Mr. Kevin Pierard, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

Subject: Transmittal of the Interim/Final Audit Report for Certification Audit A-20-30 of the Lawrence Livermore National Laboratory Central Characterization Program

Dear Mr. Pierard:

This letter transmits the Interim/Final Audit Report for Carlsbad Field Office (CBFO) Certification Audit A-20-30 of the Lawrence Livermore National Laboratory Central Characterization Program for processes performed to characterize and certify waste in accordance with the Waste Isolation Pilot Plant Hazardous Waste Facility Permit. Certification Audit A-20-30 was conducted March 30 – April 2, 2020.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Please contact Mr. Dennis Miehls, CBFO Office of Quality Assurance Acting Director, at (575) 706-0097 should you have any questions concerning this audit report.

Sincerely,

Gregory Sosson
Acting Manager
Carlsbad Field Office

Enclosure
cc: w/enclosure

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U.S. DEPARTMENT OF ENERGY
CARLSBAD FIELD OFFICE

INTERIM/FINAL AUDIT REPORT

OF THE

LAWRENCE LIVERMORE NATIONAL LABORATORY
CENTRAL CHARACTERIZATION PROGRAM

FOR

TRU WASTE ACTIVITIES
AT
LIVERMORE, CALIFORNIA
AND CARLSBAD, NEW MEXICO

AUDIT NUMBER A-20-30

March 30 – April 2, 2020

Prepared by: ________________________________  Date: ____________
Paul C. Gomez, CTAC
Audit Team Leader

Approved by: ________________________________  Date: ____________
Dennis S. Miehls, Acting Director
CBFO Office of Quality Assurance
1.0 EXECUTIVE SUMMARY

U.S. Department of Energy (DOE) Carlsbad Field Office (CBFO) Certification Audit A-20-30 was performed to evaluate the adequacy, implementation, and effectiveness of established programs for transuranic (TRU) waste characterization activities performed for the Lawrence Livermore National Laboratory (LLNL) by the Nuclear Waste Partnership LLC (NWP) Central Characterization Program (CCP).

The audit team evaluated the technical and quality assurance (QA) activities performed by NWP CCP at LLNL for characterization of contact-handled (CH) TRU Summary Category Groups (SCGs) S3000 solids and S5000 debris wastes. Audit A-20-30 is considered supplemental to initial Certification Audit A-19-29 performed in August 2019. The audit team also verified that a technical review of the generator site’s processes was performed, and that any issues identified during the technical review had been resolved per DOE/WIPP-16-3564, Generator Site Technical Review Procedure. The audit was conducted relative to the requirements of the Waste Isolation Pilot Plant (WIPP) Hazardous Waste Facility Permit (HWFP), the CBFO Quality Assurance Program Document (QAPD), the Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant (WAC), and the Waste Isolation Pilot Plant Documented Safety Analysis (DSA), Chapter 18.

Initial Certification Audit A-19-29 activities were conducted at the LLNL facilities in Livermore, California, and at the CBFO Skeen-Whitlock Building in Carlsbad, New Mexico, August 27 – 29, 2019, according to scope identified in the CBFO National TRU Program (NTP) Scope Memorandum (CBFO:ONTP:KEP:RMS:19-1341:UFC 2300.00). Audit activities for A-20-30 were conducted in Carlsbad, New Mexico, March 30 - April 2, 2020, according to scope identified in the CBFO NTP Scope Memorandum (CBFO:ONTP:KEP:VV:20-0401:UFC 5900.00).

The audit team concluded that the LLNL/CCP TRU waste characterization program procedures for characterizing CH SCGs S3000 solids and S5000 debris wastes adequately address upper-tier requirements. The processes utilized for characterizing CH SCGs S3000 solids and S5000 debris wastes were satisfactorily implemented and effective in achieving the desired results.

No WIPP HWFP Waste Analysis Plan (WAP)-affecting conditions adverse to quality (CAQs) or WAP-affecting observations were identified during Audit A-20-30. The two non-WAP-affecting CAQs that were identified during Audit A-19-29, one resulting in the issuance of Corrective Action Report (CAR) 19-075, and one corrected during the audit (CDA) after it was determined to be an isolated case requiring only remedial action, were resolved and continue to show that remedial action has adequately taken place.

2.0 SCOPE AND PURPOSE

2.1 Scope

The scope of the audit included evaluations for the adequacy, implementation, and effectiveness of the technical and QA activities performed by the NWP CCP at LLNL for characterization of CH TRU SCGs S3000 solids and S5000 debris wastes. This audit is
considered supplemental to the initial Certification Audit A-19-29 performed in August 2019. The audit team also verified a technical review of the generator site’s processes was performed and any issues identified during the technical review had been resolved per DOE/WIPP-16-3564, Rev. 0, Generator Site Technical Review Procedure. The following areas were evaluated:

**General Activities**
- Results of Previous Audits – Not Applicable (N/A*)
- Changes in Programs or Operations – N/A*
- New Programs or Activities Being Implemented – N/A*
- Changes in Key Personnel – N/A*  
  *N/A due to this being an initial certification audit.

**WAP-Related Quality Assurance Activities**
- Nonconformances
- Personnel Qualification and Training
- Records

**Non-WAP-Related Quality Assurance Activities**
- Software Version Installation*
  *This QA activity evaluation is documented within the report and does not have a respective section.

**WAP-Related Technical Activities**
- Acceptable Knowledge (AK)
- Project-Level Data Validation and Verification (PL V&V)
- Real-time Radiography (RTR)*
- Visual Examination (VE)*
- WIPP Waste Information System (WWIS)/Waste Data System (WDS)  
  *Evaluation completed during Audit A-19-29

**Non-WAP-Related Technical Activities**
- Nondestructive Assay (NDA)*, including Performance Demonstration Program (PDP)
- Container Management*
- Flammable Gas Analysis (FGA)*  
  *Evaluation completed during Audit A-19-29

The evaluation of the adequacy of LLNL/CCP documents was based on current versions of the following documents:

- Waste Isolation Pilot Plant Hazardous Waste Facility Permit NM4890139088-TSDF
- DOE/CBFO-94-1012, CBFO Quality Assurance Program Document
- WP 13-1, Nuclear Waste Partnership LLC Quality Assurance Program Description
- DOE/WIPP-02-3122, Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant

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

- CCP-PO-001, *CCP Transuranic Waste Characterization Quality Assurance Project Plan*
- CCP-PO-002, *CCP Transuranic Waste Certification Plan*
- CCP-PO-048, *CCP/LLNL Interface Document*
- Related CCP QA and technical implementing procedures

2.2 Purpose

Audit A-20-30 was conducted to evaluate the adequacy and effective implementation of program requirements for the characterization and certification of CH TRU SCGs S3000 solids and S5000 debris wastes at the LLNL for compliance with applicable upper-tier requirements.

3.0 AUDIT TEAM, MANAGEMENT REPRESENTATIVE, TECHNICAL SPECIALISTS, AND OBSERVERS

Dennis S. Miehls*  CBFO Quality Assurance Management Representative
Joe Lopez*  CBFO Quality Assurance Management Representative
Paul Gomez*  Audit Team Leader (ATL), CBFO Technical Assistance Contractor (CTAC) (PL/V&V)
Tim Boswell*  Auditor, CTAC (Training)
Katie Gentry*  Auditor, CTAC (WDS/WWIS)
Dick Blauvelt*  Technical Specialist, CTAC (AK)
Randy Fitzgerald*  Technical Specialist, CTAC (AK)
Nathan Denney*  Auditor, CTAC (AK)
Jim Oliver*  Technical Specialist, CTAC (NDA PDP)
* Indicates team members working in Carlsbad, NM, or remotely.

OBSERVERS

Ricardo Maestas**  New Mexico Environment Department (NMED)
David Biswell**  NMED
Megan McLean**  NMED
** Indicates Observers working remotely.

4.0 AUDIT MEETING ATTENDEES AND PERSONNEL CONTACTED

The audit meeting attendees and personnel contacted during the audit process are identified in Attachment 1. A pre-audit meeting was conducted via teleconference on March 30, 2020, in Carlsbad, New Mexico. Daily management briefings were planned to update LLNL/CCP management and staff on audit progress and identified concerns.
No concerns were reported during this audit. A post-audit meeting was conducted via teleconference on April 2, 2020, in Carlsbad, New Mexico. Attachment 2 lists the LLNL/CCP personnel contacted during the audit by subject area.

5.0 SUMMARY OF AUDIT RESULTS

5.1 Program Adequacy, Implementation, and Effectiveness

This audit was performed to assess the capability of LLNL/CCP to characterize CH TRU SCGs S3000 solids and S5000 debris wastes for compliance with the requirements specified in the WIPP HWFP WAP, the WIPP WAC, Chapter 18 of the WIPP DSA, and the CBFO QAPD. The characterization methods assessed were AK, NDA PDP, and PL V&V. Other areas evaluated were data generation level (DGL) quarterly re-reviews, WWIS/WDS data entry, and data quality objective (DQO) reconciliation.

Attachment 3 contains a summary table of audit results. Attachment 4 identifies the WAP-related objective evidence compiled (provided in boxes). Attachment 5 lists the audited procedures. Attachment 6 lists the processes and equipment evaluated. Attachment 7 contains the WAP-related procedure revision matrix.

The audit team concluded, based on personnel interviews and review of associated documentation and records, that the LLNL/CCP TRU waste characterization program and activities for characterizing CH TRU SCGs S3000 solids and S5000 debris wastes adequately address upper-tier requirements. The processes utilized for characterizing CH TRU SCGs S3000 solids and S5000 debris wastes were satisfactorily implemented and effective in achieving the desired results.

5.2 General Activities

5.2.1 Results of Previous Audits

This supplemental audit correlates to initial Certification Audit A-19-29, which concluded there were no previous audit results, because the audit was an initial certification audit.

5.2.2 Changes in Programs or Operations

This supplemental audit correlates to initial Certification Audit A-19-29, which concluded there were no changes in programs or operations, because the audit was an initial certification audit.

5.2.3 New Programs or Activities Being Implemented

This supplemental audit correlates to initial Certification Audit A-19-29, which concluded that all LLNL/CCP programs and activities being implemented are new, because the audit was an initial certification audit.
5.2.4 Changes in Key Personnel

This supplemental audit correlates to initial Certification Audit A-19-29, which concluded that there were no changes in key personnel because the audit was an initial certification audit.

5.2.5 Generator Site Technical Review (non-WAP-related)

As reported in Audit A-19-29, the CBFO and NWP, as WIPP HWFP co-permittees, performed Generator Site Technical Review (GSTR) LL-1-18-01 at the LLNL in Livermore, California, February 26 – March 2, 2018, and the GSTR was concluded on June 11, 2018. The GSTR Final Report was issued on November 13, 2018 (CBFO:ONTP:CF:RMS:18-2245:UFC 5900.00). The GSTR team completed their review of the program, and noted the closure in a letter issued on May 21, 2019 (CBFO:ONTP:CF:RMS:19-1281:UFC 2300.00).

5.3 WAP-Related Quality Assurance Activities

The audit team evaluated the QA elements for personnel qualification and training, nonconformances, and records for compliance with requirements in the WIPP HWFP WAP. The evaluation results for each area audited are described below.

5.3.1 Personnel Qualification and Training

As reported in Audit A-19-29, the audit team conducted interviews and reviewed the following implementing procedures relative to personnel qualification and training to determine the degree to which the procedures adequately address upper-tier requirements:

- CCP-PO-047, Rev. 3, CCP Training and Qualification Program Document
- CCP-QP-002, Rev. 45, CCP Training and Qualification Plan
- CCP-QP-041, Rev. 3, CCP Job Needs Analysis and Design
- CCP-QP-042, Rev. 2, CCP Project Level Training and Qualification
- CCP-QP-043, Rev. 3, CCP Operations Level Training and Qualification

For Audit A-20-30, the audit team conducted interviews and reviewed implementing procedure CCP-QP-002 to determine the degree to which the procedure adequately addresses upper-tier requirements. Results of the review indicate that the procedure adequately addresses upper-tier requirements.

Personnel training records associated with AK and WWIS/WDS were examined to verify implementation of associated requirements. The audit team verified that personnel performing waste characterization and certification activities are appropriately qualified.

Record reviews included an evaluation of the LLNL/CCP CH List of Qualified Individuals (LOQI), dated March 30 and April 1, 2020. Other record reviews included qualification
The procedure reviewed and objective evidence assembled provided evidence that the applicable requirements for personnel qualification and training for AKEs and WWIS/WDS personnel are adequately established for compliance with upper-tier requirements, satisfactorily implemented, and effective in achieving the desired results. No WAP-affecting or non-WAP-affecting concerns in the area of personnel qualification and training were identified.

5.3.2 Control of Nonconforming Items

The audit team reviewed implementing procedure CCP-QP-005, Rev. 26, CCP TRU Nonconforming Item Reporting and Control, to determine the degree to which the procedure adequately addresses upper-tier requirements. Results of the review indicate the procedure adequately addresses upper-tier requirements.

The audit team interviewed a CCP QA engineer and selected the one nonconformance report (NCR) that was available for review since Audit A-19-29. The team concluded that no closed NCRs available for review were generated at the DGL. Further, the closed NCR reviewed during the audit was generated at the PL.

The following NCR reviewed was initiated at the PL:

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The audit team verified CCP project level personnel are familiar with the process for reporting NCRs to the Permittees via email to the CBFO within the time frame required by the Permit. The audit team determined there were no NCRs generated at PL within the last 12 months that required reporting to the Permittees.

The team concluded that nonconformances are appropriately documented and tracked through resolution, or voided in accordance with the procedure. NCRs reviewed included original and revised NCRs and all applicable supporting documentation in the records package. The NCRs examined were verified to have been entered, managed, and tracked in the NCR log/module located within the CCP Integrated Data Center (IDC).

The procedures reviewed and objective evidence assembled provided evidence that the applicable requirements for nonconformances were adequately established for compliance with upper-tier requirements, satisfactorily implemented, and effective in achieving the desired results. No WAP-affecting or non-WAP-affecting concerns in the area of nonconformances were identified.
5.3.3 QA Records

The audit team conducted interviews with responsible personnel and reviewed the following implementing procedures relative to the control and administration of QA records to determine the degree to which the procedures adequately address upper-tier requirements:

- CCP-PO-001, Rev. 23, CCP Transuranic Waste Characterization Quality Assurance Project Plan
- CCP-QP-008, Rev. 26, CCP Records Management
- CCP-QP-028, Rev. 17, CCP Records Filing, Inventorying, Scheduling, and Dispositioning

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

During Audit A-19-29, the audit team verified the level of control for QA records through review of the CH Records Inventory and Disposition Schedule (RIDS) dated July 23, 2019. RIDS are reviewed annually by the CCP Records Manager, as required. The audit team reviewed the indexing system utilized to track the shipment of records from all generator sites to the WIPP, and observed a presentation of data entry for LLNL records submittal to the WIPP. The audit team verified the maintenance of records in file cabinets and in the electronic system stored on the WIPP server. Records that are maintained in paper format in the CCP Records Center are placed in locked fire-resistant cabinets.

Records are adequately segregated from non-record documents. Files that require control of access (such as those determined to be Unclassified Controlled Nuclear Information [UCNI], Official Use Only [OUO], Internal Use Only [IUO], and No Foreign National [NFORN] documents) are maintained on separate network servers where computer access is restricted. Paper copies of these restricted-access documents are stored separate from other documents. Records personnel are familiar with requirements for restricted-access files and adequately control distribution. Access to electronic files and restricted files are controlled administratively in the case of physical electronic media, and by use of network server logon/password methods for electronic files maintained on computer servers.

During Audit A-20-30, the procedures reviewed and objective evidence assembled provided evidence that the applicable requirements for records were adequately established for compliance with upper-tier requirements, satisfactorily implemented, and effective in achieving the desired results. No WAP-affecting or non-WAP-affecting concerns in the area of QA records were identified.

5.4 Non-WAP-Related Quality Assurance Activities

Each non-WAP-related QA area audited is discussed in detail in the following sections. The method used to select objective evidence is discussed, the objective evidence used
to assess compliance with the CBFO QAPD, WIPP WAC, or WIPP DSA, as applicable, is cited briefly, and the result of the assessment is provided.

5.4.1 LLNL/CCP Program Interface

The audit team evaluated the program interface established between the CCP and LLNL as documented in CCP-PO-048, Rev. 1, *CCP/LLNL Interface Document*, during Audit A-19-29. The audit team determined that CCP AK Assessments was not included in the list in the procedures section of the interface document. This concern resulted in issuance of a CAR (see CAR 19-075 in section 6.1.2). CBFO CAR 19-075 was closed January 24, 2020, after reviewing the new revision of the procedure issued November 12, 2019. CCP AK Assessments is listed in section 4.17.2 of CCP-PO-048, Rev. 2. The action to preclude recurrence was satisfactorily met.

The procedures reviewed and objective evidence assembled provided evidence that the applicable requirements for the LLNL/CCP program interface were adequately established for compliance with upper-tier requirements, satisfactorily implemented, and effective in achieving the desired results.

5.5 WAP-Related Technical Activities

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

5.5.1 Table C6-1, WAP Checklist

The C6-1 WAP Checklist addresses general program requirements from an overall management perspective. The general requirements checklist addresses both technical requirements and specific WIPP HWFP WAP-related QA programmatic requirements that, when collectively implemented, ensure effective overall management of TRU waste characterization activities. Requirements are integrated into controlled documents to ensure the waste characterization strategy, as defined in the WAP, is accomplished and documented in accordance with controlled processes and procedures.

Technical elements evaluated for waste characterization activities consisted of PL V&V, AK, WWIS/WDS, and preparation of Waste Stream Profile Forms (WSPFs). Objective evidence was selected and reviewed to evaluate the implementation of the associated waste characterization activities. Batch data reports (BDRs), sampling records, and personnel qualification and training documentation were included in the evaluation. Where possible, the audit included direct observation of actual waste characterization activities. Each characterization process involves:

- Collecting raw data
- Collecting QA/quality control samples or information
- Reducing the data to a useable format, including a standard report
• Review of the report by the data generation facility and the site project office
• Comparing the data against program DQOs
• Reporting the final waste characterization information to the WIPP

The flow of data from the point of generation to inclusion in the WSPF for each waste characterization technique was reviewed to ensure all applicable requirements were captured in the site operating procedures. The specific procedures audited and the objective evidence reviewed are described in the following sections.

During the audit, LLNL/CCP demonstrated compliance with the waste characterization requirements of the WAP through documentation and by performing waste characterization activities.

**Project-Level Data Validation and Verification (PL V&V)**

The audit team conducted interviews with responsible personnel and reviewed the following implementing procedures relative to the PL V&V process to determine the degree to which the procedures address upper-tier requirements:

- CCP-QP-042, Rev. 2, *CCP Project Level Training and Qualification*
- CCP-TP-001, Rev. 22, *CCP Project Level Data Validation and Verification*
- CCP-TP-002, Rev. 29, *CCP Reconciliation of DQOs and Reporting Characterization Data*
- CCP-TP-005, Rev. 31, *CCP Acceptable Knowledge Documentation*

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

The audit team verified that site project managers (SPMs) who conducted work for LLNL/CCP were appropriately trained and qualified as required by CCP-QP-042, Rev. 2.

During Audit A-19-29, the audit team evaluated BDRs generated in support of CH waste characterization activities completed at the LLNL to verify that PL V&V activities were performed in compliance with applicable procedural requirements. The BDRs were verified to be complete and accurate, and were found to be in compliance with all applicable procedural requirements.

During Audit A-20-30, the audit team verified that WSPFs were in draft, as well as a Characterization Information Summary (CIS). The WSPFs and CIS were reviewed for the following waste streams:

- LL-M001-S5400-002 with CIS Lot 1
- LL-W019-S3900-002 with CIS Lot 1
- LL-T004-S3141-002 with CIS Lot 1
The audit team verified the required quarterly repeat of the DGL data by the project level for the following:

- CP:19:01259 RTR 2nd Q2019 Results 9-11-19
- CP:19:01305 RTR 3rd Q2019 Request 11-4-19
- CP:19:01314 RTR 3rd Q2019 Results 11-7-19
- CP:20:01032 RTR 4th Q2019 Results 1-27-20
- CP:19:01244 VE 2nd Q2019 No BDRs Generated 8-16-19
- CP:19:01306 VE 3rd Q2019 Request 11-4-19
- CP:19:01312 VE 3rd Q2019 Results 11-6-19
- CP:20:01027 VE 4th Q2019 Request 1-15-20
- CP:20:01033 VE 4th Q2019 Results 1-27-20

The results from the quarterly package are complete and retained in Records. No concerns were identified.

The procedures reviewed and objective evidence assembled and evaluated during the audit provided evidence the applicable requirements for PL V&V activities were adequately established for compliance with upper-tier requirements. All requirements were satisfactorily implemented and determined effective in achieving the desired results. No WAP-affecting or non-WAP-affecting concerns in the area of PL V&V were identified.

**WIPP Waste Information System (WWIS)/Waste Data System (WDS)**

The audit team conducted interviews and reviewed implementing procedure CCP-TP-030, Rev. 38, *CCP CH TRU Waste Certification and WWIS/WDS Data Entry*, relative to the WWIS/WDS data entry process to determine the degree to which the procedure adequately addresses upper-tier requirements. Results of the review indicate that the procedure adequately addresses upper-tier requirements.

The audit team evaluated the implementation of the WWIS/WDS data entry procedure for electronic population of data, manual update of data, and electronic transfer of data from the IDC software database to the WWIS/WDS. Documentation reviewed included container information summaries, pages from BDRs showing analyses values in the IDC, WWIS/WDS Waste Container Data Reports, and submittals for WWIS/WDS review/approval. The data in the Waste Container Data Report from WDS is characterization data. It is not WCO certified data, but data used for WSPF approval, and is for audit purposes only.
The audit team reviewed waste characterization case files for the following five CH containers:

Containers from SCG S5400 (from waste stream LL-M001-S5400-002)

- LL85234240TRU
- LL85234242TRU
- LL85234246TRU
- LL85234249TRU
- LL85234369TRU

Containers from SCG S3141 (from waste stream LL-T004-S3141-002)

- LL85234507TRU
- LL85234509TRU
- LL85234511TRU
- LL85234518TRU
- LL85234519TRU

The audit team interviewed the CCP lead WCO regarding procedure work steps for performance of Unreviewed Safety Question Determinations (USQDs) and Material at Risk (MAR) evaluations. The audit team determined that WCO personnel have not received containers for certification that exceed the WIPP WAC PE-Ci (Plutonium-Equivalent Curie) limit requiring a USQD. The LLNL is not certified for shipping waste at the time of the audit; therefore, WCO personnel have not received a request from a transportation certification official (TCO) for a high MAR evaluation. The audit team determined that WCO personnel are familiar with these two processes, based on an interview relating to procedure steps during the audit. Implementation of the USQD and MAR processes are expected to be effective if future occurrences are presented.

The procedures reviewed and objective evidence assembled and evaluated during the audit provided evidence that the applicable requirements for WWIS/WDS data entry are adequately established, satisfactorily implemented, and effective in achieving the desired results. No WAP-affecting or non-WAP-affecting concerns related to WWIS/WDS were identified.

5.5.2 Table C6-2 – Acceptable Knowledge Checklist

The audit team conducted interviews with responsible personnel and reviewed the following CCP implementing procedures relative to the AK process to determine the degree to which the procedures address upper-tier requirements:

- CCP-TP-002, Rev. 29, CCP Reconciliation of DQOs and Reporting Characterization Data
- CCP-TP-005, Rev. 31, CCP Acceptable Knowledge Documentation
Results of the review indicate that the procedures adequately address upper-tier requirements as noted below.

The audit team focused on a review of available Enhanced Acceptable Knowledge Products (EAKP) and supporting AK documentation for CH TRU waste streams and requisite SCGs as a follow-up to the LLNL/CCP Certification Audit A-19-29 conducted August 27-29, 2019. The audit team examined AK documentation addressing the EAKP for SCG S5000 waste stream LL-M001-S5400-002 debris and SCG S3000 waste stream LL-T004-S3141-002 solids. The audit team specifically evaluated compliance with the most recent WAP requirements listed in the C6-2 Checklist along with portions of the C6-1 Checklist, as well as relevant requirements of the WIPP WAC, DOE/WIPP-02-3122, Rev. 9, Appendix H.

With regard to EAKP for the waste streams reviewed, the following documents were examined during the audit.

**IWMDL**

Since the WIPP WAC, DOE/WIPP-02-3122, Rev. 9, Appendix H, suspended the use of Interface Waste Management Documents Lists (IWMDL), there were none provided during this audit. Acceptable Knowledge Assessments (AKAs) are currently used to address this portion of the EAKP requirements. Revision 10 of the WAC, when issued, will reinstate the IWMDL and LLNL is preparing for the change.

**AKA**

Acceptable Knowledge Assessments were reviewed for sub-populations of waste streams LL-M001-S5400-002 and LL-T004-S3141-002. Compliance with the requirements in CCP-TP-005 was examined. In addition to the AKA contents, including historic and current waste management practices/processes, a list of historic and current absorbents and information relevant to waste stream ignitability, corrosivity, and reactivity, was reviewed. Auditors also examined a detailed description of the contents of each waste container bounded by the AKA. The primary sources for the container-specific information came from generator site paperwork, including Information Gathering Documents and Waste Disposal Requisitions. These documents contain great detail regarding the contents placed into a drum or standard waste box during packaging. Finally, the audit team reviewed and compiled as objective evidence comments from the internal CCP and LLNL site reviews.

**CCE**

The audit team examined a Chemical Compatibility Evaluation (CCE) addressing all three LLNL waste streams:

- SCG S5000 LL-M001-S5400-002
- SCG S3000 LL-T004-S3141-002
- SCG S3000 LL-W013-S3900-002

The audit team conducted a detailed review and discussion of the CCE contents, including:

- Consolidated material inputs
• Technical evaluations
• Attachment 1 Chemicals and Materials of Concern, including reactivity group number (RGN) assignment
• AKE designated quantities:
  o dominant
  o minor or trace
  o Attachment 3 Insignificant Trace Chemicals and Materials

The auditors also reviewed and compiled as objective evidence Document Review Records from internal and CBFO reviews, as well as the CBFO approval letter.

**Basis of Knowledge (Non-WAP-related)**

Basis of Knowledge (BoK) documentation was reviewed for subpopulations of waste streams LL-M001-S5400-002 and LL-T004-S3141-002. These sub-populations were determined to contain no oxidizing chemicals based upon the examination of specific container contents noted above in the AKA section. Thus, these sub-populations are exempt from the BoK requirements, as detailed in the BoK procedure DOE/WIPP-17-3589, Rev.1, *Basis of Knowledge for Evaluating Oxidizing Chemicals in TRU Waste*.

In addition to the EAKP examined for SCGs S5000 and S3000 as delineated above, the following relevant documents were reviewed by the audit team:

• Draft Waste Stream Profile Forms and Characterization Information Summaries, including the Reconciliation with Data Quality Objectives for waste streams LL-M001-S5400-002 and LL-T004-S3141-002
• Selected new or revised AK Source Documents and Source Document Summaries for each of the waste streams to demonstrate support for one or more of the EAKP
• Draft AK Accuracy Reports for waste streams SCG S5000 LL-M001-S5400-002, SCG S3000 LL-T004-S3141-002, and SCG S3000 LL-W013-S3900-002 that were not available during the previous audit
• CCP CH AK Tracking Spreadsheet (AKTSS). This AK document provides several pieces of AK information that are associated with the objectives of this AK audit. Relevant data is posted for each waste container from each waste stream that CCP is or will be characterizing and certifying. For example, the AKTSS identifies containers that are covered by EAKP, such as the CCE, an AKA, or a BoK memorandum. The auditors assured that the AKTSS tracked each container relative to the information contained in the EAKP reviewed.

Overall, the portion of the AK program that was examined during this audit was determined to be adequate in addressing the requirements of the WIPP WAP and the WIPP WAC, satisfactory in the implementation of these requirements, and effective in achieving the desired results.
5.5.3 Table C6-3, Radiography Checklist

This was audited during CBFO Audit A-19-29 in August 2019.

5.5.4 Table C6-4, Visual Examination Checklist

This was audited during CBFO Audit A-19-29 in August 2019.

5.6 Non-WAP-related Technical Activities

Each non-WAP-related technical area audited is discussed in detail in the following sections. The method used to select objective evidence is discussed, the objective evidence used to assess compliance with the CBFO QAPD, WIPP WAC, or WIPP DSA, as applicable, is cited briefly, and the result of the assessment is provided.

5.6.1 Nondestructive Assay

The audit team evaluated the adequacy, implementation, and effectiveness of the LLNL/CCP NDA characterization process for CH TRU SCGs S3000 solids and S5000 debris wastes during Audit A-19-29. For this supplemental audit, A-20-30, the audit team verified the Performance Demonstration Program that was deemed indeterminate during Audit A-19-29. The audit team conducted interviews with responsible personnel and reviewed the following implementing procedures relative to the NDA process to determine the degree to which the procedures adequately address upper-tier requirements:

- CCP-TP-058, Rev. 6, CCP NDA Performance Demonstration Program
- DOE/WIPP-02-3122, Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant, Rev. 9, October 18, 2018, Appendix A, Section A.4.1, which states, “Comparison Programs: WCPs using radioassay systems shall participate in any relevant measurement comparison program(s) sponsored or approved by the CBFO. Such programs may be conducted as part of the NDA performance demonstration program (References A11 and A12), or through other third parties (Reference: WIPP Compliance Recertification Application including Annual Reports to the EPA).”

The audit team identified that successful participation in the PDP program as evidenced by an approval status notification (assuming that both systems pass the measurement criteria) is the only evidence required to demonstrate that NDA requirements at LLNL are fully and satisfactorily implemented.

As part of Audit A-20-30, the audit team received a copy of the approval status notifications and scoring reports for PDP Drum Cycle 26A and PDP Box Cycle B19A. Review of the approval status notification memoranda indicated that a WIPP Form (WF19-950) had been generated to address concerns raised by the PDP coordinator
relative to the difference between the results reported by the segmented gamma scanner and the Mobile In-Situ Object Counting System Large Container Counter 4 even though the loading was identical.

Documents specifically reviewed include:

- Memo 19-1557, Approval Status Notification for CCP-LLNL - Drum Cycle 26A of the NDA PDP
- Report RPT-80008.003-005, PDP NDA Scoring Report for Drum Cycle 26A
- Memo 19-1576, Approval Status Notification for CCP-LLNL - Box Cycle B19A of the NDA PDP
- Report RPT-80008.003-006, PDP NDA Scoring Report for Box Cycle B19A
- WIPP Form: WF19-950

as well as system re-analysis reports:

- 00002237_CNTR0001_20191007162037 - 129-414 SAC Re-Analysis
- 00002240_CNTR0001_20191007162948 - 129-414 SAC Re-Analysis
- 00002243_CNTR0001_20191007163732 - 129-414 SAC Re-Analysis
- 00002244_CNTR0001_20191007164729 - 129-414 SAC Re-Analysis
- 00002247_CNTR0001_20191007170051 - 129-414 SAC Re-Analysis
- 00002248_CNTR0001_20191007171002 - 129-414 SAC Re-Analysis

The audit team obtained a copy of WF19-950, interviewed the originator of the WIPP Form, and requested and reviewed copies of all related supporting documents and correspondence as listed above. The audit team found that the review and re-analyses were thorough, technically adequate, and in compliance with applicable CCP and PDP procedures.

The primary cause of the difference in results between the two systems was identified as the selection and use of different self-absorption correction factors for each system. This difference was remedied and the measurement results were re-analyzed, thus showing that the two NDA systems provided substantially similar results.

The actions documented in the WIPP Form and their closure were reviewed for technical adequacy and compliance with requirements, both of which were found to be satisfactory.

The audit team was able to determine that the evidence provided related to participation in the NDA comparison program (PDP) was sufficient, complete, technically adequate, and in compliance with upper-tier requirements and, accordingly, that the applicable requirements for radiological characterization at LLNL are adequately established for compliance with upper-tier requirements, satisfactorily implemented, and effective in achieving the desired results.
5.6.2 Container Management

This was audited during CBFO Audit A-19-29 in August 2019.

5.6.3 Flammable Gas Analysis (FGA)

This was audited during CBFO Audit A-19-29 in August 2019.

6.0 CARs, CDAs, 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 – 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.

6.1.1 WAP-Affecting Corrective Action Reports

No WAP-affecting CARs were identified during Audit A-20-30.

6.1.2 Non-WAP-Affecting Corrective Action Reports

No non-WAP-affecting CARs were identified during Audit A-20-30.

One non-WAP-affecting CAR was identified during Audit A-19-29:

**CAR 19-075**

CAQ:

*During the review of CCP-PO-048, Rev. 1, CCP/LLNL Interface Document, it was identified that CCP AK Assessment document is not included in the list in the procedures section (4.21) of the document.*

Requirements:

*CCP-PO-043, Rev. 0, CCP Interface Document Preparation, section 4.1.4 [U] “Procedures” states in part: “The following documents and revisions to these documents will be provided to the SMR for review by SMEs/CP: CCP AK Assessments.”*
The A-20-30 audit team verified the corrective action was closed January 24, 2020, and this CAQ is no longer an issue.

6.2 Deficiencies Corrected During the Audit

During the audit, the audit team may identify CAQs. Audit team members, the ATL, and the CBFO QA Management Representative evaluate the CAQs to determine if they are significant. Once a determination is made that the CAQ is not significant, the audit team member, in conjunction with the ATL and the CBFO QA Management Representative, determines if the CAQ is a minor and isolated case requiring only remedial action and therefore can be corrected during the audit.

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

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.

6.2.1 WAP-Affecting Deficiencies Corrected During the Audit

No WAP-affecting CAQs were identified and corrected during Audit A-20-30.

6.2.2 Non-WAP-Affecting Deficiencies Corrected During the Audit

No non-WAP-affecting CAQs were identified and corrected during Audit A-20-30.

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.
6.3.1 WAP-Affecting Observations

No WAP-affecting Observations were identified during Audit A-20-30.

6.3.2 Non-WAP-Affecting Observations

No non-WAP-affecting Observations were identified during Audit A-20-30.

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.

No Recommendations were identified during Audit A-20-30.
7.0 LIST OF ATTACHMENTS

Attachment 1: Meeting Attendees and Personnel Contacted During Audit A-20-30
Attachment 2: Personnel Contacted During Audit A-20-30 by Subject Area
Attachment 3: Summary Table of Audit Results
Attachment 4: WAP-Related Objective Evidence Reviewed During Audit A-20-30
(provided in boxes)
Attachment 5: Table of Audited Procedures
Attachment 6: List of Processes and Equipment Evaluated During Audit A-20-30
Attachment 7: WAP-Related Procedure Revision Matrix
<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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<tr>
<td>Ballew, Veronica</td>
<td>QA Program/Project Integration Mgr./NWP</td>
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<td>Shier, Doug</td>
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<td>Valenzuela, Jamie</td>
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# PERSONNEL CONTACTED DURING AUDIT A-20-30
## BY SUBJECT AREA
### (WAP-RELATED)

<table>
<thead>
<tr>
<th>Personnel Qualification and Training</th>
<th>Jennifer Hernandez</th>
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<tr>
<td>Control of Nonconforming Items</td>
<td>Lisa Calder</td>
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<td>Joe Harvill</td>
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<td>Records</td>
<td>Lisa Calder</td>
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<td>David Moody</td>
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<td>Joe Harvill</td>
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<td>WIPP Waste Information System (WWIS Data Entry)</td>
<td>Creta Kirkes</td>
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<td>Waste Certification/Project-Level Data V&amp;V</td>
<td>Lisa Calder</td>
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<td>David Moody</td>
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<td>Acceptable Knowledge</td>
<td>Kyle Hoggatt</td>
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<td>John Kleckner</td>
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# Audit A-20-30

## Summary Table of Audit Results

<table>
<thead>
<tr>
<th>QA / Technical Elements</th>
<th>Concern Classification</th>
<th>QA Evaluation</th>
<th>Technical Evaluation</th>
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<tbody>
<tr>
<td></td>
<td>CARs</td>
<td>CDAs</td>
<td>Obs</td>
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<tr>
<td>Program Status/ Program Changes/ Interface</td>
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<td>C6 General QA Elements (NCRs, Qual. &amp; Training, Records)</td>
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<td>C6 General QA Elements (WWIS/WDS)</td>
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<td><strong>TOTALS</strong></td>
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**Definitions**

- **E** = Effective
- **S** = Satisfactory
- **I** = Indeterminate
- **M** = Marginal
- **U** = Unsatisfactory
- **NE** = Not Effective
- **A** = Adequate
- **NA** = Not Adequate
- **CAR** = Corrective Action Report
- **CDA** = Corrected During Audit
- **Obs** = Observation
- **Rec** = Recommendation
WAP-Related Objective Evidence Reviewed During Audit A-20-30

The WAP-related objective evidence supporting Audit A-20-30 is included in the shipping box(es) submitted with this report. Included in the shipping box(es) is a “Content Map” describing the location (using color-coding) and identity of all required objective evidence supporting the performance of the audit.
## Audit A-20-30

### TABLE OF AUDITED PROCEDURES

<table>
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<tr>
<th>Procedure No.</th>
<th>Rev.</th>
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<tr>
<td>1. CCP-PO-001</td>
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<td>CCP Transuranic Waste Characterization Quality Assurance Project Plan</td>
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<td>2. CCP-PO-002</td>
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<td>3. CCP-PO-047</td>
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<td>CCP Training and Qualification Program Document</td>
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<td>4. CCP-PO-048</td>
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<td>CCP/LLNL Interface Document</td>
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<td>5. CCP-QP-002</td>
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<td>CCP Reconciliation of DQOs and Reporting Characterization Data</td>
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<td>14. CCP-TP-005</td>
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<td>CCP Acceptable Knowledge Documentation</td>
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<td>15. CCP-TP-030</td>
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<td>CCP CH TRU Waste Certification and WWIS/WDS Data Entry</td>
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<td>16. CCP-TP-058</td>
<td>6</td>
<td>CCP NDA Performance Demonstration Program</td>
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# List of Processes and Equipment Evaluated During Audit A-20-30

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<th>WIPP #</th>
<th>Process/Equipment Description</th>
<th>Applicable to the Following Waste Streams/Groups of Waste Streams</th>
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<td>Acceptable Knowledge (AK)</td>
<td>Solids (S3000) Debris (S5000)</td>
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<td>Procedures: CCP-TP-005, CCP-TP-200</td>
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<td>❖ Enhanced AK</td>
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<td>❖ Enhanced Chemical Compatibility Evaluation</td>
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<td>❖ Basis of Knowledge Evaluation Oxidizing Chemicals in TRU Waste</td>
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<td>Nondestructive Assay, including Performance Demonstration Program (PDP)</td>
<td>Solids (S3000) Debris (S5000)</td>
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<td>Procedures: CCP-TP-058 (relative to PDP)</td>
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<tr>
<td></td>
<td>Description: Mobile In-Situ Object Counting System (ISOCS) Large Container Counter (MILCC) calibrated for 55-gallon drums, “12” Pipe Overpack Containers, and Standard Waste Boxes</td>
<td></td>
</tr>
<tr>
<td>13SG1</td>
<td>Nondestructive Assay, including PDP</td>
<td>Solids (S3000) Debris (S5000)</td>
</tr>
<tr>
<td></td>
<td>Procedures: CCP-TP-058 (relative to PDP)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Description: Segmented Gamma Scanner (SGS) calibrated for 55-gallon drums</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>WIPP Waste Information System/Waste Data System (WWIS/WDS)</td>
<td>Solids (S3000) Debris (S5000)</td>
</tr>
<tr>
<td></td>
<td>Procedure: CCP-TP-030</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Description: CH TRU Waste Characterization and WWIS Data Entry</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>Quality Assurance (QA)</td>
<td>Solids (S3000) Debris (S5000)</td>
</tr>
</tbody>
</table>

## NEW PROCESSES OR EQUIPMENT

| N/A | N/A |

## DEACTIVATED PROCESSES OR EQUIPMENT

| N/A | N/A |
## WAP-RELATED PROCEDURE REVISION MATRIX

**Initial LLNL/CCP Audit A-19-29 & Supplemental Audit A-20-30**

<table>
<thead>
<tr>
<th>No.</th>
<th>Procedure Number</th>
<th>Procedure Title</th>
<th>Revision During Last Annual Audit</th>
<th>Revision During Initial Audit</th>
<th>Brief Description of Procedure Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>CCP-PO-001</td>
<td>CCP Transuranic Waste Characterization Quality Assurance Project Plan (QAPjP)</td>
<td>N/A</td>
<td>R23</td>
<td>N/A</td>
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<tr>
<td>2.</td>
<td>CCP-QP-002</td>
<td>CCP Training and Qualification Plan</td>
<td>N/A</td>
<td>R45</td>
<td>N/A</td>
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<tr>
<td>3.</td>
<td>CCP-QP-005</td>
<td>CCP TRU Nonconforming Item Reporting and Control</td>
<td>N/A</td>
<td>R26</td>
<td>N/A</td>
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<td>4.</td>
<td>CCP-QP-008</td>
<td>CCP Records Management</td>
<td>N/A</td>
<td>R26</td>
<td>N/A</td>
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<td>5.</td>
<td>CCP-QP-028</td>
<td>CCP Records Filing, Inventorying, Scheduling, and Dispositioning</td>
<td>N/A</td>
<td>R17</td>
<td>N/A</td>
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<tr>
<td>6.</td>
<td>CCP-QP-041</td>
<td>CCP Jobs Needs Analysis and Design</td>
<td>N/A</td>
<td>R3</td>
<td>N/A</td>
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<td>7.</td>
<td>CCP-QP-042</td>
<td>CCP Project Level Training and Qualification</td>
<td>N/A</td>
<td>R2</td>
<td>N/A</td>
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<td>8.</td>
<td>CCP-QP-043</td>
<td>CCP Operations Level Training and Qualification</td>
<td>N/A</td>
<td>R3</td>
<td>N/A</td>
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<td>9.</td>
<td>CCP-TP-001</td>
<td>CCP Project Level Data Validation and Verification</td>
<td>N/A</td>
<td>R22</td>
<td>N/A</td>
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<td>10.</td>
<td>CCP-TP-002</td>
<td>CCP Reconciliation of DQOs and Reporting Characterization Data</td>
<td>N/A</td>
<td>R29</td>
<td>N/A</td>
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<td>11.</td>
<td>CCP-TP-005</td>
<td>CCP Acceptable Knowledge Documentation</td>
<td>N/A</td>
<td>R31</td>
<td>N/A</td>
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<tr>
<td>12.</td>
<td>CCP-TP-028</td>
<td>CCP Radiographic Training Container Construction</td>
<td>N/A</td>
<td>R11</td>
<td>N/A</td>
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<td>13.</td>
<td>CCP-TP-030</td>
<td>CCP CH TRU Waste Certification and WWIS/WDS Data Entry</td>
<td>N/A</td>
<td>R38</td>
<td>N/A</td>
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<td>14.</td>
<td>CCP-TP-033</td>
<td>CCP Shipping of CH TRU Waste</td>
<td>N/A</td>
<td>R24</td>
<td>N/A</td>
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<td>15.</td>
<td>CCP-TP-053</td>
<td>CCP Standard Real-Time Radiography (RTR) Inspection Procedure</td>
<td>N/A</td>
<td>R16</td>
<td>N/A</td>
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<td>16.</td>
<td>CCP-TP-068</td>
<td>CCP Standardized Container Management</td>
<td>N/A</td>
<td>R12</td>
<td>N/A</td>
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<tr>
<td>17.</td>
<td>CCP-TP-079</td>
<td>CCP Real-Time Radiography #2 Operating Procedure</td>
<td>N/A</td>
<td>R1</td>
<td>N/A</td>
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<td>18.</td>
<td>CCP-TP-113</td>
<td>CCP Standard Contact-Handled Waste Visual Examination</td>
<td>N/A</td>
<td>R22</td>
<td>N/A</td>
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<tr>
<td>19.</td>
<td>CCP-TP-200</td>
<td>Enhanced Acceptable Knowledge Review</td>
<td>N/A</td>
<td>R6</td>
<td>N/A</td>
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<td>20.</td>
<td>WP 13-QA.03</td>
<td>Quality Assurance Independent Assessment Program</td>
<td>N/A</td>
<td>R29</td>
<td>N/A</td>
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