
The audit team concluded with the exemption of AK for Summary Category Group (SCG) S4000, that the AMWTP technical and quality assurance (QA) processes evaluated for characterizing SCG S3000 homogeneous solids, SCG S4000 soils/gravels and SCG S5000 debris waste were adequately established for compliance with applicable upper-tier requirements, satisfactorily implemented, and effective in achieving the desired results. Since there are neither completed Enhanced AK Products nor an approved Waste Stream Profile Form (WSPF) for waste stream ID-SDA-SOIL from the CH S4000 Soils/Gravel SCG, the AK for that SCG is deemed indeterminate.

The audit team identified fourteen concerns during the audit. Seven concerns were classified as conditions adverse to quality documented on corrective action reports (CARs); three of the concerns were classified as observations; and four concerns were offered to management as recommendations.

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

Martin P. Navarrete
Senior Quality Assurance Specialist

Attachment
cc: w/attachment
R. Murray, EM
T. Shrader, CBFO
D. Gadbury, CBFO
K. Princen, CBFO
C. Fesmire, CBFO
D. Miehls, CBFO
M. Stapleton, CBFO
H. Cruickshank, CBFO
J. Zimmerman, DOE-ID
T. Jenkins, DOE-ID
J. Vliet, DOE-ID
D. Pruitt, DOE-ID
G. Byram, AMWTP
J. McCoy, AMWTP
E. Gulbransen, AMWTP
E. Dumas, AMWTP
J. Floerke, AMWTP
A. Morse, AMWTP
G. Tedford, AMWTP
J. Walsh, EPA
J. Ellis, EPA
T. Peake, EPA
E. Feltcom, EPA
J. Kieling, NMED
R. Maestas, NMED
D. Biswell, NMED
H. Tellez, NMED
M. McLean, NMED
T. Runyon, CTAC
P. Martinez, CTAC
C. Castillo, CTAC
M. Leroch, CTAC
J. Vernon, CTAC
D. Harvill, CTAC
G. White, CTAC
Site Documents
CBFO QA File
CBFO M&RC
*ED denotes electronic distribution
U.S. DEPARTMENT OF ENERGY
CARLSBAD FIELD OFFICE

INTERIM AUDIT REPORT

OF THE

ADVANCED MIXED WASTE TREATMENT PROJECT

FOR

CHARACTERIZATION AND CERTIFICATION ACTIVITIES FOR CONTACT-HANDLED TRANSURANIC WASTE AT IDAHO FALLS, IDAHO

AUDIT NUMBER A-18-04

August 27 – 30, 2018

Prepared by: Jim Vernon, CTAC Audit Team Leader

Approved by: Donald C. Gadbury, Director

CBFO Office of Quality Assurance

Date: 9-20-18

Date: 9-27-18
1.0 EXECUTIVE SUMMARY

U.S. Department of Energy (DOE) Carlsbad Field Office (CBFO) Recertification Audit A-18-04 was performed to evaluate the continued adequacy, implementation, and effectiveness of established programs for contact-handled (CH) transuranic (TRU) waste characterization activities performed at the Advanced Mixed Waste Treatment Project (AMWTP). The audit team evaluated the programs, procedures, and processes for characterizing (CH) Summary Category Groups (SCGs) S3000 homogeneous solids, S4000 soils/gravels, and S5000 debris wastes. The audit was conducted relative to the requirements of the Waste Isolation Pilot Plant (WIPP) Hazardous Waste Facility Permit (HWFP); DOE/CBFO-94-1012, U.S. Department of Energy Carlsbad Field Office Quality Assurance Program Document (QAPD) Revision 13; DOE/WIPP-02-3122, Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant (WAC) Revision 8.0; and DOE/WIPP 07-3372, Waste Isolation Pilot Plant Documented Safety Analysis (DSA) Revision 5b, Chapter 18.

The audit team evaluated several areas specific to AMWTP. The audit team evaluated the In-Situ Object Counting System (ISOCS) Nondestructive Assay (NDA) systems Z-295-100 and Z-295-101 for initial certification to characterize CH-TRU waste containers. The audit team continued to evaluate the enhanced Acceptable Knowledge (AK) process as defined in the WAC appendices H and I at AMWTP. Surveillance S-18-16 was conducted December 4 – 7, 2017 as a follow-up of an Indeterminate Condition identified during Audit A-17-04 for the enhanced AK process. The surveillance concluded that the enhanced AK process was found to be adequately implemented by AMWTP in accordance with the WAC appendices H and I for waste stream BNINW216, (SCG S3000). Audit A-18-04 evaluated the enhanced AK process for continual implementation by AMWTP.

The audit was performed August 27 – 30, 2018, at the AMWTP Sawtelle Street Facility in Idaho Falls, Idaho and the AMWTP Idaho National Laboratory (INL) facilities. The audit team concluded with the exemption of AK for Summary Category Group (SCG) S4000, that the AMWTP technical and quality assurance (QA) processes evaluated for characterizing SCG S3000 homogeneous solids, SCG S4000 soils/gravels and SCG S5000 debris waste were adequately established for compliance with applicable upper-tier requirements, satisfactorily implemented, and effective in achieving the desired results. Since there are neither completed Enhanced AK Products nor an approved Waste Stream Profile Form (WSPF) for waste stream ID-SDA-SOIL from the CH S4000 Soils/Gravel SCG, the AK for that SCG is deemed indeterminate.

The audit team identified fourteen concerns during the audit and are classified as follows:

- Two concerns in the area of AK.
- Four concerns in the area of Real-Time Radiography (RTR)
- One concern in the area of Measuring and Test Equipment (M&TE).
- One WAP related concern in the area of Project-Level Validation and Verification (PL V&V).
- One concern in the area of NDA.
- Two concerns in the area of Records.
• Two concerns in the area of Visual Examination (VE).
• One concern in the area of Software Quality Assurance (SQA).

Section 6.0 contains further discussion about all of the concerns identified during the audit.

2.0 SCOPE AND PURPOSE

2.1 Scope

The scope of audit A-18-04 included an evaluation of the continued adequacy, implementation, and effectiveness of the AMWTP technical and QA activities performed for characterizing CH TRU waste. The QA and technical activities implemented at AMWTP for CH SCG S3000, homogeneous solids, CH SCG S4000 soils/gravel and CH SCG S5000 debris were evaluated. The audit team verified that a Generator Site Technical Review (GSTR) was performed and any issues identified during the technical review have been resolved per DOE/WIPP-16-3564, Generator Site Technical Review Procedure. The audit evaluated the enhanced AK process in accordance with the WAC Appendices H and I. Surveillance S-18-16, conducted prior to audit A-18-04, determined that AMWTP has implemented the enhanced AK process for waste stream BNINW216 (SCG S3000) in accordance with the WAC Appendices H and I. Finally, the audit evaluated the adequacy, implementation and effectiveness of the mobile ISOCS for NDA. The ISOCS system is new equipment that was evaluated for full capabilities by the audit team. Further areas that were evaluated by the audit team include:

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

General QA program elements as applicable
- Organization/QA Program
- Nonconformances
- Personnel Qualification and Training
- M&TE
- Software Version Installation
- Quality Improvement
- Work Processes
- Procurement
- Audits/Assessments
- Records
- Container Management

Technical Activities
- PL V&V
- AK, including but not limited to waste certification and enhanced AK
The evaluation of the adequacy of AMWTP documents was based on current versions of the following documents:

- CBFO Management Procedure (MP) 5.2, *TRU Waste Program Certification/Recertification*
- CBFO QAPD
- Waste Isolation Pilot Plant Hazardous Waste Facility Permit NM4890139088-TSDF
- WIPP WAC
- WIPP DSA, Chapter 18

Programmatic and technical checklists were developed by the audit team from current versions of the following documents:

- PLN-5198, *AMWTP CH TRU Waste Certification Plan*
- PLN-5199, *Quality Assurance Project Plan*
- Related AMWTP technical and QA implementing procedures

2.2 Purpose

Audit A-18-04 was conducted to evaluate the adequacy, implementation, and effectiveness of program requirements for the characterization and certification of CH-TRU SCGs S3000 homogeneous solids, S4000 soils/gravel, and SCG S5000 debris at AMWTP for compliance with applicable upper-tier requirements.

3.0 AUDITORS/TECHNICAL SPECIALISTS/ MANAGEMENT REPRESENTATIVE/OBSERVERS

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
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<tbody>
<tr>
<td>Martin Navarrete</td>
<td>CBFO QA Management Representative</td>
</tr>
<tr>
<td>Dennis Miehls</td>
<td>CBFO QA Representative</td>
</tr>
<tr>
<td>Jim Vernon</td>
<td>Audit Team Leader, CBFO Technical Assistance Contractor (CTAC), Auditor</td>
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<tr>
<td>Cindi Castillo</td>
<td>Auditor, CTAC</td>
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<td>Harley Kirschenmann</td>
<td>Auditor, CTAC</td>
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<td>Bobby Hunt</td>
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<td>Ricardo Chavez</td>
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<td>Jim Schuetz</td>
<td>Auditor, CTAC</td>
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<td>Charlie Riggs</td>
<td>Auditor, CTAC</td>
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<tr>
<td>Prissy Yanez</td>
<td>Auditor, CTAC</td>
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<td>Porf Martinez</td>
<td>Auditor, CTAC</td>
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<tr>
<td>B.J. Verret</td>
<td>Auditor, CTAC</td>
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The AMWTP individuals involved in the audit process are identified in Attachment 1. The pre-audit meeting was held on August 27, 2018, at the AMWTP Sawtelle Street Facility in Idaho Falls, Idaho. Daily management briefings were held to update AMWTP management and staff on audit progress and identified concerns. A post-audit meeting was held on August 30, 2018, at the AMWTP Sawtelle Street Facility in Idaho Falls, Idaho.

Attachment 2 contains a summary table of the audit results. Attachment 3 contains a list of AMWTP documents audited, including the document revision number. Attachment 4 contains the list of processes and equipment evaluated during the audit. Audit activities, including objective evidence reviewed, are described below.

5.0 SUMMARY OF AUDIT RESULTS

5.1 Program Adequacy, Implementation, and Effectiveness

This audit was performed to assess the capability of AMWTP to characterize CH-TRU SCG S3000 homogeneous solids, SCG S4000 soils/gravel waste, and SCG S5000 debris waste for compliance with the requirements specified in the WIPP HWFP WAP, the WIPP WAC, Chapter 18 of the DSA, and the CBFO QAPD. The characterization methods assessed were AK, VE, RTR, and NOA (including PDP). Other areas evaluated were data generation, PLV&V, WWIS/WDS data entry, DQO reconciliation, container management, and the preparation of WSPFs.

The audit team concluded with the exemption of AK SCG S4000, that the AMWTP technical and quality assurance (QA) processes evaluated for characterizing CH-TRU SCG S3000 homogeneous solids, SCG S4000 soils/gravels and SCG S5000 debris waste were adequately established for compliance with applicable upper-tier requirements, satisfactorily implemented, and effective in achieving the desired results.
Since there are neither completed Enhanced AK Products nor an approved Waste Stream Profile Form (WSPF) for waste stream ID-SDA-SOIL from the CH S4000 Soils/Gravel SCG, the AK for that SCG is deemed indeterminate.

5.2 General Activities

5.2.1 Results of Previous Audits

The audit team verified sustained corrective actions for Corrective Action Reports (CARs) 17-007, 17-008, 17-009, 17-010 and 17-011 identified during the previous CBFO AMWTP Audit A-17-04. The audit team also verified sustained corrective actions for CARs 18-004, 18-005, 18-006 and 18-007 identified during surveillance S-18-16. Overall, the audit team did not identify similar concerns that had previously been identified during audit A-17-04 and surveillance S-18-16. The audit team also verified that all CARs from audit A-17-04 and surveillance S-18-16 have been closed.

5.2.2 Changes in Programs or Operations

The major change in program or operations that have occurred at AMWTP since Audit A-17-04 was the completion of retrieval and the implementation of the Enhanced AK process. In 2017, AMWTP completed all waste retrieval activities. AMWTP has been retrieving legacy waste containers from the Transuranic Storage Area - Retrieval Enclosure (TSA-RE) since 2003. Retrieval operations in the TSA-RE have exhumed more than 50,000 cubic meters of waste drums and boxes by AMWTP personnel. With retrieval complete, AMWTP will focus on characterization and certification of all the retrieved waste.

In 2017, AMWTP implemented the Enhanced AK process as described in the WIPP WAC Revision 8.0. Surveillance S-18-16 completed by CBFO confirmed that AMWTP has implemented the Enhanced AK process for waste stream BNINW216 (SCG S3000) in accordance with the WIPP WAC Appendices H and I.

5.2.3 New Programs or Activities Being Implemented

The only new program or activity currently being implemented by AMWTP is the ISOCS NDA system for waste characterization. The ISOCS system will allow AMWTP to perform NDA on waste containers that have previously been unable to be counted on a fixed assay system.

5.2.4 Changes in Key Personnel

The only change in key personnel since Audit A-17-04 is the addition of the deputy remote-handled (RH)/CH TRU programs manager.

5.2.5 Generator Site Technical Review

A GSTR was completed at AMWTP in January of 2017. In October of 2017, the CBFO issued the closure of the GSTR report for AMWTP and determined that all identified issues have been satisfactorily addressed and resolved by AMWTP.
5.3 Quality Assurance Activities

The audit team evaluated the applicable QA elements for organization/QA program, graded approach, personnel qualification and training, nonconformances, M&TE, quality improvement, records, document control, work processes, procurement, inspection and testing, audits/assessments, SQA and container management for compliance with requirements in the WIPP HWFP WAP. The evaluation results for each area audited are described below.

5.3.1 Organization/QA Program

The audit team reviewed documentation to verify that AMWTP met the requirements of the CBFO QAPD, Revision 13, Section 1.1, Organization and Quality Assurance Program. The audit team reviewed the following AMWTP procedures:

- PLN-5198, AMWTP CH TRU Waste Certification Plan
- PLN-5199, Quality Assurance Project Plan
- Manual 13, Quality Assurance Program

The audit team also reviewed various AMWTP organization charts to determine the degree to which the procedures adequately address upper-tier requirements. The results of the review confirmed that the procedures adequately address upper-tier requirements.

The audit team interviewed QA management personnel and reviewed the organizational structure to verify independence of the QA program from TRU waste characterization activities. The AMWTP QA Manager has the authority and overall responsibility to independently audit AMWTP's implementation of the QA Program to verify the achievement of quality. Quality is achieved and maintained by those assigned responsibility for performing work, and is verified by those not directly responsible for performing the work.

PLN-5199 Section B-0 identifies the organizational structure, roles, and responsibilities for management of waste characterization and certification activities. Further, PLN-5198 Section 5 describes how the QA program is integrated into CH-TRU waste characterization, certification, transportation and operation activities. Section 5.4 of PLN-5198 describes how the CBFO QAPD QA requirements are incorporated by the AMWTP QA program.

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

5.3.2 Graded Approach

The team reviewed documentation to verify that the AMWTP met the requirements of the CBFO QAPD, Section 1.1.2 regarding implementation of a graded approach. The
The audit team reviewed implementing procedure MCP-540, Assigning Quality Levels, Revision 25 to determine the degree to which the procedure adequately addresses upper-tier requirements.

Review of the current document confirmed that MCP-540 adequately addresses upper-tier requirements. MCP-540 was submitted to and approved by the CBFO QA Director, on September 22, 2016. PLN-5198, Revision 2, was approved by the CBFO Director of the Office of Quality Assurance on 7/26/18.

The audit team verified by responses to the Quality Level Determination (QLD) form questions and the software process of the QLD database in the Electronic Data Management System (EDMS), that there was sufficient detail provided to understand the scope and boundaries of the identified system. Completion of the QLD form identifies the Quality Level after the Requester/Design Authority provides scope and boundary responses to the software process. Initial questions to be answered by the Requester/Design Authority relating to background information is provided by the software, including item or activity, Nuclear Regulatory Commission (NRC) regulated item or activity, software or Waste-Acceptance-Impacting information. Completion of questions that follow relate to failure consequence level and failure potential level, which further defines the scope and boundaries that are evaluated by the QLD web based program. Results are developed by following the above process description. The results were deemed appropriate by the audit team.

Based on following the process identified above, the audit team verified that several 431.67 "Quality Level Determination" forms were completed in accordance with the requirements of MCP-540, and included approvals by the Quality Engineer and the Chief Engineer. Additionally, the audit team verified that when a QLD is issued identifying safety software or a QL-1 or QL-2 System, Structure or Component (SSC) that includes software, the Requester/Design Authority requests LST-430, “Safety Software Inventory List,” be updated to include the safety software using the EDMS Suggestion System.

Proper application of graded approach controls were verified by review of selected documents. Commercial Grade Dedication number CGD-1111 utilized the results of QLD-7249, "Safety Significant SSCs of Drum Assay" to develop what resulted in Purchase Order (PO) 18-4322, "MODBUS Plus Module-Refurbished-CGD Plan, CGD-1111." PO 18-4322 was placed 3/26/18. In addition, Commercial Grade Dedication number CGD-1107 utilized the results of QLD-6944 to prepare and implement work orders 521122, “Swap Blue and White Bank CIDAS UPS batteries (CP-891-003)” and work order 521136, “Annual Surveillance of the CIDAS system.” The work orders verified the critical characteristics by meeting the acceptance criteria.

The audit team verified the process for superseding and canceling outdated QLDs is performed in accordance with MCP-540, Section 4.4. QLD number 2873 was processed and approved to supersede Tie-Down Straps. "Superseded" was clearly identified on the QLD-2873 form. QLD number 7054 was processed and approved to cancel the existing QLD form 7054, “Conveyor System Photoelectric Switch.” “Canceled” was clearly identified on the QLD-2873 form.
The audit team also verified that Form 431.67, "Quality Level Determination" (QLD) form and Form 431.75, "Quality Level Upgrade for Existing SSCs" are maintained as records in accordance with MCP-557, Records Management. Form 241.98, Interim Record Holding System (IRHS) approval was received for QLD of which each QLD is uniquely numbered, and, (IRHS) approval was received for MAXIMO Version 7.5.0.5, Form 431.75, Quality Level Upgrade for Existing SSCs Reference MCP-577, Revision 19, Section 4.10, Managing Software Applications that Create Records for the description of use of the IRHS form.

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

5.3.3 Personnel Qualification and Training

The audit team verified that AMWTP met the requirements of the CBFO QAPD Section 1.2, Personnel Qualification and Training. The audit team conducted interviews with responsible personnel in the AMWTP Training Department. Implementing procedures were reviewed to determine the degree to which the procedures adequately address upper-tier requirements. The current implementing procedures are:

- MCP-33, Personnel Qualification and Certification
- MCP-48, Training Analysis, Design, Development and Release
- MCP-68, Training Program Evaluation
- MCP-85, Training Records Administration
- MCP-196, Qualification of Auditors and Lead Auditors
- MCP-1309, Inspection Personnel Certification
- PRD-4374, WIPP Training Requirements Implementation Matrix

Review of the current implementing procedures confirmed that they adequately address upper-tier requirements.

Personnel training records associated with AK, NDA, RTR, VE, and PL V&V were examined to verify implementation of associated requirements and to verify personnel performing characterization activities were appropriately trained and qualified. The records review provided evidence of AMWTP training program implementation. The audit team evaluated AMWTP qualification/requalification packages (qualification cards) and related individual training files for the various AMWTP positions through job analysis documentation and employee training history documentation from the Training Records and Information Network (TRAIN) database. The team reviewed qualification packages for AK Experts (AKEs), NDA, RTR, VE, VE Experts (VEEs), Waste Certification Officials (WCOs) and Site Project Managers (SPMs). Documentation of waste stream training required for RTR and VE operators was evaluated, along with RTR operator training container (capability demonstration) documentation and eye examination forms.
The audit team reviewed the TRU Programs and WIPP WAP Overview training module and the course report from the TRAIN database indicating AMWTP personnel received the required training.

The audit team verified that access to computerized training records is controlled and that personnel entering changes are authorized by the training manager/supervisor. Employee training files are stored on EDMS and read/write access to the training folders on these systems is restricted. The Training Department demonstrated the organization of training records within the electronic filing systems.

The audit team verified that a management assessment of the AMWTP training program was performed in April 2016 and was within the required three-year timeframe.

There were no concerns identified during the audit. The procedures reviewed and objective evidence assembled and evaluated during the audit provided evidence that the applicable requirements for personnel qualification and training are adequately established for compliance with upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

5.3.4 Control of Nonconforming Items

The audit team verified that AMWTP met the requirements of the CBFO QAPD Section 1.3.2, Nonconformances. The audit team conducted interviews with representatives of the AMWTP QA organization. Implementing procedure MCP-538, Control of Non-Conforming Items, was reviewed to determine the degree to which the procedure adequately addresses upper-tier requirements. The audit team evaluated randomly selected nonconformance reports (NCRs) and observed AMWTP QA personnel working in the Issues Management System (IMS – TrackWise) to ensure that nonconforming conditions were appropriately identified, documented, dispositioned, and tracked through closure. TrackWise is an integral part of the entire AMWTP QA Issues Management Program and allows readily available information to track issues through closure; initiate issues when identified; and prompt users to follow up on action items needed to correct and close issues.

NCRs were also reviewed to ensure that AMWTP was documenting and reporting WIPP WAP related nonconformances (identified at the project management level) to the CBFO as required. Four WIPP WAP related NCRs were identified for the audit period and all were reported within the required time frame. The number of open NCRs was also reviewed. Currently, there are 638 open Type 1 (QA Program) NCRs and 4598 open Type 3 (Characterization) NCRs. All of the Type 3 NCRs are associated with waste containers and the majority of the Type 1 NCRs are associated with waste containers. In order to ensure these NCRs are resolved prior to shipping a container, AMWTP utilizes two linked software systems. TrackWise is used to manage NCRs and all NCRs are automatically transferred into the Waste Tracking System (WTS) for the container. The containers are physically tagged when practical, but are also bar-coded without exception. The bar code is connected to any open NCRs preventing loading and shipping of any waste tied to open NCRs. All randomly selected NCRs were found to be in the WTS for the identified container.
Training records of personnel identifying, initiating, and dispositioning NCRs were reviewed and were found to meet procedural requirements. QA Records are maintained as required in the EDMS, an approved IRHS. The EDMS approval was reviewed and met all applicable requirements.

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

5.3.5 Quality Trending - Reports to Management

The audit team verified that AMWTP met the requirements of CBFO QAPD Section 1.3.3.9, Quality Trending. The audit team conducted interviews with representatives of the AMWTP QA organization. Implementing procedure MCP-4014, Reports to Management, was reviewed to determine the degree to which the procedure adequately addresses upper-tier requirements.

The audit team reviewed the completed Semi-Annual Reports to Management completed for the following time periods:

- 7/1/2016 to 12/31/2016
- 1/1/2017 to 6/30/2017
- 7/1/2017 to 12/31/2017
- 1/1/2018 to 6/30/2018

Reports reviewed during the audit for the time periods were prepared and distributed as required by MCP-4014.

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

5.3.6 Corrective Action

The audit team verified that AMWTP met the requirements of CBFO QAPD Section 1.3.3, Corrective Action. The audit team conducted interviews with representatives of the AMWTP QA organization. Implementing procedure STD-1113, Cause Analysis and Corrective Action Development, was reviewed to determine the degree to which the procedure adequately addresses upper-tier requirements.

The audit team reviewed Apparent Cause Analysis (ACA), Documented Cause Analysis (DCA), Formal Cause Analysis (FCA) and Corrective Action Plan (CAP) development documentation. All activities reviewed, including reporting requirements, were conducted in compliance with procedural requirements.
Training records of personnel conducting Cause Analysis (CA) and Corrective Action activities were reviewed and were found to meet procedural requirements. QA Records are maintained as required in EDMS, an approved IRHS. The EDMS approval was reviewed and met all applicable requirements.

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

5.3.7 Quality Improvement

The audit team verified that AMWTP met the requirements of CBFO QAPD Section 1.3, Quality Improvement. The audit team conducted interviews with representatives of the AMWTP QA organization. Implementing procedure MCP-598, Corrective Action System, was reviewed to determine the degree to which the procedure adequately addresses upper-tier requirements.

The audit team reviewed issues management activities (CAQs, NCRs, CA and CAPs) as well as issue closure, queries and reports in the TrackWise Issues Management System. All activities and documentation reviewed were conducted in compliance with procedural requirements.

Training records of personnel conducting Quality Improvement activities were reviewed and were found to meet procedural requirements. QA Records are maintained as required in EDMS, an approved IRHS. The EDMS approval was reviewed and met all applicable requirements.

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

5.3.8 Document Control

The audit team verified that AMWTP meets the requirements of CBFO QAPD Section 1.4, Documents. The audit team evaluated the following AMWTP procedures:

- MCP-135, Revision 43, Document Management
- WIP-5, Revision 0, Obtaining DOE-ID and Carlsbad Field Office Review and Approval of WIPP Documents

The procedures were reviewed to determine the degree to which the procedures adequately address upper-tier requirements. The results of the review confirmed that the procedures adequately address upper-tier requirements.
The audit team conducted interviews with document control personnel and observed activities for adherence to approved procedures, and evaluated recently completed Document Change Requests (DCRs) and case files associated with current and revised work instructions and management procedures. Demonstrations of the EDMS allowed for audit team evaluation and verification of document issue, validation, verification, and changes. New procedures and revisions were properly reviewed, approved, and issued. The team verified procedural detail for format and content of instructions and procedures, including performer action steps, notes, hold, verification, independent witness points, warnings, and cautions. The audit team verified that forms receive the same review as the implementing document, and that current forms are accessed through the EDMS. EDMS is the repository for electronic controlled copies of documents. A limited number of hardcopy documents are maintained as controlled copies. These are distributed from the Document Control office through a formal transmittal and receipt process.

There were no concerns identified during the audit. The procedures reviewed and objective evidence assembled and evaluated during the audit provided evidence that, overall, the applicable requirements for document control are adequately established for compliance with upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

5.3.9 Records

The audit team verified that AMWTP met the requirements of CBFO QAPD Section 1.5, Records. The audit team evaluated the adequacy of the following Fluor procedures:

- MCP-557, Revision 19, Records Management
- MCP-2064, Revision 5, Implementing Records Management Processes

With respect to the requirements of the CBFO QAPD, the audit team determined that the procedures contain adequate flow-down of upper-tier requirements.

AMWTP has proceduralized a uniform method for organizations and employees to manage records. General records management instructions are provided in procedure MCP-557. A review of this procedure showed that Form 353.01, "Separation Notice" listed as part of the records section, is not a controlled form for Records management. The form is available through a web application in the Human Resources website. The form is sent to Records with an employee termination package; therefore, it is recommended for Records Management to remove this form out of procedure MCP-557, (See Recommendation 3 in section 6.4).

Records Management program processes for planning, identifying, categorizing, maintaining, and dispositioning records are specified in MCP-2064. The audit team reviewed a Course Report from the TRAIN database for course 000ICP91, ICP Records General Awareness Training. All ICP organization employees and subcontractors are required to complete this training. ICP Records Management Program personnel (Records Manager, Records Analysts, and Records Specialists) are properly trained through completion of required reading for procedures MCP-557 and
MCP-2064, as well as completion of course 00TRN900, *Document Image and Electronic Record Processing*.

The audit team interviewed Records Management personnel and observed activities to determine AMWTP record storage methods and records practices were in compliance with procedural and CBFO QAPD requirements. Records Management activities evaluated by the audit team included records custodian training, records receipt, identification, verification, validation, submittal, and records maintenance. The audit team reviewed samples of record transmittals and receipt logs and observed record indexing and a demonstration of a records search. The audit team reviewed sample Electronic System Record Storage Record Identification forms and Interim Record Holding System Approval forms indicating records are adequately stored and maintained in approved electronic record repository applications.

The audit team conducted a walkthrough of the INL Site Records Center (ISRC) to verify organization, maintenance, storage, dispositioning and retrievability of records. The team also observed a posted access list of authorized personnel.

The audit team reviewed corrective actions from CBFO CAR 17-010 identified in Audit A-17-04 concerning legibility of records and that all data fields are completed in the QA record as appropriate to the work accomplished. The corrective actions included evaluation and revision of multiple documents. The audit team found that the corrective actions were effective in correcting this concern.

Lifetime and non-permanent WIPP records are categorized and classified in Table 1 and Table 2, respectively, of procedure MCP-2064. The audit team verified that procedures are established to ensure that the generator/storage site maintains records that are designated as WIPP lifetime records for the life of the waste characterization program plus six years, or transferred to the WIPP Records Archive (WRA). The team also verified that the generator/storage site maintains records that are designated as WIPP non-permanent records for ten years from the date of record generation, and then dispositioned according to the approved schedule or transferred to the WRA.

Throughout the audit, procedures and various records were reviewed for compliance to applicable requirements, completeness, legibility, and accuracy. During the RTR review, the audit team discovered that the characterizations records had not been turned into the EDMS for record completion, which resulted in a determination of a condition adverse to quality, and led to the issuance of CAR 18-051 (See CAR 18-051 in section 6.1).

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

5.3.10 Procurement

The audit team verified that AMWTP met the requirements of CBFO QAPD Section 2.3, *Procurement*. The audit team conducted interviews with representatives of the AMWTP
Procurement and QA organizations. Implementing procedures were reviewed to
determine the degree to which the procedures adequately address upper-tier
requirements. The implementing procedures are:

- MCP-4021, Acquisition of Material and Services
- MCP-4022, Material Management
- MCP-591, Supplier Evaluation and Qualification

Review of the current documents confirms that the implementing documents adequately
address upper-tier requirements.

The audit team verified that Purchase Requisitions (PRs) are planned and initiated in
the MAXIMO computer system. During a review of several QL-2 purchase requisitions,
subcontract and purchase orders, including a software procurement and a commercial
grade dedicated item, it was determined that technical, quality, safety and performance
requirements were appropriately specified. The quality levels were clearly identified
along with qualified suppliers and required attachments to the procurement documents
and forms, including FRM-1255, Receiving Inspection Report. Quality clauses are
identified in the purchase orders and subcontracts and based on review, were deemed
appropriate to the item/software. Approvals were documented as required, including
the WCO for a container related procurement.

The audit team also verified that software quality plans were documented, approved
and attached to the QL-2 purchase orders. Details of one of the software quality plans
specified the functional requirements. AMWTP identified that the software development
will be performed in accordance with a SQA program meeting NQA-1-2008, Part II,
Subpart 2.7, and AMWTP will control the software after delivery as Class I or Class II for
Independent Technical Review (ITR) review and mobile characterization in accordance
with MCP-3996, Software Quality Assurance. Software errors and failures are to be
reported in accordance with quality clauses 47, NCRs, and 48, Inspection and Test
Failure. Subsequent to installation, AMWTP will maintain the software for changes and
will process errors in accordance with the Fluor procedures. The audit team assessed
material management through review of completed and in-process documents in the
MAXIMO system, status tags, and by an on location review of operations at the
Yellowstone Warehouse and site warehouses. The team also reviewed and verified
training and qualification records for Supply Chain Inspectors and Warehouse Clerks.

No concerns were identified during the audit. The personnel interviewed, documents
reviewed, and the computer system evaluated during the audit provided evidence that
the applicable requirements for procurement are adequately established for compliance
with upper-tier requirements, satisfactory in the implementation of these requirements,
and effective in achieving the desired results.

5.3.11 Inspection and Testing (Control of Measuring and Test Equipment for Data
Collection)

The audit team verified that AMWTP complies with the requirements of the CBFO
QAPD Section 2.4, Inspection and Testing. Implementing procedures were reviewed to
determine the degree to which the procedures adequately address upper-tier requirements. The implementing procedures are:

- MCP-4023, *Measuring and Test Equipment Program*
- MCP-6303, *Calibration of Installed Facility Process and Control Instrumentation*
- TPR-7998, *Calibration and Control of Measuring and Test Equipment*

Review of the current documents confirms that applicable requirements are satisfactorily incorporated and all documents adequately address upper-tier requirements.

The audit team interviewed personnel and reviewed the applicable AMWTP procedures for the established methods and processes to calibrate and control both M&TE and in-plant and process instrumentation. In general, M&TE is calibrated by an approved calibration facility. In-plant and process instruments undergo calibration and/or functional checks performed at prescribed intervals using calibrated M&TE and approved procedures. Each item of M&TE has a unique number for identification and tracking.

Records of both M&TE calibrations and in-plant and process instrumentation checks are maintained in the Computerized Maintenance Management System (CMMS). Multiple records for M&TE and in-plant and process instruments were reviewed using CMMS.

A site tour was also conducted to observe the site tool crib and in-plant instrumentation. One inspection and testing concern was identified during course the audit. The Enterprise Asset Management System Equipment List Status Field contained some erroneous entries such as equipment designated as "Operating" which have actually been retired from service, but have not been designated as such (See CAR 18-052 in section 6.1).

Although a concern was identified, the personnel interviewed, documents reviewed, areas inspected, and the computer system evaluated during the audit provided evidence that the applicable requirements for inspection, testing, and use of M&TE are adequately established for compliance with upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

5.3.12 Audits/Surveillances/Assessments

Audits

The audit team verified that AMWTP met the requirements of CBFO QAPD Section 3.2.2, *Audits*. The audit team conducted interviews with representatives of the AMWTP QA organization. Implementing procedure MCP-9278, *Quality Assurance Audits*, was reviewed to determine the degree to which the procedure adequately addresses upper-tier requirements.

The audit team reviewed the current AMWTP audit schedule. There have been four audits conducted during the audit period and four planned for the year to date. Prior to the audit period, AMWTP Management opted to perform surveillances and
management assessments in lieu of independent QA assessments due to a loss of qualified Lead Auditors. This issue has been corrected and AMWTP is now conducting audits and planning future audits; although the majority of oversite remains surveillances and management assessments. The objective evidence reviewed confirmed that QA audits are conducted in compliance with procedural requirements.

Training records of personnel conducting QA audits were reviewed and were found to meet procedural requirements. QA Records are maintained as required in EDMS, an approved IRHS. The EDMS approval was reviewed and met all applicable requirements.

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

**Surveillances**

The audit team verified that AMWTP met the requirements of CBFO QAPD Section 3.2.1, Surveillances. The audit team conducted interviews with representatives of the AMWTP QA organization. Implementing procedure MCP-589, Quality Assurance Surveillances, was reviewed to determine the degree to which the procedure adequately addresses upper-tier requirements.

The audit team reviewed the current AMWTP Surveillance Schedule and completed Surveillance Reports to ensure surveillances were scheduled, planned, performed, results evaluated and corrective action taken as necessary.

Training records of personnel conducting surveillances were reviewed and were found to meet procedural requirements. QA Records are maintained as required in EDMS, an approved IRHS. The EDMS approval was reviewed and met all applicable requirements.

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

**Management Assessments**

The audit team verified that AMWTP met the requirements of the CBFO QAPD Section 3.1, Management Assessment. The audit team conducted interviews with representatives of the AMWTP QA organization. Implementing procedure MCP-8, Management Assessments, was reviewed to determine the degree to which the procedure adequately addresses upper-tier requirements.

The audit team reviewed the current AMWTP Management Assessment Schedule and completed Management Assessment Reports to ensure management assessments
were scheduled, planned, performed, results evaluated and corrective action taken as necessary. Management Assessment Reports for the QA Manager's effectiveness review of corrective actions for significant conditions adverse to quality were also reviewed.

Training records of personnel conducting management assessments, issue identification and corrective action activities were reviewed and were found to meet procedural requirements. QA Records are maintained as required in EDMS, an approved IRHS. The EDMS approval was reviewed and met all applicable requirements.

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

5.3.13 Software Quality Assurance

The audit team reviewed AMWTP procedures with respect to requirements of the CBFO QAPD Section 6, Software Requirements. Implementing procedures were reviewed to determine the degree to which the procedures adequately address upper-tier requirements were as follows:

- MCP-3996, Software Quality Assurance
- MCP-3997, Software Version Control
- MCP-3998, Software Inventory Classification
- MCP-3999, System Data Change Request
- MCP-4000, Class III Software Change Requests
- MCP-4001, Temporary Software Override
- MCP-9600, AMWTP Change Control
- MCP-9609, AMWTP Facility Modification Proposal Preparation

Review of the current documents confirms that applicable requirements are satisfactorily incorporated, and all documents adequately address upper-tier requirements.

The audit team evaluated the implementation of the AMWTP SQA process. The evaluation included interviews with personnel and examination of a sample of electronic and hard-copy record documents. Documents reviewed included software build notes, software patch release logs, tests reports, test cases, system change requests (SCRs), software parameter updates (SPUs), software data change requests (SDCRs), and temporary software overrides (TSOs). Further document review included the Baseline Inventory and Software Classification document listing applications installed on AMWTP systems, SCR release documentation, Software Change Screening forms, SQA Plan documents, Software Change Impact Analysis, and Qualification cards of personnel performing SQA activities.
Details of SCRs were reviewed from printed electronic record documents generated from the Helix software application used for generation and management of SCRs. Details of configuration control of software code modules were reviewed from printed electronic record documents generated from the Polytronic Version Control System (PVCS) used for control of AMWTP code. Both programs use access permission and assigned user roles to track and manage software changes and check-in or check-out software code modules for modification or installation. Software life-cycle documents and other documents supporting software changes and development are referenced and viewed within the Helix application. Performance and status of software configuration management activities is captured within and reported using the Helix applications including names, dates, notes, and sequence of activities performed. Notification of status of changes is adequately distributed and communicated to users, departments impacted by changes, and management. Installation of software changes onto the plant environment is managed using the Test Track Pro application for work control.

AMWTP SQA provides for categorization of software applications with a safety software tag. The Fissile Tracking System (FTS) is credited in the AMWTP Documented Safety Analysis (DSA) as a safety software application. WTS is the software application that is used by AMWTP for all waste characterization and certification, and is the backup system for the FTS and is categorized as a safety software application. WTS is also utilized as a double-check for the FTS.

The audit team determined that the involvement of appropriate departments in the generation, review, approval, implementation, and closure of software changes, data changes, parameter updates, facility changes, and temporary software overrides is adequate and satisfactorily documented.

The audit team identified one concern related to implementation of the SQA process at AMWTP. The concern relates to an incorrect link in the software that generates an NDA ISOCs Batch Data Report (BDR) where a link referenced and displayed an incorrect procedure reference. The concern was discussed with AMWTP SQA personnel who determined that a software change using an SCR was appropriate to address the concern. The audit team determined that SCR #5119 was generated and will be completed to address the concern allowing sufficient time to complete all details in accordance with AMWTP procedures. The concern is classified as an Observation indicating that the corrected report will prevent a possible future CAQ where reports with incorrect references might be distributed (See Observation 2 in section 6.3).

Despite the one identified concern, overall, the audit team determined that the activities and procedures evaluated during the audit provided evidence that the applicable requirements for SQA are adequately established for compliance with upper-tier requirements, that procedure implementation is satisfactory, and that implementation results in an effective SQA and facility configuration management program.

5.3.14 Container Management and Filter Installation

The audit team reviewed AMWTP procedures with respect to requirements of the CBFO QAPD and upper tier requirements. Implementing procedures were reviewed to
determine the degree to which the procedures adequately address upper-tier requirements. The implementing procedures are:

- TPR-8083, *Waste Container Handling*
- TPR-8107, *Drum Filter Installation*
- TPR-8108, *WMF-615 Filter Insertion Operations*

Review of the current documents confirmed that applicable requirements of the former documents were satisfactorily incorporated and all documents adequately address upper-tier requirements.

Container management activities are performed to procedure TPR-8083, *Waste Container Handling*, and were evaluated by a walkthrough of AMWTP container storage areas in buildings WMF-630, WMF-636 Pad 2, and WMF-636 Pad 1. Container management activities were evaluated by a walkthrough of AMWTP container storage areas and interviews with operators involved with container management. Container status and location are tracked using the WTS, and verified by examining the Electronic Inventory Analysis dated 08/27/2018. Containers were chosen from the list of containers in the analysis and their documented locations were verified in buildings WMF-630, WMF-636 Pad 2, and WMF-636 Pad 1. Daily checks are performed and reported to management via email to verify location of acceptable drums. Storage of containers ready for shipment were verified to be satisfactory and effective in preventing non-eligible containers from being shipped to the WIPP. Non-INL containers were verified to be stored separately from INL containers. Containers with NCRs were verified to be stored separately from containers without NCRs. Containers ready for shipment were stored indoors in the rows labeled "Containers Ready to Ship," while rows of containers with NCRs did not have such a label. AMWTP has signage posted at each entry door reminding employees that there may be NCR drums in the building. Labelling of containers was verified to be compliant and tracking of the drums using the labels was acceptable.

Filter installation equipment for TRU drums was audited in Building 634 during a walkthrough. Filter insertion activities are controlled by TPR-8107, *Drum Filter Installation* and TPR-8108, *WMF-615 Filter Insertion Operations*. The Drum Vent System (DVS) in Building WMF-634 is used to remotely insert an approved filter through the lid of a drum and through the liner lid, if present. The system is controlled by an operator who loads the DVS with the appropriate filter and then initiates and controls the operation of the DVS using a dedicated computer. When filter installation operations are finished, the operator uploads the drum information into the WTS and sends the drum out for further characterization. Although no drum filters have been installed in the last year using the DVS, the procedure remains active and is reviewed and revised semi-annually. Personnel training was verified to be current.

Vent operations in Building WMF-615 were also audited. Unvented drums enter the venting chamber via conveyor. The drum is drilled using a remote control drill, and filters are installed by hand using a pass-through glove box. The filters are installed, then, using the conveyor, the drums are removed from the filter installation chamber and stored until characterization operations begin. M&TE calibration of instruments and
equipment in WMF-615 was verified to be current and the labels were found to be complete. Personnel training was verified to be current.

Two Bills of Lading from the last two outgoing shipments of TRU waste, 003679989 GBF and 003679990 GBF were examined. These manifests were verified to be complete and compliant with the applicable requirements.

No concerns were identified during the audit. Overall, Container Management and Filter Installation activities for AMWTP were determined to be adequate in incorporating the relevant requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

5.4 Technical Activities

Each technical area evaluated is discussed in detail in the following sections. The methods used to select objective evidence are discussed, the objective evidence used to assess compliance with the HWFP is cited briefly, and the results of the evaluation are provided.

5.4.1 Acceptable Knowledge

The AK audit team members examined the AK record for waste streams from CH SCG S5000 Debris and S3000 homogeneous solids waste. With regard to CH SCG S4000 Soil/Gravel, there is one AMWTP waste stream, ID-SDA-SOIL, with an AK Summary Report. Since the last AMWTP Recertification Audit in December of 2016, there have been no additions to the AK record for this waste stream with the exception noted below. The AK Summary Report has not been revised. No Enhanced AK Products have been developed. There has been characterization activity including visual examination and non-destructive assay. As a result, the AK auditors did not complete a full review of the AK record for this waste stream; however, they did include ID-SDA-SOIL drums in the WAP required traceability exercise.

Prior to this audit, the AK auditors examined the following recently issued AMWTP AK procedures:

- WIP-6, Collection, Review, and Management of Acceptable Knowledge Documentation
- WIP-7, Preparation of Waste Stream Profile Forms
- WIP-9, Preparation of Chemical Compatibility Evaluation and Basis of Knowledge Assessment

The objective of this review was to confirm that these procedures are consistent with the requirements in the WAC and the WAP. The procedures were found to be compliant by the audit team. In addition, the audit team reviewed the procedures to identify any additions or deletions compared to the previous requisite AK procedures. While there were some format changes and some language had been added or modified, the technical process steps were unchanged for each procedure reviewed. As a result, applicable sections from these procedures were used in conjunction with the AK portions of the WAP C6-1 and C6-2 checklists.
Consistent with a recertification audit, the AK auditors reviewed the AK record and compiled objective evidence demonstrating compliance with all applicable AK requirements from both the WAP and the WAC, using WAP C6-2 and C6-1 checklists as noted above, in addition to a WAC AK checklist focused primarily on radiological properties. In addition, a checklist was developed that focused on completed Enhanced AK Products as described in WAC Revision 8 Appendix H.

There were three waste streams examined during the audit. The first audited waste stream was CH SS5000 TRU mixed waste debris stream BN510.4, the supercompacted debris waste stream described in AK Summary RPT-TRUW-83 Acceptable Knowledge Summary for Supercompacted Debris Waste, Revision 12. The second audited waste stream was CH-TRU S3000 homogeneous solids generated at the Rocky Flats Plant designated as BNINW216, and described in RPT-TRUW-09, Acceptable Knowledge Summary for First/Second Stage Sludge (BNINW216), Revision 9. The final audited waste stream was a second Rocky Flats Plant CH-TRU S3000 homogeneous solids stream BNINW218 described in RPT-TRUW-15 Revision 14, Acceptable Knowledge Summary for Building 374 Sludge (BNINW218).

These AK Summary reports document information that addresses the waste stream specific requirements of the WAP. The corresponding documentation of the WAP programmatic requirements for these three waste streams are found in generator site AK documents RPT-TRUW-06, Acceptable Knowledge Document for AMWTP Waste and RPT-TRUW-56, AK Document for INL Stored TRU Waste-Rocky Flats Plant, respectively. A review of these five primary AK documents demonstrated that all of the above noted WAP requirements were met. Additional objective evidence was compiled which further demonstrates compliance with the WAP requirements including Form 1066 (FRM-2182), "TRU Waste Management Checklist" and Form 1067 (FRM-2457), "TRU Waste Stream AK Documentation Checklist." These forms provide a crosswalk between the WAP requirements and specific AK Source Documents that address the requirement.

In addition to the AK Summary Reports and generator site AK documents noted above, WAP and WAC required and/or supporting information from AK upper-tier documents were reviewed by the audit team and included the following:

- RPT-TRUW-12 AMWTP Waste Stream Designations
- RPT-TRUW-07, Determination of Radioisotopic Content in TRU Waste Based on Acceptable Knowledge

Furthermore, the audit team examined AK discrepancy resolution documentation for discrepancies in the AK record and discrepancies identified during characterization testing. Of particular interest was the review of AK discrepancies identified during RTR in which a change to the Item Description Code (IDC) of the waste container being examined was proposed that would effectively move the container to another waste stream and/or IDC. The process and justification was thoroughly reviewed for several examples of this activity. The audit team also reviewed NCRs dealing with the identification and remediation of prohibited items. Documentation of electronic holds on
non-compliant containers along with the application of a “hold” tag on those containers was reviewed.

Numerous other documents from the AK record that demonstrate compliance with additional applicable requirements were reviewed and compiled as objective evidence, including the requisite WSPFs and attachments documenting the reconciliation of DQOs for the three waste streams. The auditors examined a large number of AK Source Documents and AK Source Document Summaries from which the AK is derived, along with the latest version of the AK Document Reference Inventory, a complete listing of all AK Source Documents for AMWTP waste streams.

**Item Description Code**

During the audit, there were extensive discussions regarding how AMWTP has historically managed and classified waste that it has been received from offsite generators like Rocky Flats, from on-site activities outside of the AMWTP program (e.g., Accelerated Retrieval Project [ARP]), and from waste generated within the AMWTP such as squeezants from supercompaction. All AMWTP TRU waste has been assigned an IDC such as RF-001 for Rocky Flats Building 774 First Stage Sludge. The assignment is based upon available AK information. A compilation of these IDCs is found in RPT-TRUW-05, Waste Matrix Code Reference Manual, currently in revision 42. Over 300 references are contained in the report and footnoted in each IDC description to document the sources of the AK information. Many IDCs are part of a WIPP approved waste stream such as BNINW216 First/Second Stage Sludge from Rocky Flats, which may contain IDCs RF-001, RF-002, RF-741, RF-742 or RF-800 depending upon the time period of generation and/or whether the sludge was collected from the first or second stage of the process. There are a total of 126 IDCs for debris waste from both onsite and offsite generators that are approved as feedstock into the supercompaction process that yields approved waste stream BN510.4. Numerous other IDCs documented in RPT-TRUW-05 have not been compiled into a waste stream and may not be fully containerized as is the case for the squeezants noted above that are absorbed in plastic bottles. Some waste may be assigned IDC UN-000, Undetermined Form. During RTR or VE examination of a waste container, the information in RPT-TRUW-05 is used by the operator to confirm the IDC assignment or on occasion to propose an IDC change as discussed above in the review of AK discrepancies during characterization. Information provided in RPT-TRUW-05 includes a description of the waste, container packaging, including any inner containment such as cans or bottles, primary waste parameters, the presence of absorbents, potential prohibited items, and other information deemed important to the operator. This activity is unique to AMWTP.

With regard to the status of the development of Enhanced AK Products, the AK audit team spent a considerable amount of time prior to and during the audit examining several products for the three waste streams reviewed during this audit. A summary of the products reviewed is described below.

**Interface Waste Management Documents List (IWMDL)**
There were no IWMDLs available for the waste streams examined. Since all of the containers in the audited waste streams for Enhanced AK (BNINW216, BNINW218, BN510.3 and BN510.4) were previously certified, the requirements for an IWMDL does not apply.

Chemical Compatibility Evaluation (CCE)

Two Chemical Compatibility Evaluation Memorandums (CCEMs) and supporting documentation were examined during the audit. The first was developed to address the population of BN510.3 SCG S5000 product drums that were stored at the Waste Control Specialist (WCS) facility in Andrews, Texas and of BN510.4 supercompacted drums at the INL. While it was prepared for the entire BN510 through BN510.4 population, this CCEM was approved only for the population of product drums at WCS. These drums contained pucks from the supercompaction process that represented primarily debris waste streams from Los Alamos National Laboratory (LANL) sent to INL for supercompaction. In addition, there was a small amount of waste (1-2 pucks) from specific debris streams from Mound and Argonne National Laboratory East (ANLE). The CCEM and supporting internal and external review comments were examined and compiled.

The second CCEM reviewed was written and approved for waste stream BNINW216 SCG S3000. The CCEM was applied to all waste containers in this waste stream including those containers at the INL that have not yet been certified. This CCEM and supporting documentation, as noted above, was also thoroughly reviewed. It was applied appropriately to the BNINW216 subpopulation in the WIPP Waste Handling Building and BNINW216 subpopulations Lot 1 and Lot 2, which are at the INL and were reviewed by the AK auditors with respect to documenting a complete set of Enhanced AK Products for each of those Lots.

Acceptable Knowledge Assessment (AKA)

The AK audit team examined several AK Assessments (AKAs) during this audit that represented the following waste stream subpopulations

- The BNINW216 subpopulation in the Waste Handling Building
- The BNINW216 Lot 1 certified but not shipped subpopulation at the INL
- The BNINW216 Lot 2 certified but not shipped subpopulation at the INL
- The BNINW218 Lot 1 certified but not shipped subpopulation at the INL
- The BN510.3 subpopulation at WCS
- The BN510.4 Lot 1 certified but not shipped subpopulation at the INL.

Each of the AKAs for these waste stream subpopulations identified relevant historic and current waste management practices, absorbents and neutralization agents utilized and specific waste containers to which the AKA applied. Supporting AK documentation in the form of review comments from the SPM and the Site Management Representative (SMR) were collected as objective evidence.

Basis of Knowledge (BoK)
BoK memoranda were reviewed for the following waste stream subpopulations

- The BNINW216 subpopulation in the Waste Handling Building
- The BNINW216 Lot 1 certified but not shipped subpopulation at the INL
- The BNINW216 Lot 2 certified but not shipped subpopulation at the INL
- The BN510.3 subpopulation at WCS

Each BoK memorandum was examined with regard to the response to every criterion identified in the two BoK documents developed for, (1) waste in the Waste Handling Building and at WCS and (2) waste at the generator sites. For some subpopulations, an addendum to the BoK memorandum was required to address the disposition of waste containers that initially failed one or more of the BoK criteria. Supporting documentation in the form of review checklists and BoK Council member comments were compiled.

Acceptable Knowledge Briefings

The requirements for conducting an AK briefing in AMWTP WIP-6 are as follows:

A. When the AK summary report is revised due to changes in the waste stream characteristics or packaging configuration.

B. As requested by the SPM or SMR when generation of waste varies in characteristics or packaging configuration.

Since there have been no AK Summary Report revisions since the last audit, there were no AK Briefings to address that requirement. However, a request was made by the SMR to have the AKE provide an AK Briefing for IDC RF-361 that provided a comprehensive description of this IDC, including but not limited to the generation process, physical, chemical and radiological parameters and potential prohibited items. The AK auditors have compiled that AK Briefing as objective evidence along with the attendance list. No issues were identified by the audit team for the reviewed AK briefing.

Traceability

A total of ten drums were tracked for the WAP required traceability exercise including the following:

- Drums from the BN510.3 waste stream at WCS and from BN510.4 Lot 1 at the INL
- Two drums from BNINW216 Lot 2 at INL
- Two drums from BNINW218 Lot 1 at INL
- Two drums from the ARP Soil waste stream ID-ARP-SOIL also at INL.

In addition to reviewing the relevant VE, RTR and NDA characterization BDRs, the audit team also compiled traceability screenshot data from WTS along with waste container input data, when available. The auditors also reviewed several data reconciliation packages for the traceability containers that reconciled characterization data with requisite AK information.
With regard to the QA aspects of the AK portion of the audit, the audit team reviewed training records for eight AKEs and four SPMs who have participated or could potentially participate in characterization activities for AMWTP. The audit team reviewed BDRs, NCRs and AK Resolutions. There were no new AK record discrepancies to evaluate since the last recertification audit; however, several AK record discrepancies identified before the last recertification audit were reviewed to verify that a process is in place to resolve discrepancies found in the AK record. The Audit team examined the handling of AK records for compliance with preparation, legibility, accuracy, review, approval, and maintenance requirements. The distribution, control and use of appropriate AK procedures was reviewed. The audit team also examined the most recent internal surveillance reports relevant to AK:

- ICP Surveillance 114473, TRU AK-CH AMWTP, conducted September 19, 2017

The audit team did not identify any QA issues regarding AK during the audit.

The AK Auditors documented two concerns. The first concern deals with direction initially provided in Revision 40 of RPT-TRUW-05, *Waste Matrix Code Reference Manual*, to no longer assign IDC CW-216 to a waste container. This direction appears to not have been followed (See CAR 18-053 in section 6.1).

The second concern is in regard to the CCEM for waste stream BNINW216. After the CCEM was developed, reviewed and approved, 31 additional chemicals were identified as potentially being present in this waste stream (See Observation 1 in section 6.3).

Despite the two identified concerns, the AMWTP AK Program was determined to be adequate in representing the relevant requirements, satisfactory in the implementation of these requirements and effective in achieving the desired results, that is, properly certified waste for shipment for CH S3000 homogeneous solids and CH S5000 Debris SCGs. Since there are neither completed Enhanced AK Products nor an approved WSPF for waste stream ID-SDA-SOIL from the CH S4000 Soils/Gravel SCG, the AK for that SCG is deemed indeterminate.

### 5.4.2 Project-Level Validation and Verification

The audit team interviewed AMWTP project level personnel and verified through the SPM Designee and SPM that AMWTP maintains a program that meets the requirements of the CBFO QAPD. The team verified the adequacy of AMWTP procedures:

- MCP-4006, *Level II Data Validation*
- WIP-3, *Level II Data Validation*

The audit team also verified the following procedures that support project level validation and verification:

- MCP-4004, *TRU Waste Certification*
• MCP-4007, *Data Reconciliation*
• MCP-4010, *Collection, Review, and Management of AK Documentation*
• MCP-4013, *Preparation of Waste Stream Profile Forms,*
• WIP-4, *Data Reconciliation*
• WIP-7, *Preparation of Waste Stream Profile Forms*

Documentation of characterization processes through approval of the SPM included two approved WSPF packages:


The AK summaries and the CIS provided adequate information to complete the characterization processes at AMWTP and support the containers characterized by AMWTP. The audit team evaluated randomly selected BDRs generated since Audit A-17-04 including:

**RTR**

RTR17-00025  RTR17-00096  RTR18-00003  RTR18-00004

**VE**

VEA17-0002  VEA17-00160  VEA17-00231  VEB17-00707

VEB18-00039  VEB18-00278  VEB18-00470  VEP17-00104

VEP17-00108  VEP17-00176  VNC17-000105

**NDA**

ASY17-00023  ASY17-00138  ASY17-01667  ASY17-04011

ASY18-00055  ASY18-00125  ASY18-00706  ASY18-01659

The audit team verified a random sampling of reconciliation report lots for individual containers from the selected lots:

BNINW216.0100  BNINW216.0107  BN510.4.0042  BN510.4.0055

BN510.4.0063  BN510.4.0082  BN510.4.0089  BN510.4.0098
Review of the current BDRs confirm that applicable requirements of the project level documents are satisfactorily incorporated, and the BDRs adequately address the upper-tier requirements.

The audit team verified the NCRs associated with the evaluated BDRs the team randomly selected for the audit. The NCRs were either open, which includes those containers not for WIPP certification, and those which are closed to lead toward certified lots. NCRs from BDR RTR17-00096 include:

- NCR110871
- NCR110872

Review of the current NCRs confirm that applicable requirements of the project level issuance regarding NCRs are satisfactorily incorporated, and the NCRs adequately address the requirements of upper-tier documents.

The audit team verified the AMWTP quarterly surveillance reports as required by the Permit section C3-4b. The SPM provided the following Surveillance Reports:

100601 - 1Q2016 - VEB 116165 - 1Q2017 - VEB 116266 - 1Q2018 - VEB
100552 - 2Q2016 - RTR 107119 - 2Q2017 - RTR 116267 - 2Q2018 - RTR
100554 - 3Q2016 - VEB 107120 - 3Q2017 - VEB 100555 - 4Q2016 - NDA
107121 - 4Q2017 - NDA

One concern was identified by the audit team. The audit team did not find evidence of WAP required quarterlies for 2016 and 2017, 4th quarter. AMWTP performs quarterly reviews on NDA, since the WAP requires quarterly reviews for RTR and VE (See CAR 18-054 in section 6.1).

The review of the current quarterlies, with exception of the WAP related concern identified, confirms that applicable requirements of the project level issuance of re-reviews was satisfactorily incorporated, and adequately addresses the requirements of upper-tier documents.

Despite the one identified concern, overall, the audit team verified that PL V&V activities continue to meet the requirements of the upper-tier documents. The procedures are adequately established, 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 AMWTP VE characterization process for SCG S3000 homogeneous solids, SCG S4000 soils waste and SCG S5000 debris waste.
The audit team reviewed the following AMWTP procedures to determine the degree to which they adequately address upper-tier requirements.

- TPR-8041, Visual Examination Operations
- TPR-8103, Non-Facility Visual Examination Operations
- TPR-7997, Visual Examination Activities At RWMC
- WIP-2, Level 1 Data Validation
- MCP-33, Personnel Qualification and Certification

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

The audit team toured the South and North Box Lines and interviewed the VE operators and the VEE. Both areas were performing cleanup operations at the time of the tour.

The audit team also toured the ARP VIII facility in building WMF-1621 and observed VE of drum 10648011, a CH SCG S3000 homogeneous solids waste from waste stream ID-SDA-SLUDGE. AMWTP uses RPT-TRUW-05, Waste Matrix Code Reference Manual, as their AK reference to confirm the assigned IDC is correct. The log books for the North and South Box lines and the ARP VIII facility were logged correctly and were reviewed by the VPM as required. The team verified two torque wrenches used during VE operations were calibrated.

The audit team examined the following VE Batch Data Reports:

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<th>VEB17-00080</th>
<th>VEB17-00509</th>
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<td>VEB17-00069</td>
<td>VEB17-00080</td>
<td>VEB17-00509</td>
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</table>

The audit team examined training records for VE operators/ITRs and confirmed the appointment of AMWTP VEEs. The audit team verified that VE operators/ITRs are appropriately qualified as required.

The audit team identified two concerns related to VE. While reviewing TPR-7997, the audit team noted that the procedure does not address the duties and responsibilities of the VE Expert as defined in PLN-5198. (See CAR 18-056 in section 6.1). Further, the audit team witnessed a VE operator performing work prior to completing required reading (See CAR 18-057 in section 6.1).

Despite the two identified concerns, the procedure reviews, field observations, and document reviews provided evidence that the applicable requirements for characterizing SCG S5000 debris waste, SCG S4000 soils waste, and SCG S3000 homogeneous solids 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 Real-time Radiography

The audit team evaluated the adequacy, implementation, and effectiveness of the AMWTP RTR characterization process for SCGs S5000 debris waste, S4000 soil/gravel, and S3000 homogeneous solids.

The audit team reviewed the following procedures to determine the degree of adequacy in addressing upper-tier requirements:

- TPR-8089, Real-Time Radiography Examinations (Certification Scans)
- WIP-2, Level I Data Validation
- PLN-5199, Quality Assurance Project Plan
- PLN-5198, AMWTP CH-TRU Waste Certification Plan
- PRD-4374, WIPP Training Requirements Implementation Matrix
- MCP-33, Personnel Qualification and Certification
- PRD-5072, Personnel Training and Qualification
- MC-538, Control of Non-Conforming Items

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

The audit team evaluated RTR operations in building WMF-634 on RTR units Z-213-101 and Z-213-106. The team interviewed RTR personnel, verified the equipment was operational, and verified the use of the most current operating procedures. AMWTP uses RPT-TRUW-05, Waste Matrix Code Reference Manual, as their AK reference to confirm the assigned IDC is correct. During the evaluation, a concern was identified by the audit team. There was no documented evidence provided to verify the most current revision of RPT-TRUW-05, Revision 42, was used as a reference while performing certification scans to verify waste container contents (See CAR 18-055 in section 6.1).

RTR operations were observed on RTR unit Z-213-101 for the Image Quality Indicator (IQI) and characterization scan of containers #10636329 and #10636328, BDR# RTR18-00041, waste matrix code S5490 heterogeneous debris waste from IDC BN180. The RTR operator recommended an IDC change to BN524. AMWTP is currently not using RTR unit 1001 in building WMF-610 to perform certification scans of TRU waste. The audit team did inspect the unit and verified the unit consisted of the components required to perform RTR and is operational. All RTR units contained the components required by the WAP to effectively characterize the CH SCG wastes subject to the scope of the audit. The audit team also examined RTR operational logbook entries in the electronic login system (eSOMS) for both RTR units 101 and 106 to verify logbook entries were correct and reviewed by the facility shift supervisor as required.

Also, during field evaluations of RTR in Building WMF-634, the audit team witnessed that that Image Quality Indicator forms are hand-written by the RTR operators and they are not included as part of the BDR record. Therefore, the audit team recommends that AMWTP include the Image Quality Indicator Verification form, FRM-2188, be included as part of the RTR Batch Data Report. (See Recommendation 1 in section 6.4).
The audit team evaluated RTR operator training documentation. The audit team examined training records for three RTR operators and determined they were appropriately trained and qualified for compliance with training requirements. The training files for each of the RTR operators included an annual record of eye examination, RTR Operator/ITR qualification card, and documentation/required read & sign for current AK reports.

During the field evaluation of RTR operations, the audit team identified an additional concern. During the RTR characterization scan of container 10636329, the audit team observed the RTR operator quickly answered “no” to a series of questions. When asked by the audit team when those specific questions would be answered “yes,” the RTR operator could not answer the question referencing those specific prohibited items. Review of RTR Qualification Package QPOT03A0, Revision 14, March 2016, Section VII, ADMINISTRATIVE TASKS and KNOWLEDGE, Item 47 discusses Prohibited Items. The qualification package does not address the discussion on identifying the following prohibited items: non-radionuclide pyrophoric materials, such as elemental potassium; wastes incompatible with backfill, seal and panel closure materials, container and packaging materials, shipping container materials, or other wastes; and waste exhibiting the characteristic of ignitability, corrosivity, or reactivity (EPA Hazardous Waste Numbers of D001, D002 or D003). Although the qualification package did not address those items specifically, they are covered in the required reading of the WAC, Rev.8, and AMWTP’s QAPjP (PLN-5199). (See Observation 3 in section 6.3)

The audit team evaluated the RTR operator required training container documentation, along with the corresponding audio/video media for two qualified operators. AMWTP has training containers representing waste from waste streams SCGs S4000, Soil/Gravel and SCG S5000 Debris Wastes in one training container and waste representing waste streams from SCG S3000 homogeneous solids in a separate training container. AMWTP requires RTR operators to examine a training container with waste representing SCGs S4000 and S5000 waste semiannually and during the next cycle (six months later), a training container with waste representing SCG S3000. During the audit, a concern was identified by the audit team as to the WAP semiannual training requirements for RTR. After the audit, additional objective evidence was received and further discussions were held between the audit team and CBFO QA & CBFO NTP. The additional documentation reviewed included initial qualification cards for prospective RTR operators. This included information on training container scans, which showed evidence that the RTR operators were initially trained to identify waste streams applicable to the site. However, the audit team recommends when AMWTP configures future training containers, that they consider including items from waste streams for all three SCGs. (See Recommendation 4 in section 6.4).

The audit team examined BDRs and audio/video media for selected containers within the following RTR BDRs:

| RTR16-00316 | RTR17-00059 | RTR17-00140 | RTR18-00003 |
| RTR16-00322 | RTR17-00096 | RTR17-00146 | RTR18-00011 |
| RTR16-00332 | RTR17-00128 | RTR17-00158 | RTR18-00017 |
| RTR17-00033 | RTR17-00139 | RTR17-00167 |
No concerns were identified during the review of RTR BDRs.

With the exception of the four RTR-related concerns noted above, the procedure reviews, field observations, and document and audio/video reviews provided evidence that the applicable requirements for characterizing S3000 homogeneous solids, S4000 soil/gravel, and S5000 debris waste using the RTR process is adequately established for compliance with upper-tier requirements. Implementation and effectiveness of these requirements were determined to be satisfactorily implemented and effective.

5.4.5 Nondestructive Assay

The audit team evaluated the continued adequacy, implementation, and effectiveness of the following NDA systems:

- Integrated Waste Assay Systems (IWAS) systems designated as the Z-390-100 and Z-390-101
- NDA systems in Building WMF-676, the Z-211-102 and Z-211-103
- NDA systems as well as the Retrieval Box Assay System (RBAS), designated Z-212-105 in Building WMF-634,
- The Waste Assay Gamma Spectrometer (WAGS)
- The SWEPP (Stored Waste Examination Pilot Plant) Gamma-Ray Spectrometer (SGRS) at the AMWTP.

CBFO previously evaluated these systems during Audit A-17-04 in December of 2017.

Additionally, the audit team evaluated the adequacy, implementation and effectiveness of two new In-Situ Object Counting Systems (ISOCS) systems designate Z-295-100/200 and Z-295-101/201. AMWTP presented two physical ISOCS systems for evaluation. The different number designations indicate whether the system is being used to characterize drummed waste (the 100 and 101 designations) or boxed waste (the 200 and 201 designations). As presented to the auditors, the Z-295-100/200 instrument consisted of Low Energy Germanium (LEGe) detector (S/N 8753) and a laptop computer (WTSL295100). The Z-295-101/201 instrument contained two Broad Energy Germanium (BEGe) detectors (S/N 8149 and 8151) and a laptop computer (WTSL295101).

The ISOCS systems are capable of assaying waste in a wide variety of containers as there are no limitations imposed by assay chambers or fixed calibration geometries. Waste containers include:

- 55-Gallon drums
- 83/85 Gallon drums
- 100 Gallon puck drums
- 110 Gallon drums
- Low Level Waste Export Boxes
- Shredder Boxes
- Standard Large Box 2 Assembles
- Standard Waste Boxes
- Fiberglass Reinforced Packages
- M-III bins
- Various other container geometries as long as those geometries have been properly modeled and input into the ISOCS modeling system.

Additionally, and of important note, the mobile nature of the ISOCS systems differentiates them from the other NDA systems evaluated at AMWTP. The CBFO has experience with other ISOCS systems that are integral parts of the Mobile ISOCS Large Container Counters (MILCCs) found at Oak Ridge National Laboratory (ORNL) and LANL. Similar to the systems at ORNL and LANL, the ISOCS units at AMWTP will be routinely repositioned in order to properly orient the detectors relative to waste containers and to compensate for effects such as high gamma containers that could cause excessive dead time in detectors. AMWTP may choose to reposition the ISOCS detectors; however, they must meet the applicable WAC requirements to account for location specific effects of measurements including all effects of background radiation and the presence of any materials that could affect the energy and profile of measured gamma rays (e.g., attenuators or reflectors.)

In addition to the new ISOCS systems, AMWTP staff were observed using an H3D gamma-ray imaging spectrometer "Gamma Camera." Use of this equipment is governed by TPR-8177, Using the Portable H3D Gamma-Ray Imaging Spectrometer. The audit team found that the "Gamma Camera" was being used for qualitative evaluation of specific waste container conditions (such as "hot spots") but was not being used for WIPP data quality effecting purposes. Therefore, the audit team did not evaluate the "Gamma Camera" for compliance with documents and procedures that control the collection, analysis, and reporting of WIPP data. Should AMWTP choose to use the "Gamma Camera" in the future to collect WIPP data or use information from the "Gamma Camera" to quantitatively affect WIPP data, the use of the instrument and the associated data must be evaluated for compliance with WIPP controlling documents.

The Z-390-100 and Z-390-101 systems are capable of assaying waste in 55-gallon drums, while the Z-211-102 and Z-211-103 systems are capable of assaying waste in both 55 and 83/85 gallon drums. The RBAS is capable of assaying boxes with a maximum dimension of 98" X 58.5" X 78". Boxes assayed may include Standard Waste Boxes (SWBs), Standard Large Boxes II (SLB II's), and Fiber Reinforced Plywood (FRP) boxes or their custom equivalents. The WAGS and SGRS can only assay 55-gallon drums.

The Z-390-100 and Z-390-101 units are located inside the AMWTP processing facility where waste is sorted and delivered to the supercompactor. These units therefore see only SCG S5000 waste. The RBAS is capable of assaying both S3000 and S5000 SCG's, but has not been used to assay S3000 waste. The Z-211-102, Z-211-103, WAGS and SGRS have seen waste from all approved SCGs.
The IWAS NDA systems are Canberra multi-mode hybrid systems that run on NDA 2000 and incorporate Canberra's Genie 2000, Multi Group Analysis (MGA), as well as Multi-Group Analysis-Uranium (MGA-U), when sufficient quantities of uranium are detected or anticipated based on AK. Each IWAS system consists of the following components:

- Two broad energy germanium (BEGe) gamma detectors mounted one over the other in the assay chamber wall, perpendicular to, and pointing toward the vertical axis of the drum;
- An array of 122 Helium-3 (He-3) proportional tubes arranged in a 4π geometry around the assay chamber. These tubes are divided into 16 detector banks currently only used in the passive neutron coincidence counting mode. These systems have the capability (both qualified and maintained) to assay in the active neutron differential die-away (DDA) mode. Active mode was not used for WIPP assay purposes since the last audit;
- A Cf-252/Cs-137 Add-A-Source (AAS) correction source, mounted in a retractable housing external to the assay cavity, with an intensity of approximately 105 neutrons per second is used, in part, for the determination of matrix correction factors (MCF);
- A 14 MeV neutron generator with a capability of producing 10^8 14-MeV neutrons per second can be used, along with cavity and barrel flux monitors and four Fast Neutron Detector Packs (FNDP), in the active neutron DDA mode.

The RBAS is an imaging passive/active neutron system supplemented with a High Purity Germanium (HPGe) gamma system. The measurement techniques used with the box assay system are passive neutron multiplicity counting, imaging active neutron counting using thermal and epithermal DDA techniques, and high-resolution gamma isotopic analysis. The integrated information from the neutron measurements, gamma-ray measurements, and AK are used to determine the isotopic distribution, quantify the radionuclide masses, and compute the associated derived quantities (Plutonium Equivalent Curies (PECi), the Plutonium equivalent Fissile Gram Equivalents (FGE), the total TRU Alpha Activity, and the decay heat) for each waste box.

Once a box is loaded onto the RBAS loader/turntable, the system feeds the box fully into the RBAS where the gamma measurement is taken. The box is then conveyed to the middle section of the unit where banks of Helium-3 detectors count the passive neutrons emitted by the waste and a neutron source is directed through the box to allow for the measurement of moderating and absorbing characteristics of the waste and correct for waste matrix effects. The neutron detectors also count the neutrons that are emitted actively in response to the source to perform the DDA analysis. The box is measured in segments as it passes through the area of detectors and the interrogating source. Once the full length of the box has passed through this region, the loader/turntable unloads the box, rotates it 180 degrees and repeats the entire measurement.

The RBAS uses PC-FRAM (Fixed-energy Response function Analysis with Multiple efficiencies) for the isotopic analysis of the gamma spectra. Integration of FRAM results
and RBAS neutron results is performed using off-line software known as RBAS WIPP Analysis Reporting Software for Expert Analysis (RWARS-EA).

The SGRS and WAGS are both gamma spectrometers with multiple high-resolution Broad Energy Germanium (BEGe) detectors. The WAGS uses six such detectors divided into two vertical banks of three detectors each. One bank is positioned opposite a set of three Ba-133 sources. These detectors are calibrated, based on a density correction obtained from the Ba-133 transmission, to quantify gamma-emitting radionuclides using the Canberra MGA software. The second bank of three BEGe detectors uses cadmium filters to attenuate low energy gamma rays, thus reducing dead time and increasing measurement resolution. The spectra obtained from these detectors are used to determine the relative isotopic ratios of gamma-emitting radionuclides. The SGRS differs from the WAGS in that it does not use a transmission source to perform a density correction. The SGRS utilizes four BEGe detectors that each acquires a gamma spectrum. The four spectra are then summed and corrected using a multi-curve correction that was developed during system calibration. This multi-curve correlates detector efficiency with waste density and gamma energy. Once the spectra are corrected, the same Canberra MGA software is used to quantify the individual radionuclides present.

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

- System stability as evidenced by the implementation and effectiveness of daily and weekly measurement controls and calibration verifications;
- Applicability of each system's calibration and operational range to the matrix, geometry and radionuclide content of waste assayed since Audit A-17-04;
- Successful participation in the CBFO-sponsored NDA PDP Cycle 25A and B17A;
- Completed BDRs to ensure data are reported and reviewed as required;
- Data storage and retrievability;
- Personnel qualification and training; and
- Continued operability and condition of the NDA systems since Audit A-17-04.

The audit team interviewed AMWTP NDA personnel and operations staff, observed equipment operations and practices, and examined electronic and paper copies of records, including BDRs, control charts, nonconformance reports, and work orders. No system recalibrations have been required or performed on the assay systems since Audit A-17-04 and the system performance checks have been performed as required. AMWTP successfully participated in PDP cycle 25A for 7 drum systems (4 IWAS units, the SGRS, and the 2 ISOCS systems except for sludge wastes — the WAGS did not pass the PDP test criteria) and box cycle B17A for the RBAS.
The audit team specifically reviewed the following documents:

**IWAS**
- TPR-8025, Revisions 3, 4, and 5, *In-Plant Drum Assay Operations*
- TPR-8094, Revisions 2 and 3, *Drum Assay Operations*
- TPR-7994, Revision 2, *Drum Assay Post-Maintenance Calibration and Verification*
- Cl-IDA-NDA-0035, Revision 3, *Calibration Verification and Confirmation Procedure for the Integrated Waste Assay System (IWAS) at AMWTP*
- Cl-IDA-NDA-0055, Revision 1, *Total Measurement Uncertainty for the AMWTP Integrated Waste Assay System*

**RBAS**
- TPR-8095, Revisions 4, 5, and 6, *Box Assay Operations*
- TPR-7995, Revision 2, *Box Assay Post-Maintenance Calibration and Verification*
- BII-5112-TMU-001 Revision 2, *AMWTP Retrieval Box Assay System (RBAS) Total Measurement Uncertainty Report*
- PSC-5431-CCR-001 Revision 0, 1, and 2, *RBAS Calibration Confirmation Reports*
- PSC-5431-SADD-001 Revision 10, *System and Algorithm Definition Document*
- PSC-5431-SADD-002 Revision 3, *System and Algorithm Definition Document*

**SGRS**
- TPR-8092, Revisions 3, 4, and 5, *Stored Waste Examination Pilot Plant Gamma-Ray Spectrometer Operations*
- CCP-INL-SGRS-001, Revision 2, *SWEPP Gamma-Ray Spectrometer (SGRS) Calibration, Confirmation, and Verification Report*
- CCP-INL-SGRS-0002, Revision 0, *Total Measurement Uncertainty for the SGRS Assay System*

**WAGS**
- TPR-8093, Revision 3, *Waste Assay Gamma Spectrometer Operations*
The following drum assay BDRs were reviewed during the audit:

- **Z-390-100 IWAS** (Sample size of 2 out of a population of 22)
  - ASY18-01631 and ASY18-01637

  Both of these BDR's report waste drums from the S5490 SCG:

- **Z-390-101 IWAS** (Sample size of 2 out of a population of 19)
  - ASY18-01423 and ASY18-01607

  Both of these BDR's report waste drums from the S5490 SCG:

- **Z-211-102 IWAS** (Sample size of 5 out of a population of 489)
  - ASY18-00942, ASY18-01550, ASY17-02527, ASY17-03334, and ASY17-03293

  These BDR's report waste drums from the S3900 and S5490 SCGs:

- **Z-211-103 IWAS** (Sample size of 5 out of a population of 376)
  - ASY17-02336, ASY17-02349, ASY17-00892, ASY17-00357, ASY17-01127

  These BDR's report waste drums from the S3121, 4200 and S5490 SCGs:

- **SGRS** (Sample size of 18 out of a population of 6809)

These BOR's report waste drums from the S3100, S3900, S4200, and S5400 SCGs:

WAGS (Sample size of 14 out of a population of 3963)

These BOR's report waste drums from the S3100, S3900, 4200, and 5400 SCGs.

The following box assay BDRs were reviewed during the audit:

RBAS (Sample size of 3 out of a population of 12)
• BSY17-00014, BSY17-00036, BSY18-00048.

These BDR's report waste drums from the S5400, and S5490 SCGs:

ISOCS (Sample size of 2 out of a population of 2)
• ASY18-01852, ASY18-01853.

These BDR's report waste drums from the S5000 SCGs.

The audit team concluded overall, NDA activities were determined to be adequate, satisfactorily implemented, and effective.

The audit team evaluated qualification packages for technicians (ITRs), and Expert Technical Reviewers (ETRs) for each NDA system (including initial indoctrination for ISOCS). The auditors verified NDA personnel are trained to the existing industry standardized training requirements of the Standard Guide for Selection, Training and Qualification of Nondestructive Assay Personnel, American Society for Testing and Materials (ASTM) C1490. NDA technicians/ITRs have received indoctrination training; on-the-job training; required reading on the WAP; WAC, Revision 8, and applicable implementing operating procedures; and training on the objectives of the WIPP Program. The audit team received objective evidence to show that NDA operators and ITRs qualifications are current and that they are requalified every two years.

For initial qualifications pertinent to the ISOCS, the qualification packages for the ISOCS SME; ETRs; ITRs; and technicians included qualification cards, resumes, and a letter from Mirion Technologies (CANBERRA), an industry leader in the nuclear measurements and instrumentation, recognizing them as possessing the required expertise, training, education, and experience required to perform the ISOCS field
measurements, and associated data reviews and validation in accordance with ASTM C1490 (letters dated April 30, 2018).

One concern was identified during the course of the audit. The audit team offered the following training-related recommendation to NDA management: At the next revision of the ISOCS Technician and ITR qualification cards, consider:

- Adding AMWTP’s QAPjP (PLN-5199) to the required reading section;
- Adding an entry for discussion on Quality Assurance Objectives within the Fundamentals Knowledge section;
- Also, for consistency, consider reviewing all other NDA system/operator qualification cards for similar section changes.

(See Recommendation 2 in section 6.4)

During field activities, the following QA-related elements were evaluated to verify compliance with upper-tier QA requirements of the CBFO QAPD:

- Logbooks for all NDA systems: Each logbook is controlled within the eSOMS system. Logbook entries included daily required operator entries, and also the required log review by the shift supervisor at least once during the shift, as required in the current revision of MCP-2970, Logbooks. The evaluation confirmed that the logbooks are adequate in documenting required information and satisfactory in log keeping practices.

- Certificates of Calibration: The audit team verified that all NDA-related scales were within the calibration limits and did not exceed the expiration dates listed on the calibration stickers.

  - WAGS-SID-1001 cal. date: 9/28/17 expiration: 9/28/18
  - RBAS 212-WS-001 cal. date: 11/1/17 expiration: 11/1/18
  - IWAS Z-390-100 cal. date: 6/7/18 expiration: 6/7/19
  - IWAS Z-390-101 cal. date: 6/7/18 expiration: 6/7/19

- NCRs: The audit team verified quality-affecting problems and items that do not meet established requirements are identified, documented, reported and corrected. The audit team held discussions with the technicians regarding the current process for identification of nonconforming items. Technicians were knowledgeable of the requirements and utilized the current revision of MCP-538 as required.

- Document Control: The audit team verified that the operating procedures were distributed to affected personnel and used at each NDA system work location. Each operating procedure contains an effective date and the current status and revision of controlled forms are maintained within eSOMS and WTS.

- NDA-related records: The audit team reviewed BDRs; ETR reports; NDA-related calibration, confirmation, & verification reports; raw electronic data including
instrument readouts, calculation records and radioassay quality control records; required reading documentation/training watch lists; qualification packages; technical review reports, and other applicable records generated from the NDA process. The audit team found the NDA records accurately reflect completed work and were in compliance with QA requirements.

- NDA-related Software: Versions for NDA system software were found to be current according to the software database. New software versions for ISOCs systems were verified: NDA 2000 (v. 4.0) and Genie 2000 (v. 3.2.1).

With exception of the concern identified, the procedure reviews, field observations, and document reviews provided evidence that the applicable requirements for characterizing SCG S5000 debris waste, SCG S4000 soils waste, and SCG S3000 homogeneous solids waste using the NDA process is adequately established for compliance with upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

5.4.6 WIPP Waste Information System/Waste Data System

The audit team reviewed AMWTP procedures with respect to requirements of the CBFO QAPD Section 2.1, Work Processes, related to the procedures of waste characterization and WDS/WWIS data entry work steps. Implementing procedures were reviewed to determine the degree to which the procedures adequately address upper-tier requirements where procedures are implemented by AMWTP. The following procedure was reviewed by the audit team; WIP-1, TRU Waste Certification.

Review of the current procedure confirms that applicable requirements are satisfactorily incorporated and that upper-tier requirements are adequately addressed.

The team evaluated implementation of WIP-1, TRU Waste Certification, regarding data entry, waste characterization, and waste certification using the WTS software application. Waste management activities include implementation of the Waste Container Data Entry Form (WCDEF) and the Offsite Shipping Module (OSM) within the WTS software. The evaluation included review of documentation of the data entry process and demonstrations of data entry, data review, and data submittal using both the manual WCDEF and electronic WTS methods and waste certification and transmittal of data to WDS/WWIS using the off-site shipping (OSM) module of the WTS. Documentation of waste certification using the WCDEF and electronic WTS methods were reviewed. Demonstrations and waste container certifications were presented by AMWTP WCOs.

Waste certification demonstrations were performed using data for waste containers that are part of previously certified WSPFs. Demonstration of certification in the WDS/WWIS was performed as far as possible with the understanding that the enhanced AK information for the waste streams and associated waste containers has not been fully completed, approved, and entered into WDS/WWIS. The audit team determined that AMWTP WCO personnel have been trained in the content of the enhanced AK information relating to container characterization and certification and are familiar with data entry of container information once all enhanced AK information is
approved and available to allow full certification of AMWTP previously certified and newly certified containers with approved and fully documented waste streams.

Record review included evaluation of WCDEF forms, WTS electronic data screens, OSM data reports, WDS/WWIS Container Data Reports, electronic container information summaries, and electronic BDRs that present waste characterization analytical values used in the data entry and verification processes. Electronic access of enhanced AK information that supports container characterization and certification was also demonstrated by the AMWTP WCO personnel. Data entry, container characterization, and container certification using the WCDEF method is a combination of manual and electronic data entry and electronic submittal to WDS/WWIS. Data collection, container characterization, and container certification using the WTS characterization, certification, and OSM modules is a fully electronic method including interface with analytical equipment software applications and electronic promotion and reviewed in WTS and submittal of data to WDS/WWIS. Verification of waste characterization and certification analytical values in the OSM is performed electronically within WTS. BDRs and characterization and certification data forms are viewed and compared electronically. Verification of enhanced AK information supporting waste certification and characterization is also fully electronic. The AMWTP WTS is used to electronically manage and track NCRs associated with containers being characterized and certified. Verification of resolution of NCRs associated with specific containers is performed electronically within the AMWTP WTS. Characterization and certification of containers is performed primarily using the OSM module and method. The WCDEF characterization and certification method is only used for containers that do not have electronic BDRs and will be discontinued when all containers with non-electronic information are certified or when containers are analyzed using equipment generating electronic data reports.

The team reviewed a sample of WDS/WWIS waste certification packages for CH waste containers ID# 10037315 from waste stream BNINW216 and BN10621129 from waste stream BN510.4. Container 10037315 provided evidence of use of the WCDEF waste certification method. Container BN10621129 provided evidence of use of the electronic WTS/OSM waste certification method. The audit team reviewed 55-gallon "to be overpacked" container 10037315 and 100-gallon "direct load" container BN10621129 providing evidence and documentation of submittal of data to WDS/WWIS. These containers have not yet had flammable gas analysis performed and the enhanced AK information is not complete for either container. Flammable gas analysis data entry will be performed by the Central Characterization Program on behalf of the AMWTP program. AMWTP will complete enhanced AK data entry in the WDS/WWIS AK dashboard module. Once the analyses are performed and data entry is complete, AMWTP WCO personnel will proceed with certification of the containers. The audit team determined that AMWTP WCO personnel are familiar with the status of flammable gas and enhanced AK information and can complete container certification once all information is approved and available. The audit team determined that waste certification and documentation of characterization and certification activities for both the WCDEF and electronic WTS/OSM methods are adequately performed, including data entry, data entry review, and certification of waste containers. MAR will be evaluated during the annual transportation surveillance of the INL transportation program.
The audit team identified no concerns related to the CH waste container characterization/certification process. Overall, the audit team determined that the waste characterization data entry, submittal of data to WDS/MMVIS, and container certification activities and procedures that were evaluated during the audit provided evidence that the applicable requirements for waste characterization and certification are adequately established for compliance with upper-tier requirements (including WAC, Revision 8), procedures are satisfactorily implemented (including reference of enhanced AK information), and that implementation results in an effective waste characterization and certification program.

5.4.7 Load Management

AMWTP practices payload management on CH TRU waste streams as appropriate following the guidance and requirements in the WAC Rev 8.0, Appendix E, Payload Management of TRU Alpha Activity Concentration in conjunction with AMWTP implementing procedure PLN-5198, currently in Revision 2. The audit team examined two waste streams during the audit that are payload managed. The first example is SCG S3000 waste stream BNINW216, as described in RPT-TRUW-09, Acceptable Knowledge Summary for First/Second Stage Sludge (BNINW216). The drums of BNINW216 are assayed and overpacked into a standard waste box such that the payload container is greater than 100 nanocuries per gram (nCi/g). A second S3000 waste stream reviewed during the audit was BNINW218 as described in RPT-TRUW-15, Acceptable Knowledge Summary for Building 374 Sludge (BNINW218). As with BNINW216, the drums of BNINW218 are assayed and overpacked into a standard waste box such that the payload container is greater than 100 nCi/g. Estimates of the amount of waste greater than, and less than 100 nCi/g, are provided as required with supporting documentation available in RPT-TRUW-07, Determination of Radioisotopic Content in TRU Waste Based on Acceptable Knowledge. For example, for IDC RF-002 in waste stream BNINW218, it is estimated that 21% of the volume is less than 100 nCi/g.

This review of payload management at AMWTP yielded no concerns during the audit. Overall, the audit team determined that the load management activities and procedures evaluated during the audit provided evidence that the applicable requirements for waste characterization and certification are adequately established for compliance with upper-tier requirements, procedure implementation is satisfactory, and implementation results in an effective waste characterization and certification program.

6.0 CORRECTIVE ACTIONS, OBSERVATIONS, AND RECOMMENDATIONS

6.1 Corrective Action Reports

During the audit, the audit team may identify conditions adverse to quality (CAQs), as defined below, and document such conditions on corrective action reports (CARs).

Condition Adverse to Quality (CAQ) – An all-inclusive term used in reference to any of the following: failures, malfunctions, deficiencies, defective items, nonconformances, and technical inadequacies.
Significant Condition Adverse to Quality (SCAQ) – A condition which, if uncorrected, could have a serious effect on safety, operability, waste confinement, TRU waste site certification, regulatory compliance demonstration, or the effective implementation of the QA program.

The following CARs were issued as a result of the audit.

**CAR 18-051**

Condition:

Characterization records were discovered that have not been turned into the Electronic Document Management System (EDMS). Some of the records were completed in 2016.

Requirement:

MCP-557, *Records Management*, Revision 19, step 4.6.1 states "Employees: Unless otherwise documented in the organization's RTL, transfer all ICP records to Records Management for processing within 30 days of record completion."

**CAR 18-052**

Condition:

The Enterprise Asset Management (EAM) equipment list contains some erroneous entries, such as, equipment that is designated as "Operating," but has been retired from service (RTS). Furthermore, the EAM list does not show the equipment designated as RTS (e.g., Varian Helium Leak MT-187 was removed from service 11 years ago, but still showing as operational).

Requirement:

MCP-4023, *Measuring and Test Equipment Program*, Revision 1, step 4.1.2 states "MTEC: Ensure the EAM database is regularly updated and is the master M&TE list."

**CAR 18-053**

Condition:

Direction in RPT-TRUW-05, *Waste Matrix Code Reference Manual*, instructs operators to no longer assign IDC CW-216 to containers. Recently generated VE BDRs suggest that IDC CW-216 is still being used so the RPT-TRUW-05 direction is not being followed.

Requirement:

Other absorbents (Aquaset II-G and Micro-Cel E) were added during previous AMWTP treatment for liquids. Original generator absorbents are also included in the waste. (54, 181, 289, 298)

This waste is defined as PCB-contaminated waste. (280, 298)

CW-216 should not be assigned to new containers. Containers currently assigned IDC CW-216 should be re-assigned as follows:

- BN-216 – Primarily inorganic sludge with any identified RF-003 or RF-743 waste.
- BN-217 – Primarily inorganic sludge with no identified RF-003 or RF-743 waste.
- BN-218 – Primarily organic sludge.

**CAR 18-054 (WAP-related deficiency)**

Condition:

A quarterly report was not submitted supporting either VE, RTR in 2016 4th calendar quarter and 2017 4th calendar quarter.

Requirement:

WIP-3, *Level II Data Validation*, Revision 0, Section 4.4.1 states “SPM: At least once each quarter (every 3 months), ensure that the Level I review, validation, and verification are repeated on the data for a minimum of one randomly chosen waste container.”

**CAR 18-055**

Condition:

There is no objective evidence to verify the RPT-TRUW-05 *Waste Matrix Code Reference Manual*, Revision 42, was used as a reference while performing RTR characterization scans to verify waste container contents.

Requirement:

TPR-8089, *Real-Time Radiography Examinations (Certification Scans)*, Revision 4, Section 4.6.39 states “Verify that the physical form of the waste is consistent with the IDC, WMC, summary category, and waste stream description (as defined in RPT-TRUW-05, or for waste NOT covered in RPT-TRUW-05, other approved applicable AK documents and reports) for the waste container and recorded correctly in WTS.”

**CAR 18-056**

Condition:

Requirement:

PLN-5198, *AMWTP CH TRU Waste Certification Plan*, Revision 2, Appendix G, G.2 states "Each VE facility shall designate one or more VE experts. The VE expert is familiar with the waste generating processes and with all types of waste being characterized at the site. The VE expert shall be responsible for the overall direction and implementation of the VE at the ICP."

PLN-5199, *Quality Assurance Project Plan*, Revision 2, C1-2 states "Each VE facility shall designate one or more VE experts. The VE expert is familiar with the waste generating processes and with all types of waste being characterized at the site. The VE expert shall be responsible for the overall direction and implementation of the VE at the ICP."

**CAR 18-057**

Condition:

A Visual Examination (VE) operator was found performing characterization prior to completing required reading of RPT-TRUW-05, *Waste Matrix Code Reference Manual*, Revision 42. The VE batch in question is VEA18-00084 with the associated containers: 10648006, 10647842, 10648011 and 10648010.

Requirement:

MCP-2983, *Required Reading*, Revision 6, Section 3.1 states "Identify appropriate documents to be included in a required reading program. Assign completion dates for reading assignments." Further Section 4.3.1 states "Cognizant manager or supervisor assign a completion date to each document based on the urgency and nature of the document."

Finally Section 4.3.2 states "Operations personnel complete assigned reading by the assigned completion date. Complete required reading of documents designated as immediate read before performing any affected evolution or assuming responsibility for the affected position."

6.2 Deficiencies Corrected During the Audit

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.

No CDAs were identified and 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 members, in conjunction with the ATL, evaluate these conditions and classify them as Observations using the following definition:

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

Once a determination is made, the audit team member, in conjunction with the ATL, categorizes the condition appropriately.

The audit team identified two Observations which were submitted for AMWTP management consideration during the audit.

Observation 1

The Chemical Compatibility Evaluation Memorandum (CCEM) was developed and approved November 15, 2017 for waste stream BNINW216. The AK Summary Report for BNINW216 (RPT-TRUW-09, Revision 9) was used in the development of the CCEM. Subsequently, additional chemicals have been identified and are listed in the AK Assessment for BNINW216 Lot 2 that was approved February 13, 2018. These chemicals may be present in the subpopulation of containers that have been emplaced and/or certified based on the original CCEM for BNINW216.

Subsequent to the documentation of this concern, the Office of the National TRU Program (ONTP) noted that a similar issue has arisen with waste stream LA-MHD03.001 at LANL. ONTP indicated that based upon these occurrences, there is an expectation of the identification of additional chemicals associated with other approved CCEs. A remedial action plan has been proposed and implemented for the referenced LANL waste stream and is currently going through internal and CBFO review. It is anticipated that AMWTP will follow a similar process. The ONTP also indicated that additional guidance is being proposed for insertion in DOE/WIPP-02-3122, Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant, Appendix H.3, Certified Program Enhanced Chemical Compatibility Evaluation.

Observation 2

The ISOCS BDRs (ASY18-01852 and 01853) printed on a paper form and provided to the audit team contain QC Event Reports that do not reference the correct procedure ID (TPR-8182, Revision 0, ISOCS Technical Operations). It incorrectly references TPR-8094, Revision 4, Drum Assay Operations. The official records contained in the Waste Tracking System (WTS) for these BDRs were verified to contain the correct procedure reference.

The electronic form recently created specifically to print the ISOCS BDR from WTS was not updated from the previous template to pull the correct procedure. The printed form is not used in any official capacity, but was provided as an alternative to looking at the
record in WTS. After discussions with the NDA SME, a software change request (#5119) has been issued to correct the source link for the data in the procedure ID field.

**Observation 3**

During the RTR characterization scan of container 10636329, the audit team observed the RTR operator quickly answered "no" to a series of questions. When asked by the audit team when those specific questions would be answered "yes," the RTR operator could not answer the question referencing those specific prohibited items. Review of RTR Qualification Package QPOT03A0, Revision 14, March 2016, Section VII, ADMINISTRATIVE TASKS and KNOWLEDGE, Item 47 discusses Prohibited Items. The qualification package does not address the discussion on identifying the following prohibited items: non-radionuclide pyrophoric materials, such as elemental potassium; wastes incompatible with backfill, seal and panel closure materials, container and packaging materials, shipping container materials, or other wastes; and waste exhibiting the characteristic of ignitability, corrosivity, or reactivity (EPA Hazardous Waste Numbers of D001, D002 or D003). Although the qualification package did not address those items specifically, they are covered in the required reading of the WAC, Rev.8, and AMWTP's QAPjP (PLN-5199).

### 6.4 Recommendations

During the audit, the audit team may identify 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.

Once a determination is made, the audit team member, in conjunction with the ATL, categorizes the condition appropriately.

The audit team offered three Recommendation for AMWTP management consideration during the audit.

**Recommendation 1**

It is recommended that the Image Quality Indicator Verification Form for RTR, FRM-2188, Revision 0, be included as part of the RTR Batch Data Report.

**Recommendation 2**

The audit team offers the following recommendations to NDA management:

At the next revision of the ISOCS Technician and ITR qualification cards, consider:

- Adding AMWTP's QAPjP (PLN-5199) to the required reading section
• Adding an entry for discussion on Quality Assurance Objectives within the Fundamentals Knowledge section

Also, for consistency, consider reviewing all other NDA system/operator qualification cards for similar section changes.

**Recommendation 3**

Form 353.01, "Separation Notice" is not a controlled form through the Electronic Document Management System (EDMS). The form is available through a web application in the Human Resources website. The form is sent to Records with an employee termination package; therefore, it is recommended for Records Management to remove this form out of Procedure MCP-557, *Records Management*, Revision 19.

**Recommendation 4**

AMWTP has training containers representing waste from waste streams SCGs S4000, Soil/Gravel and SCG S5000 Debris Wastes in one training container and waste representing waste streams from SCG S3000 homogeneous solids in a separate training container. AMWTP requires RTR operators to examine a training container with waste representing SCGs S4000 and S5000 waste semiannually and during the next cycle (six months later), a training container with waste representing SCG S3000. During the audit, a concern was identified by the audit team as to the WAP semiannual training requirements for RTR. After the audit, additional objective evidence was received and further discussions were held between the audit team and CBFO QA & CBFO NTP. The additional documentation reviewed included initial qualification cards for prospective RTR operators. This included information on training container scans, which showed evidence that the RTR operators were initially trained to identify waste streams applicable to the site. However, the audit team recommends when AMWTP configures future training containers, that they consider including items from waste streams for all three SCGs.

### 7.0 LIST OF ATTACHMENTS

- Attachment 1: Personnel Contacted During Audit A-18-04
- Attachment 2: Summary Table of Audit Results
- Attachment 3: List of Audited Documents
- Attachment 4: Processes and Equipment Reviewed
<table>
<thead>
<tr>
<th>NAME</th>
<th>TITLE/ORG</th>
<th>PRE-AUDIT MEETING</th>
<th>CONTACTED DURING AUDIT</th>
<th>POST-AUDIT MEETING</th>
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<td>Aaron Atwell</td>
<td>RTR Operator – AMWTP/Fluor</td>
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### Definitions
- **E** = Effective
- **S** = Satisfactory
- **I** = Indeterminate
- **M** = Marginal
- **NE** = Non Effective
- **A** = Adequate
- **U** = Unsatisfactory
- **NA** = Not Adequate
- **CAR** = Corrective Action Report
- **CDAs** = Corrected During Audit
- **Rec** = Recommendation
- **Obs** = Observation
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## Processes and Equipment Reviewed During Audit A-18-04 of the AMWTP

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# Processes and Equipment Reviewed During Audit A-18-04 of the AMWTP

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| 9WAGS  | Procedure – TPR-8093          | Solids (S3000) Soils (S4000) Debris (S5000)                   | N/A                        | YES                       |
|        | Description – Waste Assay Gamma Spectrometer System WAGS-610 |                               |                            |                           |

| 9SGRS1 | Procedure – TPR-8092          | Solids (S3000) Soils (S4000) Debris (S5000)                   | N/A                        | YES                       |
|        | Description – SWEPP Gamma-Ray Spectrometer System SGRS         |                               |                            |                           |

## Nondestructive Examination (NDE)

| 9RR1   | Procedure – TPR-8089          | Solids (S3000) Debris (S5000)                                 | YES                        | YES                       |
|        | Description – Real-Time Radiography System Z-213-101          |                               |                            |                           |

| 9RR2   | Procedure – TPR-8089          | Solids (S3000) Debris (S5000)                                 | YES                        | YES                       |
|        | Description – Real-Time Radiography System Z-213-106          |                               |                            |                           |

| 9RR3   | Procedure – TPR-8120          | Solids (S3000) Debris (S5000)                                 | YES                        | YES                       |
|        | Description – Real-Time Radiography System RTR-1001           |                               |                            |                           |
## Processes and Equipment Reviewed During Audit A-18-04 of the AMWTP

### List of Processes and Equipment Evaluated During Audit A-18-04

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## Processes and Equipment Reviewed During Audit A-18-04 of the AMWTP

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| 9VE12  | Procedure TPR-7997 - Visual Examination of ARP Packaging stations (VEA and VEP) | Solids ($3000)  
Sloils ($40000)  
Debris ($50000) | NO | YES |

### DEA CTIVATED PROCESSES OR EQUIPMENT

*No processes or equipment have been deactivated since the previous Audit A-17-04.*