

CBFO SURVEILLANCE REPORT

Surveillance Number: S-11-18 **Date of Surveillance:** April 18, 2011

Surveillance Title: Savannah River Site/Central Characterization Project (SRS/CCP),
Battelle Columbus Laboratory (BCL) Drum BC0148

Organization: SRS/CCP

Surveillance Team:

Priscilla Y. Martinez	Team Leader, CBFO Technical Assistance Contractor (CTAC)
Porf Martinez	Auditor/Technical Specialist, CTAC
Paul Gomez	Auditor/Technical Specialist, CTAC
Dick Blauvelt	Technical Specialist, CTAC
B. J. Verret	Technical Specialist, CTAC
Jim Oliver	Technical Specialist, CTAC

Surveillance Scope:

Surveillance S-11-18 was conducted to evaluate the transuranic (TRU) waste characterization processes for remote-handled (RH) Summary Category Group (SCG) S5000 debris waste from waste stream SR-RL-BCLDO.002, conducted by SRS/CCP for BCL drum BC0148.

The surveillance team evaluated batch data reports (BDRs) for BCL drum BC0148, which included processes for Acceptable Knowledge (AK), Project-Level Validation and Verification (V&V), Visual Examination (VE), Headspace Gas (HSG) Sampling, Sampling and Analysis, and Dose to Curie (DTC) activities.

Governing Documents/Requirements:

- DOE/CBFO-94-1012, *CBFO Quality Assurance Program Document (QAPD)*
- NM4890139088-TSDF, *Waste Isolation Pilot Plant Hazardous Waste Facility Permit*, the New Mexico Environment Department
- DOEWIPP-02-3122, *Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant (WAC)*
- DOEWIPP-02-3214, *Remote-Handled TRU Waste Characterization Program Implementation Plan (WCPIP)*
- CCP implementing procedures

Surveillance Results:

The results of the surveillance indicate that the TRU waste characterization activities evaluated for BCL drum BC0148 were adequate, satisfactorily implemented, and effective.

Activities Evaluated:

Headspace Gas Sampling

The surveillance team examined HSG sampling operations performed on drum BC0148. The team verified the HSG sampling team collected the sample and recorded the information on the chain of custody form and verified the drum filter (NucFil-013) was installed as required. Sampling BDR SRHSGS1102 was reviewed to ensure the completion of data forms. The custody forms contained all required information. Collection of duplicate samples and a Field Reference Standard (FRS) was verified. The calibration of thermometers and temperature recorders, pressure gauges, and min/max thermometers was also verified. Proper sampling time and drum age criteria were evaluated and met all requirements for the sampling event.

The surveillance team evaluated the custody records, sample tags, drum age criteria data sheets, and the letter dated 10/13/08 authorizing CCP to cease collection of an FRS. The FRS Certificate of Accuracy (Air Liquid, Cylinder CLM005522) identified the correct composition and concentration of the FRS.

Overall, the HSG sampling activities evaluated were adequate in addressing upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

Visual Examination

The surveillance team evaluated procedure CCP-TP-500, *CCP Remote-Handled Waste Visual Examination*, Rev. 9 (the revision in use during the VE process). Training qualifications for VE operators and VE Experts (VEEs) were evaluated during SRS/CCP recertification Audit A-11-01.

The surveillance team examined RH VE BDR RHSRSVE100006 for drum BC0148 (the only container in waste stream SR-RL-BCLDP.002) and reviewed the associated audio/video media. Interviews were conducted with the SRS/CCP RH Site Project Manager (SPM), SRS/CCP Vendor Project Manager (VPM), and an Acceptable Knowledge Expert (AKE). SRS/CCP uses the two-operator method when performing VE characterization activities. For this container, the surveillance team reviewed audio/video media and TRU waste package loading records, and observed two qualified operators as they visually examined the waste, placed it into an RH steel container, reviewed package loading records,

and referred to AK source documents (P1000 and P1001) to ensure no prohibited items were present.

Overall, the RH VE activities evaluated were determined to be adequate in addressing upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

Project-Level Data V&V

The surveillance team reviewed the following objective evidence, including BDRs completed through CCP SPM review, for HSG sampling and analysis and VE. In addition, procedures, AK documentation, and a Waste Stream Profile Form (WSPF) were reviewed to ensure that SRS/CCP could adequately perform data reconciliation and properly prepare a WSPF.

The referenced objective evidence was reviewed to make an adequacy determination for the SPM V&V procedures. The surveillance team evaluated BDRs from each of the waste characterization activities.

The flow of data from the point of generation to inclusion in the WSPF for each characterization technique was reviewed to ensure that all applicable requirements were captured in the site operating procedures.

Compliance with the characterization requirements of the WAP was demonstrated through documentation and demonstrations of characterization activities. The surveillance team evaluated the project-level data V&V process by reviewing VE BDR RHSRSVE100006, and HSG Sampling and Analysis BDRs SRHSGS1102, ECL11004G, and ECL11004M.

Objective evidence was reviewed to ensure project-level data V&V activities were adequately performed to support waste characterization. The surveillance team reviewed the following:

- In-process WSPF Characterization Information Summary for SR-RL-BCLDO.002
- CCP procedures governing HSG sampling using SUMMA® canisters
- Data review and validation
- Sampling BDR SRHSGS1102 for RH-S5000 debris waste
- Drum age criteria, sample chain-of-custody, and shipment to the analytical laboratory
- HSG analysis of the SUMMA® samples
- VE project-level review of RH BDR RHSRSVE100006
- Project-level RH DTC review consisting of Radiological Technical Report CCP-AK-SRS-501, Rev. 8, supporting SR-RL-BCLDO.002 data reported.

Overall, the Project-Level Data V&V activities evaluated were determined to be adequate in addressing upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

Acceptable Knowledge

The surveillance team reviewed various AK documents and related records, identified several issues that can be addressed in a freeze file change to the AK Summary. It is recommended that clarifying statements be added to the AK Summary, such as noting that the waste matrix code S5190 was assigned by BCL when the drum was part of a larger debris stream. The waste matrix code S5110, assigned by CCP, is most appropriate for drum BC0148. The recommended changes were provided to the SRS-CCP AK personnel prior to close of the audit. It should be noted that none of the issues identified would constitute a condition adverse to quality.

Overall, the AK Program activities evaluated were determined to be adequate in addressing upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

Dose To Curie

BCL drum BC0148 contains RH waste generated as a result of an experiment to simulate the effect of sabotage on a container of high-level waste. The contents of the drum are predominantly metal debris contaminated with TRU waste created specifically to mimic high-level waste. A number of spent fuel elements from a nuclear power plant were dissolved and processed through a scale facility for the PUREX process used to extract plutonium and uranium from nuclear fuel and irradiated targets in the past. The residual material was mixed with depleted uranium to reintroduce similar material to that removed during the PUREX processing. The resultant material was vitrified, resulting in a waste form analogous to that of high-level waste, and placed into an experimental fixture to simulate the transportation container to be sabotaged.

To perform DTC on the drum, SRS/CCP had to determine the relevant ratios of the radionuclides of concern to cesium 137. The computer code ORIGEN2.2 was used to determine the quantities of fission products and activation products in the spent fuel, based on knowledge of the original fuel composition and the burn-up history. Information on the PUREX process and the quantities of material added was used to derive the ultimate ratios of radionuclides of concern to cesium 137 (the scaling factors for DTC.)

The technical basis for the approach used to develop the DTC scaling factors was found to be valid. ORIGEN2.2 has been used in the past to support the development of scaling factors. The resulting Waste Drum DTC Conversion Record for BCL drum BC0148 was reviewed for adequacy and accuracy and

found to be satisfactory. The development of measurement uncertainty associated with the approach was evaluated and found to adequately address areas of concern.

No technical issues were identified with the development of scaling factors, the measurement of the drum's dose rate, or the application of the DTC method.

Overall, the DTC activities evaluated were determined to be adequate in addressing upper-tier requirements, satisfactory in the implementation of these requirements, and effective in achieving the desired results.

Recommendation:

The surveillance team recommends that SRS/CCP address issues identified during the surveillance in the area of AK. It is recommended that clarifying statements be added to the AK Summary (freeze file change), such as noting that the waste matrix code S5190 was assigned by BCL when the drum was part of a larger debris stream. The waste matrix code S5110, assigned by CCP, is most appropriate for drum BC0148. The recommended changes were provided to the SRS-CCP AK personnel prior to close of the audit.

Surveillance Team Leader Signature: Priscilla Y. Martinez Date: 5-4-11
Priscilla Y. Martinez

Assistant Manager/Office Director: N/A Date: N/A

CBFO QA Director Approval Signature: D. J. Mills Date: 5-4-11