE13014

ANLRHVE14001

ANLRHVE14003

DTC

ANLRHDTTC13001 ANLRHDTTC13010 ANLRHDTTC13014

Dimensional

RHANLDG13002 RHANLDG14001

Dimensional Calculation

ANLE-RH-50-80 ANLE-RH-50-81 ANLE-RH-50-82  
ANLE-RH-50-83 ANLE-RH-50-84 ANLE-RH-50-85  
ANLE-RH-50-87 ANLE-RH-50-88

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 dimensional measurements.

One concern was identified in the area of PL V&V involving the radiological documentation package in support of dimensional results of ANLE-RH-50-82, Attachment 6, *SPM Checklist*, for container 1229. The SPM did not complete any of the checkbox portion of the checklist during the BDR review. The audit team therefore deemed that there was no objective evidence that the data had been reviewed by the SPM regarding DQOs and calculations for container 1229 (see section 6.1, CAR 14-062).

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 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 to determine the degree to which they adequately address upper-tier requirements:

- CCP-TP-500, Rev. 13, *CCP Remote-Handled Waste Visual Examination*
- CCP-QP-002, Rev. 38, *CCP Training and Qualification Plan*
- CCP-TP-163, Rev. 4, *CCP Evaluation of Waste Packaging Records for Visual Examination of Records*
- CCP-TP-509, Rev. 6, *CCP Remote-Handled Transuranic Container Tracking*

The review determined that the procedures adequately address upper tier requirements. ANL/CCP has not performed VE of records since Audit A-13-24.

ANL/CCP uses the two-operator method when performing RH VE characterization of waste. 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 (RH-ANLE-VE-016) and verified logbook entries were logged correctly and reviewed by the vendor project manager (VPM) as required. During the audit, the VE audit team toured the AGHCF in Building 212 and observed VE being performed on container 1406.

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:

ANLRHVE13008	ANLRHVE13011	ANLRHVE13013
ANLRHVE13016	ANLRHVE14001	ANLRHVE14002

The audit team examined training records for seven VE operators/ITRs, and confirmed the appointment of an ANL/CCP VEE. The audit team verified that VE operators, ITRs, and the VEE 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 or gravimetric measurement used at ANL by the CCP to characterize waste stream AERHDM. The audit team also evaluated the actual measurement of the dose rate and the collection of dimensional or gravimetric data 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). The application of the DTC methodology at ANL to characterize RH TRU waste was previously evaluated by CBFO as part of Audit A-13-24. 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. For the application of the gravimetric methodology, the mass of non-uniform RH waste is used in conjunction with a derived concentration if radiological properties expressed as a function of mass. It should be noted that ANL/CCP is not approved to use the gravimetric process for the characterization of RH SCG S5000 debris waste at this time.

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 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 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
- Development of the relationship between the measured length and the required radiological properties
- Measurement of the external dose, 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-13-24
- Results of applying the DTC or dimensional methodologies to characterize waste since Audit A-13-24
- Determination of the number of containers examined, completed BDRs and BDRs that had been through project-level review that were generated since Audit A-13-24
- 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 and dimensional measurement since Audit A-13-24

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

- CCP-PO-002, Rev. 27, *CCP Transuranic Waste Certification Plan*
- CCP-TP-504, Rev. 16, *CCP Dose-to-Curie Survey Procedure for Remote-Handled Transuranic Waste*
- CCP-TP-513, Rev. 2, *CCP Procedure for Dimensional or Gravimetric Measurements for Radiological Characterization for Remote-Handled Transuranic Waste*

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 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. In the case of the dimensional or gravimetric methodology, the same information sources and computer modeling were performed, but the results were expressed as a function of length or mass versus a function of Cs-137 dose rate.

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-13-24. 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 operation's logbooks. A Thermo Electron Model RO-7 survey meter fitted with the appropriate probe (RO-7LD or RO-7BM) is used to gather low-range or high-range measurements respectively. Each container is rotated 90 degrees successively between each of the four measurements. The average measured dose or exposure rate for each waste container and associated scaling factors are used to calculate 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, calculation packages, and records.

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.

Since Audit A-13-24, nine BDRs have been completed through project-level review:

ANLRHDTC13008	ANLRHDTC13009	ANLRHDTC13010
ANLRHDTC13011	ANLRHDTC13012	ANLRHDTC13013
ANLRHDTC13014	RHANLDG13002	RHANLDG14001

The audit team also reviewed 22 calculation packages associated with the waste containers included in the BDRs listed above. Those calculation packages were: ANLE-RH-50-69 through ANLE-RH-50-90.

One CAQ was identified during the review of calculation package ANLE-RH-50-69. One of the statements on Attachment 5, *Remote-Handled Waste Technical Staff ITR Checklist*, read: "Calculations have been verified." This statement in BDR ANLE-RH-50-69 was annotated to change the word "verified" to "reviewed," which is consistent with the language describing the ITR review at step 4.3 in procedure CCP-TP-513. However, making annotations to correct language in a technical procedure contradicts the requirement in CCP-PO-005, which requires a revision to the procedure when the procedure cannot be performed as written. This annotated change is reflected in all the BDRs selected for review, i.e., ANLE-RH-50-69 through ANLE-RH-50-90 dating back to October 2013 (see CAR 14-061 in section 6.1). Two of the above-listed BDRs are a result of the application of the dimensional methodology, and seven are from the application of the DTC methodology.

With the exception of the one CAQ noted, RH waste characterization utilizing both the DTC and dimensional methodologies, 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. 11, *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, examined related data, and observed entry of information into the WWIS/WDS by a waste certification assistant and waste certification official. 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 two WWIS/WDS waste certification packages for RH waste canisters. The packages reviewed were for canister AE0077, which had one internal container (956) and canister AE0078, which had three internal containers (1038, 1039, and 1040). The canisters are emplaced in WIPP with certification and emplacement data included in the certification package reviewed. The team reviewed two additional WWIS/WDS waste certification packages for RH waste containers. The packages

reviewed were for container RW48259 (a 55-gallon drum) and container 1261 (a 30-gallon drum). Data for both containers has been certified in WWIS/WDS, but the containers have not yet been built into a canister. The RH WWIS/WDS waste certification packages were 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.

#### **CAR 14-061**

During the review of calculation package ANLE-RH-50-69 it was noted that one of the statements on Attachment 5, *Remote-Handled Waste Technical Staff ITR Checklist* read: "Calculations have been verified." The statement in BDR ANLE-RH-50-69 was annotated to change the word "verified" to "reviewed," which is consistent with the language describing the ITR review at step 4.3 in procedure CCP-TP-513. However, making annotations to correct language in a technical procedure contradicts the requirement in CCP-PO-005, which requires a revision to the procedure when the procedure cannot be performed as written. This annotated change is reflected in all the BDRs selected for review, i.e., ANLE-RH-50-69 through ANLE-RH-50-90 dating back to October 2013.

#### **CAR 14-062**

During the review of the radiological documentation package in support of dimensional results of ANLE-RH-50-82, Attachment 6, *SPM Checklist*, for container 1229, it was noted that the SPM did not complete the checkbox portion of the checklist during the BDR review. The audit team therefore deemed that there was no objective evidence that the data had been reviewed by the SPM regarding DQOs and calculations for container 1229.

## **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:

CDA – 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.

There were no observations generated during Audit A-14-20.

## **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 AK audit team recommended that CCP identify in the AK Summary Report specific documentation in the AK record that provides additional information regarding absorbent materials, their properties, and appropriate use. References will include identification of the AK source document listing MSDS forms, information referred to in the AK Summary Report Chemical Table, and AK source documents that describe processes utilizing absorbent materials.

## **7.0 LIST OF ATTACHMENTS**

- |                      |   |
|----------------------|---|
| <b>Attachment 1:</b> | <b>Personnel Contacted During Audit A-14-20</b>               |
| <b>Attachment 2:</b> | <b>Summary Table of Audit A-14-20 Results</b>                 |
| <b>Attachment 3:</b> | <b>List of Audited Procedures</b>                             |
| <b>Attachment 4:</b> | <b>Processes and Equipment Evaluated During Audit A-14-20</b> |

PERSONNEL CONTACTED DURING AUDIT A-14-20				
NAME	TITLE/ORG	PRE-AUDIT MEETING	CONTACTED DURING AUDIT	POST-AUDIT MEETING
Cheryl Armijo	Training Records Analyst/CCP/TFE		X	
Pat Beallis	Operator/CCP/NWP		X	
Dale Bignell	CBFO/CTAC Observer	X		X
Michele Billett	Training Coordinator/CCP/TFE		X	
Norma Castaneda	Observer/TSTD/CBFO			X
Ed Collins	Project Manager/FMS/ANL			X
Dale Dietzel	FPD/DOE Argonne Site Office	X		X
Lee Essenmacher	Technician/NWM/ANL		X	
AJ Fisher	CCP Support Group Manager/CCP	X	X	
Monterrey Harris	Operator/CCP/NWP		X	
Laura Jones	QA Specialist/CCP/NWP		X	
Irene Joo	RH Operations Manager/NWP	X	X	X
Creta Kirkes	WCO/NWP/CCP		X	
Wayne Ledford	QA Specialist/CCP/NWP	X	X	X
Bill Martinez	Technician/NWM/ANL		X	
Shelly Martinez	CE/RTR/VE/NWP	X	X	X
Tom Morgan	Observer/CBFO	X		X
Leon Navarrete	Records Clerk/CCP/TFE	X		
Dan Pancake	Project Manager/FMS/ANL	X		X
Sheila Percy	CCP Records Manager/CCP/TFE	X	X	X
Jeff Poole	VEE/CCP/NWP	X	X	X
Mat Racz	Operator/NWM/ANL		X	
Michael Romero	FSM/ANL			X
Cynthia Rock	Project Manager/ANL	X		
Wesley Root	VEO/DTC/VPM/NWP	X	X	X
Steve Schafer	CCP Acceptable Knowledge Expert/NWP	X	X	
Coleman Smith	Observer/NMED		X	
JR Stroble	Acting Assistant Manager/DOE/CBFO	X		

**SUMMARY TABLE OF AUDIT A-14-20 RESULTS**

Program Element	Concern Classification				QA Evaluation		Technical
	CARs	CDAs	Obs.	Rec	Adequacy	Implementation	Effectiveness
<b>Activity</b>							
Program Status					A	S	E
Acceptable Knowledge (AK)				1	A	S	E
Visual Examination (VE)					A	S	E
Project Level V&V	1				A	S	E
Dose-to-Curie (DTC)/ Dimensional Measurement (DM)	1				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
<b>TOTALS</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>A</b>	<b>S</b>	<b>E</b>

**Definitions**

E = Effective

CAR = Corrective Action Report

Rec. = Recommendation

S = Satisfactory

CDA = Corrected During the Audit

A = Adequate

I = Indeterminate

NE = Not Effective

NA = Not Adequate

Obs. = Observation

**Audit A-14-20  
LIST OF AUDITED PROCEDURES**

	<b>Document No.</b>	<b>Rev.</b>	<b>Document Title</b>
1.	CCP-PO-001	21	CCP Transuranic Waste Characterization Quality Assurance Project Plan
2.	CCP-PO-002	27	CCP Transuranic Waste Certification Plan
3.	CCP-PO-005	24	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	3	CCP Remote-Handled Transuranic Waste Authorized Methods For Payload Control (CCP RH-TRAMPAC)
7.	CCP-QP-001	8	CCP Graded Approach
8.	CCP-QP-002	38	CCP Training and Qualification Plan
9.	CCP-QP-005	24	CCP TRU Nonconforming Item Reporting and Control
10.	CCP-QP-008	23	CCP Records Management
11.	CCP-QP-010	24	CCP Document Preparation, Approval, and Control
12.	CCP-QP-014	6	CCP Quality Assurance Trend Analysis and Reporting
13.	CCP-QP-015	12	CCP Procurement
14.	CCP-QP-016	19	CCP Control of Measuring and Testing Equipment
15.	CCP-QP-017	4	CCP Identification and Control of Items
16.	CCP-QP-018	11	CCP Management Assessment
17.	CCP-QP-019	7	CCP Quality Assurance Reporting to Management
18.	CCP-QP-021	10	CCP Surveillance Program
19.	CCP-QP-022	14	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-030	9	CCP Written Practice for the Qualification of CCP Helium Leak Detection Personnel
25.	CCP-QP-032	2	CCP Written Practice for the Qualification of CCP Pressure Change Leak Testing 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

**Audit A-14-20**  
**LIST OF AUDITED PROCEDURES**

	<b>Document No.</b>	<b>Rev.</b>	<b>Document Title</b>
28.	CCP-TP-005	26	CCP Acceptable Knowledge Documentation
29.	CCP-TP-055	5	CCP Varian Porta-Test Leak Detector Operations
30.	CCP-TP-082	10	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	13	CCP Remote-Handled Waste Visual Examination
33.	CCP-TP-504	16	CCP Dose-to-Curie Survey Procedure for Remote-Handled Transuranic Waste
34.	CCP-TP-505	8	CCP Removable Lid Canister/Neutron Shielded Canister Loading
35.	CCP-TP-506	5	CCP Preparation of the Remote-Handled Transuranic Waste Acceptable Knowledge Characterization Reconciliation Report
36.	CCP-TP-507	8	CCP Shipping of Remote-Handled Transuranic Waste
37.	CCP-TP-509	6	CCP Remote-Handled Transuranic Container Tracking
38.	CCP-TP-512	6	CCP Remote-Handled Waste Sampling
39.	CCP-TP-513	2	CCP Procedure for Dimensional or Gravimetric Measurements for Radiological Characterization of Remote-Handled Transuranic Waste
40.	CCP-TP-530	11	CCP RH TRU Waste Certification and WWIS/WDS Data Entry
41.	WP 13-QA.03	23	QA Independent Assessment Program

**PROCESSES AND EQUIPMENT EVALUATED DURING AUDIT A-14-20**

WIPP #	Process/Equipment Description	Applicable to the Following Summary Category Groups	Currently Approved by NMED	Currently Approved by EPA
<b>PREVIOUSLY APPROVED PROCESSES OR EQUIPMENT</b>				
The following were reevaluated during CBFO Audit A-14-20				
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

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ATTACHMENT 4  
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WIPP #	Process/Equipment Description	Applicable to the Following Summary Category Groups	Currently Approved by NMED	Currently Approved by EPA
8RHGM 1	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