DOCKET NO: A-98-49, II-A4-70

WASTE CHARACTERIZATION INSPECTION REPORT

EPA BASELINE INSPECTION NO. EPA-ANL-CCP-RH-9.06-8 OF THE CENTRAL CHARACTERIZATION PROJECT REMOTE-HANDLED TRANSURANIC WASTE CHARACTERIZATION PROGRAM AT THE ARGONNE NATIONAL LABORATORY

September 12-14, 2006

U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Center of Federal Regulations
1200 Pennsylvania Avenue, NW
Washington, DC 20460

November 2006

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ATTACHMENTS

1.0 EXECUTIVE SUMMARY

In accordance with 40 CFR 194.8(b), the U.S. Environmental Protection Agency (EPA or the Agency) conducted Baseline Inspection No. EPA-ANL-CCP-RH-9.06-8 of the Central Characterization Project's (CCP) waste characterization (WC) program for remote-handled (RH) transuranic (TRU) waste at the U.S. Department of Energy's (DOE) Argonne National Laboratory (ANL), also known as Argonne National Laboratory East (ANLE), located in Argonne, llinois. EPA conducted a baseline inspection of the CCP's program to characterize RH TRU wastes proposed for disposal in the Waste Isolation Pilot Plant (WIPP). The inspection activities described in this report occurred September 12-14, 2006.

EPA must verify compliance with 40 CFR 194.24 before waste may be disposed of at the WIPP, as specified in Condition 3 of the Agency's certification of the WIPP's compliance with disposal regulations for transuranic (TRU) radioactive waste (63 *Federal Register* (FR) 27354 and 27405, May 18, 1998). This was the first inspection of RH WC activities conducted by EPA at ANL-CCP. EPA Baseline Inspection No. EPA-ANL-CCP-RH-9.06-8 was performed in accordance with the provisions of 40 CFR 194.8(b), as issued in a July 16, 2004, FR notice (Vol. 69, No. 136, pp. 42571–42583). The purpose of the ANL-CCP RH WC inspection was to evaluate the adequacy of the site's WC programs for one (1) RH debris waste (S5000) stream to be disposed of at the WIPP. The activities examined during the inspection included the following:

- Acceptable knowledge (AK) for RH retrievably-stored TRU debris waste (S5000)
- Visual examination (VE) for RH retrievably-stored TRU debris waste (S5000)
- Radiological characterization as described in this report for RH retrievably-stored TRU debris waste (S5000)

At the end of the inspection, EPA's inspection team identified three concerns, two in VE and one in AK. All concerns were documented on EPA Inspection Issue Tracking Forms (see Attachments B.1 through B.3) and are discussed in Sections 8.1 and 8.3 of this report. Only one concern in the area of VE required a response and this was provided by CCP personnel. The EPA inspection team members evaluated the CCP's response for completeness and adequacy, and concluded that it had been satisfactorily resolved. Accordingly, EPA considers all concerns to be resolved, and there are no open issues resulting from this inspection.

EPA's inspection team determined that ANL-CCP's RH WC program activities were technically adequate. EPA is therefore, proposing to approve the ANL-CCP RH WC program in the configuration observed during this inspection, described in this report and documented in detail in the checklists in Attachment A. The proposed approval includes the following:

(1) The AK process for RH retrievably-stored TRU debris in one waste stream, Argonne National Laboratory Waste Stream AERHDM, as defined in CCP-AK-ANLE-501, Revision 2, July 21, 2006

(2) The radiological characterization process using DTC and modeling-derived scaling factors for assigning radionuclide values to one RH waste stream for which the scaling factors are applicable, as described in CCP-AK-ANL-501, Revision 2

(3) The VE process for one retrievably-stored RH S5000 debris waste stream AERHDM using the trained personnel, documentation, and procedures discussed in this report

EPA is not proposing to approve the WIPP Waste Information System (WWIS) for tracking the waste contents of RH debris wastes. Although the WWIS is currently approved by EPA for tracking contact-handled (CH) waste, this system has not been demonstrated by ANL-CCP for its adequacy to track RH waste contents. EPA, therefore, requires that ANL-CCP provide WWIS information concerning RH waste content tracking as a Tier 1 (T1) change for EPA inspection. EPA will review the WWIS database populated with actual RH waste content data when the RH modules have been completed. No RH waste can be shipped to the WIPP for disposal until EPA approves the WWIS database. EPA may evaluate the adequacy of the implementation of CCP's WWIS procedure for RH waste during the comment period. However, EPA will not approve WWIS until after the Agency finalizes the proposed approval of CCP's RH waste characterization program at ANL.

Any changes to the WC activities from the date of the baseline inspection must be reported to and, if applicable, approved by EPA, according to Table 1. Please note that each T1 and Tier 2 (T2) change listed in Table 1 is followed by a reference to the report section where the technical basis for the T1 or T2 designation is presented.

EPA will notify the public of the results of its evaluations of proposed Tier 1 (T1) and Tier 2 (T2) changes through the EPA Web site and by sending e-mails to the WIPPNEWS list (see Section 2.0, below, for a brief discussion of tiering). All T1 changes must be submitted for approval before their implementation and will be evaluated by EPA. Upon approval, EPA will post the results of the evaluations through the EPA Web site and the WIPPNEWS list, as described above. EPA will post T2 changes approximately every three months beginning with the date of EPA's approval of the TRU WC program implemented at ANL-CCP. EPA expects the first report of ANL-CCP's T2 changes approximately three months from the date of EPA's approval of the TRU WC program implemented at ANL-CCP.

Table 1. Tiering of RH TRU WC Processes Implemented by ANL-CCP (Based on September 12–14, 2006 Baseline Inspection)

RH WC Process Elements	ANL-CCP RH WC Process - T1 Changes	ANL-CCP RH WC Process - T2 Changes*
Acceptable Knowledge (AK)	Any new waste streams not approved under this baseline; AK (1) & AK (3) Modification of the approved waste stream AERHDM to include additional containers beyond the approximately 45 included in CCP-AK-ANLE-500, Revision 3; AK (1) & AK (4) Substantive modification(s)*** that have the potential to affect the characterization process to CCP-AK-ANLE-500, CCP-AK-ANLE-501 or CCP-AK-ANLE-502; AK (8), AK (9), AK (13) & AK (14) Load management for any RH waste stream; AK (16)	Changes made to AK documentation as a result of WCPIP revisions**; AK (4) Waste stream data package for debris waste stream once completed, and any modifications to that WSPF including the CRR and AK Summary; AK (4), AK (13), AK (14) & AK (19) Updates to documents as follows: • All future revisions of CCP-ANLE-AK-500, CCP-ANLE-AK-501 and CCP-ANLE-AK-502; AK (4), AK (8) • Listing of the references that document the assembly of fuel pin data and review process; AK (5) • CCP-AK-ANLE-500 and CCP-AK-ANLE-502 to address freeze file changes; AK (8) Comparison of AK versus DTC-derived radiological data to support the use of waste stream-specific instead of drum-specific radiological data and the completed DTC results for all containers in this waste stream; AK (13) AK accuracy reports, prepared annually at a minimum; AK (15)
Radiological Characterization, including Dose-To-Curie (DTC)	Application of new scaling factors for isotopic determination other than those documented in CCP-AK-ANLE-501; RC (8.2.2 & 8.2.3) Use of any alternate radiological characterization procedure other than DTC with established scaling factors as documented in CCP-TP-504 or substantive modification*** of the DTC procedure; RC (8.2.2 & 8.2.3) Any new waste stream not approved under this baseline or addition of containers to waste stream AERHDM that require changing the established radionuclide scaling factors; RC (8.2.3)	Revisions of CCP-AK-ANLE-501 or CCP-TP-504 that require CBFO approval**; RC (8.2.2 & 8.2.3)
Visual Examination (VE)	VE by reviewing existing audio/visual recordings for S4000 and S3000 wastes; VE (1) & VE (3) VE by any process other than review of existing audio/visual recordings for S5000 debris wastes; VE (1) & VE (3)	Changes made to any VE procedure(s) that require CBFO approval; VE (1) & VE (3) Addition of new S5000 debris waste streams; VE (2)

Table 1. Tiering of RH TRU WC Processes Implemented by ANL-CCP (Based on September 12–14, 2006 Baseline Inspection)

RH WC Process Elements	ANL-CCP RH WC Process - T1 Changes	ANL-CCP RH WC Process - T2 Changes*
Real Time Radiography (RTR)	Any use of RTR requires EPA approval	None
WIPP Waste Information System (WWIS)	Any use of WWIS requires EPA approval prior to RH waste disposal	None

* Upon receiving EPA approval, ANL-CCP will report all T2 changes to EPA every three months.

** Excluding changes that are editorial in nature or are required to address administrative concerns. New references that are included as part of the document revision may be requested by EPA.

*** *Substantive modification* refers to a change with the potential to affect ANL's RH WC process, e.g., the use of an inherently different type of measurement instrument or the use of the high range probe as described for CCP-TP-504 for radiological characterization.

2.0 PURPOSE OF INSPECTIONS

On May 18, 1998, EPA certified that the WIPP will comply with the radioactive waste disposal regulations at 40 CFR Part 191. In this certification, EPA also included Condition No. 3, which states that "the Secretary shall not allow shipment of any waste from…any waste generator site other than LANL [Los Alamos National Laboratory] for disposal at the WIPP until the Agency has approved the processes for characterizing those waste streams for shipment using the process set forth in §194.8." The approval process described at 40 CFR 194.8 requires DOE to (1) provide EPA with information on AK[1] for waste streams proposed for disposal at the WIPP, and (2) implement a system of controls used to confirm that the total amount of each waste component that will be emplaced in the WIPP will not exceed limits identified in the WIPP Compliance Certification Application (CCA).

Under the changes to 40 CFR 194.8 promulgated in the July 16, 2004, FR notice, EPA must perform a single baseline inspection of each TRU waste generator site's WC program. The purpose of the baseline inspection is to approve the site's WC program based on the demonstration that the program's components, with applicable conditions and limitations, can adequately characterize TRU wastes and comply with the regulatory requirements imposed on TRU wastes destined for disposal at the WIPP. An EPA inspection team conducts an onsite inspection to verify that the site's system of controls is technically adequate and properly implemented. Specifically, EPA's inspection team verifies compliance with 40 CFR 194.24(c)(4), which states the following:

> *Any compliance application shall: . . . Provide information which demonstrates that a system of controls has been and will continue to be implemented to confirm that the total amount of each waste component that will be emplaced in the disposal system will not exceed the upper limiting value or fall below the lower limiting value described in the introductory text of paragraph of this section.*[2] *The system of controls shall include, but shall not be limited to: measurement; sampling; chain of custody records; record keeping systems; waste loading schemes used; and other documentation.*

In other words, the purpose of the baseline inspection is to assess whether DOE sites that characterize TRU waste prior to disposal at the WIPP are capable of characterizing and tracking the waste in such a manner that EPA is confident that the waste will not exceed the approved limits. By proposing the approval of WC systems and processes at ANL-CCP, EPA has evaluated the capabilities of systems and processes to accomplish two tasks: (1) the identification and measurement of waste components (such as plutonium) that must be tracked

[1] As of the FR notice of July 16, 2004, EPA has replaced the term *process knowledge* with *acceptable knowledge*. Acceptable knowledge refers to any information about the process used to generate waste, material inputs to the process, and the time period during which the wastes were generated, as well as data resulting from the analysis of waste conducted prior to or separate from the waste certification process authorized by an EPA certification decision to show compliance with Condition 3 of the certification decision.

[2] The introductory text of 40 CFR 194.24(c) states, "For each waste component identified and assessed pursuant to [40 CFR 194.24(b)], the Department shall specify the limiting value (expressed as an upper or lower limit of mass, volume, curies, concentration, etc.), and the associated uncertainty (i.e., margin of error) for each limiting value, of the total inventory of such waste proposed for disposal in the disposal system."

for compliance,[3] and (2) the confirmation that the waste in any given container has been properly identified as belonging to the group of approved waste streams.

Following EPA's approval of WC processes evaluated during the baseline inspection, EPA is authorized to evaluate and approve, if necessary, changes to the site's approved WC program by conducting additional inspections under the authority of 40 CFR 194.24(h). Under 40 CFR 194.24, EPA has the authority to conduct continued compliance inspections (both announced and unannounced) to verify that the site continues to use only the approved WC processes to characterize the waste and that those WC processes remain in compliance with all the applicable regulatory requirements. Based on the adequacies of the WC processes demonstrated during the baseline inspection, including all conditions and limitations, EPA will specify which subsequent WC program changes or modifications must undergo further EPA inspection or approval under 40 CFR 194.24. This will be accomplished by assigning a tier level to each aspect of the characterization program, i.e., Tier 1 and Tier 2 activities. Tier 1 activities have more stringent reporting requirements and require that DOE notify EPA of proposed T1 changes prior to implementation, and that EPA provide approval prior to implementation. Tier 2 activities are reported to EPA by DOE based on the frequency established in the inspection report. DOE may choose to characterize and dispose of at risk while EPA considers the proposed T2 changes.

If ANL-CCP contemplates a change that is not identified in this report, EPA recommends that the site in consultation with CBFO discuss the nature of the change with EPA. This would minimize a possibility of EPA not approving the site-assigned tiers. The rule under which this baseline inspection was conducted can be found in the FR (Vol. 69, No. 136, pp. 42571–42583, July 16, 2004).

3.0 PURPOSE OF THIS REPORT

This report documents the basis for EPA's proposed approval decision, and explains the results of Baseline Inspection No. EPA-ANL-CCP-RH-9.06-8 in terms of findings or concerns. Specifically, this report does the following:

- Describes the characterization systems proposed for approval
- Provides objective evidence of the approval basis for all WC systems
- Identifies all relevant limitations and/or conditions for each WC system
- Provides objective evidence of findings or concerns in the form of documentation, as applicable
- Describes any tests or demonstrations completed during the course of the inspection and their relevance to EPA's approval decision

[3] The potential contents of a single or group of waste streams determine which processes can adequately characterize the waste. For example, if AK suggests that the waste form is heterogeneous, the site should select the matrix-appropriate radiological characterization technique to obtain adequate radionuclide measurements. VE serves to confirm and quantify waste components, such as cellulosics, rubbers, plastics, and metals. Once the nature of the waste has been confirmed, characterization techniques quantify selected radionuclides in the waste. In some cases, a TRU waste generator site may be able to characterize a range of heterogeneous waste streams or only a few. A site's stated limits on the applicability of proposed WC processes govern the scope of EPA's inspection.

The completed checklists attached to this report in conjunction with the listings in each section, reference the documents that the EPA inspection team members reviewed in support of the technical determination. To see or obtain copies of any items identified in the attached checklists, write to the following address:

Quality Assurance Manager
USDOE/Carlsbad Field Office
P.O. Box 3090
Carlsbad, NM 88221

EPA's final approval decision regarding the ANL-CCP RH WC program will be conveyed to DOE separately by letter. EPA will also post the final approval on EPA's Web site at http://www.epa.gov/radiation/WIPP, in accordance with 40 CFR 194.8(b)(3).

4.0 SCOPE OF INSPECTION

The scope of Baseline Inspection No. EPA-ANL-CCP-RH-9.06-8 included the technical adequacy of the WC systems in use at ANL-CCP to characterize RH TRU wastes. These systems were evaluated with respect to their ability to perform the following:

- Identify and quantify the activities of the 10 WIPP-tracked radionuclides (^{241}Am, ^{137}Cs, ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{90}Sr, ^{233}U, ^{234}U, and ^{238}U) using a combination of AK and radiological characterization, including DTC and radionuclide scaling factors derived from modeling
- Assign waste material parameters (WMPs) correctly and confirm the presence or absence of prohibited items using VE for RH retrievably-stored debris waste

Specifically, these systems consisted of the following components:

- The AK process that supports retrievably-stored S5000 debris wastes from one (1) RH debris waste stream, Argonne National Laboratory Waste Stream No. AERHDM
- The system of radiological characterization including DTC and the application of radionuclide scaling factors derived by modeling for one (1) RH debris waste stream, Argonne National Laboratory Waste Stream No. AERHDM
- VE for retrievably-stored S5000 RH debris wastes

During an inspection, EPA does not approve characterization data; that function is the sole responsibility of the WC organization being evaluated during the inspection, in this case ANL-CCP. EPA evaluated the WC processes implemented by the site to characterize RH retrievably-stored debris. The evaluation consisted of interviewing personnel, observing equipment operations that are controlled through site procedures, and inspecting records related to each of the WC processes within the inspection's scope. An important aspect of this evaluation is the objective evidence that documents the effectiveness of the WC processes. Objective evidence typically takes the form of batch data reports (BDRs) for radiological characterization and VE; AK Summaries and accuracy reports; and VE tapes. During an inspection, EPA typically selects samples of each of these items, based on the number and variety of items that were completed

and available for each WC process, consistent with standard auditing techniques. Due to the newness of the RH TRU characterization program, there was only one (1) completed BDR for VE and radiological characterization available for the EPA inspection team's evaluation. Accordingly, the EPA inspection team evaluated one hundred percent of the drums in this package rather than choose a subset (sample) from a population of completed BDRs. Based on the evaluation of the WC processes in conjunction with the objective evidence, EPA determined the technical adequacy of the WC processes within the inspection's scope.

5.0 INSPECTION-RELATED DEFINITIONS

During the course of an inspection, EPA inspectors may encounter items or activities that require further inquiry for their potential to adversely affect WC and/or isolation within the repository. The two main categories relevant to WC inspections are identified below:

Finding: A determination that a specific item or activity does not conform to 40 CFR 194.24(c)(4). A finding requires a response from CBFO.

Concern: A judgment that a specific item or activity may or may not have a negative effect on compliance and, depending on the magnitude of the issue, may or may not require a response.

Note: Concerns not requiring a response do not have to be addressed prior to program approval. However, EPA recommends that when DOE accepts the site's response addressing the issue raised in the EPA concern, EPA should be informed concurrently with implementation of the corrective action in response to the concern, similar to a T2 issue.

6.0 PERSONNEL

6.1 EPA Inspection Team

The members of the EPA WC inspection team are identified below.

Table 2. EPA Inspection Team Members

Inspection Team Member	Position	Affiliation
Mr. Ed Feltcorn	Inspection Team Leader	U.S. EPA ORIA
Ms. Rajani Joglekar	Inspector	U.S. EPA ORIA
Ms. Lisa Sharp	Observer	U.S. EPA ORIA
Ms. Connie Walker	Inspector	S. Cohen & Associates, Inc.
Ms. Dorothy Gill	Inspector	S. Cohen & Associates, Inc.
Mr. Patrick Kelly	Inspector	S. Cohen & Associates, Inc.

6.2 Personnel Contacted

The EPA inspection team conducted interviews with ANL-CCP personnel in several disciplines. The personnel contacted represented a sample of the RH TRU WC staff, and they are listed in the table below, along with their affiliation and technical area.

Table 3. Personnel Contacted During Inspection

Personnel	Affiliation	Area of Expertise
Eric D'Amico	CCP	AK, DTC, SPM
Jene Vance	CCP	AK, AKE/DTC; Scaling Factors
A.J. Fisher	CCP	SPQAO
Lisa Price	CCP	AK, AKE
Larry Porter	CCP	AK, VE SPM; Scaling Factors
Steve Schaffer	CCP	AK, AKE
Jeff Harrison	CCP	AK, AKE
Kevin Peters	CCP	AK, AKE
Ed Gulbransen	CCP	DTC, SME
Mark Doherty	CCP/WTS	DTC & Scaling Factors
Joe Harvill	CCP/WTS	DTC & Scaling Factors
Tommy Mojica	CCP	Operator/ITR, SME/OJT, VEE
Gloria Ruppert	CCP	Operator/ITR
Gary Redman	CCP	Operator/ITR
Irene Quintana	WTS	SPM
Wes Root	CCP	VE, VPM

During the baseline inspection, ANL-CCP provided a list of RH TRU WC personnel from which EPA selected the individuals to be interviewed. The EPA inspectors reviewed the qualifications and training records of these individuals relative to their WC responsibilities. Based on this evaluation, EPA determined that ANL-CCP WC personnel responsible for characterizing RH TRU waste and certifying it as TRU waste were qualified and had received adequate training to perform their assigned function. If key WC personnel changes occur, EPA may request qualification and training records of the new individuals identified as key WC personnel. EPA will review these records and may interview the personnel to determine their abilities to produce quality data. This personnel qualification evaluation and review of training records would be the equivalent of the evaluation done by the EPA inspection team on site during this inspection.

7.0 PERFORMANCE OF THE INSPECTION

Site Background and History

ANL is located in Argonne, Illinois, approximately 22 miles southwest of downtown Chicago and 25 miles west of Lake Michigan. The site encompasses 1,275 acres, 200 of which are occupied by laboratory facilities. Founded in 1946 by the Atomic Energy Commission to support the initial production of plutonium for the Manhattan Project, ANL is a multi-disciplinary laboratory that performs work in basic and applied science. ANL initially included a facility in Idaho, called ANL-West, located on the Idaho National Laboratory (INL) site outside of Idaho Falls, Idaho. In 2005, the ANL-W facility was formally incorporated into the INL and the name of the ANL-W facility was changed to the Materials and Fuel Complex. At that time, it was no longer necessary to distinguish between ANL-W and ANL-E, and the name of ANL-E

was changed to simply ANL. This report contains references to ANL and ANL-E; however, the distinction is not significant and is used to maintain consistency with references to specific documents, processes, or other records.

Inspection Process Overview

EPA Inspection No. EPA-ANL-CCP-RH-9.06-8 occurred on-site at ANL on September 12-14, 2006. The inspection was conducted in the following steps:

(1) Obtaining and reviewing site procedures, reports, and other technical information related to RH WC activities at ANL-CCP in advance of the inspection.

(2) Preparing draft checklists and technical questions specific to WC areas prior to the inspection, as appropriate.

(3) Participating in a conference call with CBFO technical support contractors to brief the EPA inspection team members regarding technical details related to the ANL-CCP RH WC program.

(4) Interacting with CBFO and ANL-CCP personnel to arrange inspection logistics.

(5) One (1) visit onsite at ANL to verify the technical adequacy or qualifications of RH WC personnel, procedures, processes, and equipment by means of interviews, observation, and demonstrations, and recording the results.

(6) Recording all concerns on EPA issue-tracking forms, which were completed and provided to CBFO and site personnel as they were generated (see Attachment B).

(7) Communicating all pertinent information with CBFO and ANL-CCP personnel on site and in other meetings, as appropriate.

(8) Pursuing resolution of all identified issues prior to completion of the inspection and post-inspection by discussions with CBFO and INL-CCP personnel.

(9) Conducting entrance, exit, and daily briefings for CBFO and ANL-CCP management personnel at ANL and CBFO, as appropriate.

(10) Preparation of this inspection report.

8.0 TECHNICAL WASTE CHARACTERIZATION AREAS

8.1 Acceptable Knowledge

EPA examined the AK process and associated information to determine whether ANL-CCP demonstrated compliance with 40 CFR 194.8 requirements for RH waste stream: Argonne National Laboratory Waste Stream No. AERHDM.

Waste Characterization Element Description

As part of the inspection, EPA reviewed the following with respect to the use of Acceptable Knowledge for waste characterization:

- Waste stream identification and the definition of waste stream, including radiological content of the waste
- Identification of HLW, TRU vs. LLW, spent nuclear fuel
- Role of AK in the characterization methodology (including AK characterization using modeling/scaling factors derived by ANL)
- Compiling AK documentation and assembly of required information
- Adequacy of WCPIP AK process implementation and the AK Summary Report
- AK data traceability
- AK source document sufficiency
- WCPIP Interpretation with respect to AK qualification
- Confirmatory Test Plan preparation and plan adequacy
- Characterization Reconciliation Report preparation and plan adequacy
- Correlation and Surrogate Summary form and CH-RH correlation
- Personnel training and qualification
- Applicability of mass spectrometry information
- NCRs and AK discrepancy resolution
- AK accuracy
- Plans for load management
- Identification of the method for determining data quality objectives (DQOs)
- DQOs attained through AK Qualification

Documents, Waste Containers, and Batch Data Reports Provided

Many of the documents listed below are considered by CCP as common to both the ANL and INL RH waste streams recently inspected by EPA. Therefore, some of the references listed were provided to EPA during the earlier INL inspection and were not requested again during the ANL inspection. EPA verified that the appropriate revision of each document was provided.

- DOE/WIPP-02-3214, Remote Handled TRU Waste Characterization Program Implementation Plan, Revision 0D, October 30, 2003
- DOE/WIPP-02-3122, Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plan, Revision 5, effective date TBD
- CCP-PO-002, Revision 16, CCP Transuranic Waste Certification Plan, dated May 8, 2006
- CCP-AK-ANLE-500, Central Characterization Project Acceptable Knowledge Summary Report for Argonne Remote-Handled Debris Waste, Revision 1, July 18, 2006
- CCP-AK-ANLE-501, Central Characterization Project Remote-Handled Transuranic Radiological Characterization Technical Report for Remote-handled Transuranic Debris Waste from Argonne National Laboratory-East, Revision 0, July 21, 2006

- CCP-AK-INL-502 Central Characterization Project, RH TRU Waste Certification Plan for 40 CFR Part 194 Compliance and Confirmation Test Plan for ANL RH Waste Stream: AERHDM, Revision 0, July 21, 2006
- CCP-TP-506, CCP Preparation of the Remote-Handled Transuranic Waste Acceptable Knowledge Characterization Reconciliation Report, Revision 2, June 8, 2006
- Inter-Office Correspondence, from A.J. Fisher to I. Quintana, Acceptable Knowledge Accuracy Report: Argonne National Laboratory- East Waste Stream Number AERHDM, dated August 28, 2006
- P593, Engineering Design File, Quantifying Special Actinides in RH-TRU Waste from Irradiated Fuel Examined at ANL-E, EDF-2555 Revision 0, December 16. 2002
- P592, Evaluation of Radionuclide contents in RH-TRU Waste Drums 728 through 737 Based on Reported Irradiated Fuel Examination INEEL/EXT-02-00168, Revision 0, September 2003
- AK Tracking Spreadsheet for Argonne National Laboratory, print out dated September 13, 2006
- Characterization Reconciliation Report for Waste Stream CRR-ANLE-AERHDM, signed August 30, 2006
- NCR-RHANL-0002-06, Revision 0, NCR dealing with waste cans 292 (drum 00825) and 257 and 260 (waste drums 00829), dated July 12, 2006
- AK Pu-FGE Factor Calculation, Including AK-derived Isotopics, for drums 810 (container 76642), 815 (76650), 817 (76652), 820 (78103), 824 (78107) and 826 (78109), provided during inspection (individual sheets dated March 7-8, 2002, and August 1999 (824)
- CCP-TP-500 Revision 2, Attachment 1 VE Data Forms for RH Drums 810, 815, 817, 820, 824, and 826 BDR RHANLVE060001, various dates, 2006
- Container Dose to Curie Conversion Records for drums 810, 815, 817, 820, 824, and 826, provided during inspection September, 2006 (dated analysis August 8-9, 2006)
- RH TRU Waste Correlation and Surrogate Summary Form, ANL RH TRU Waste Stream AERHDM, provided during audit September 13, 2006
- AK Qualification Card, Kevin Peters dated 8/6/03; Resumes for K. Peters and S. Schafer provided September 13, 2006
- Source Documents Reference List (CCP-TP-005 Revision 17 Attachment 4) undated
- Solid Radioactive Waste Disposal Requisition Date sheets, various containers provided September 2006
- CCP-QP-002, CCP Training and Qualification Plan, Revision 20 Effective date 5/3/2006
- C003, Intralaboratory Memo to Harvey Welsh re: Dimensions of Intermediate TRU Waste Containers, prepared by Dennis Donahue, dated September 14, 1989
- C006, Interview with Larry Neimark, re: AGHCF samples, applicable programs, defense relationship to materials and commingling of the waste; Cheryl Schultz Record of communication ROC-C6, July 17, 2001

- C024, Intra-Laboratory memo to W.C. Kettman from L.A. Neimark IPR, Clarification of 00 No.29 with Regard to Inventory of 8 inch Storage Holes, dated December 7, 1993
- C058, Intra-Laboratory memo to R. Boule from Ralph Ditch, re: Needs Prior to Shipment of Nelmarks's TRU-RH Drums to Idaho, dated March 1, 1990
- C060, Intra-Laboratory memo to R. Boule from A.C Smith, re: Status: Resumption of Shipments of TRU waste to INEL, dated March 30, 1990
- C066, Record of Communication between Bill Kettman and Dennis Donahue, re: AGHCF Operations and Waste Packaging, recorded by Julia Whitworth and M. Wyco, dated August 7, 2001
- C084, Intra-Laboratory Memo to Building 212 Personnel re: Disposal of Solid Radioactive Waste, F.P. Marchetti, dated February 4, 1986
- C121, Record of Communication with L. Neimark, A Cohen, and F. Pausche by J. Whitworth and J. Biedscheld, and P. Kuan, R. Bhatt, and S. Kheriche, re: ACHCF Radiological Characterization of RH-TRU Waste Shipped to INEEL, dated December 19, 2001
- C149, Correspondence to Mr. Daniel Hecker, Waste Management Office, Argonne National Laboratory-East re: Transmittal of Final Argonne National Laboratory-East Transuranic Waste Acceptable Knowledge Report; Tom Krause, Project Manager, Benchmark Environmental Corporation, a ThermoRetec Company, September 29, 2000
- C306, Memo from R.J Page to G.L Winner, Subject: Isotopic Inventory of the AGHCF, R.J. Page, July 20, 2005
- C330, Memorandum to Ines Tray, CBFO from F. Marcinowski, Determination and Findings, Defense Origin of Nuclear Waste, Kerr-McGee Waste, dated April 15, 2005
- C331, Memorandum to CCP Central Records from K. Peters, re: Evaluation of Kerr-McGee Production and FFTF History, dated June 26, 2004
- C332, Memorandum to CCP Central Records from D.B. Becker, re: Assessment of Waste Material Parameters for Waste Stream ID-ANLE-S5000, dated January 3, 2006
- C333, Memorandum to CCP central Records from D.B. Becker, re: Assessment of Waste Material Parameters for Waste Stream AERHDM, dated January 2006
- C345, Shaw Discrepancy Report R8 for RH TRU Waste form ANL-E, AGHCF, re: WMC determination, Cheryl Schultz, July 15, 2003
- C349, Radiological Evaluation for Waste Stream AERHDM, S. Schafer, August 3, 2006
- DR10, Discrepancy Resolution Regarding the Volume of 7-Gallon Waste Cans, K. Peters, DR10 June 7, 2006
- DR011, Waste Requisition and Videotape Discrepancies, Lisa Price, undated (signed August 16, 2006)
- DR013, Discrepancy Resolution Form Regarding the Argonne Waste Population of 44 drums versus 45 drums, S. Schafer, August 28, 2006

- P001, AGHCF Operations Manual, Argonne National Laboratory, IPS-2-00-00, 2, dated September 10, 1990
- P002, Central Characterization Project Acceptable Knowledge Report for Argonne National Laboratory-East Contact Handled TRU Waste Facility Maintenance and Laboratory Operations; CCP-AK-ANLE-001, Revision 11, dated December 31, 2003
- P006, Safety Analysis for Twenty Year Retrievable Storage of Intermediate Gamma Level Transuranic Waste, W.D. Jackson Alpha-Gamma Hot Cell Facility, Argonne National Laboratory, dated June 1, 1976
- P009, TRU-RH Waste Certification Plan for Waste Management Operations, Ralph W. Ditch and Gary Griggin, J0306-0033-SA Revisions 2 and 4, dated November 10, 1986 and April 16, 1991
- P012, The Status of Uranium-Silicon Alloy Fuel Development for the RERTR Program, R.F Domagia, C. Wiencek, H.R. Thresh and D. Stahl; Argonne National laboratory, Materials Science Division, November 1, 1990
- P013, Frontiers: Research Highlights 1946-1996, Argonne National Laboratory, January 1, 1996
- P023, Argonne National Laboratory-East Remote Handled Waste, by W. Mahlon Hellaeson, EDF-RWMC-759, August 29, 1994
- P032, Procedure for Sorting Remote-Handled TRU Waste (30-Gallon Intermediate-Level Waste), Alpha-Gamma-Hot Cell Facility Irradiation Performance Section Materials and Components Technology Division, dated January 7, 1987
- P055, [Argonne East] Waste Handling Procedures, C.L. Cheever, Manger Waste Management Operations, dated September 18, 1986
- P380, Alpha Gamma Hot Cell Facility (ACHCF) Safety Analysis Report, ANL-IPS-221-00-01, Revision 1, October 2001
- P412, Remote Handled Transuranic Waste Sorting and Packaging, ANL AGHCF-OPS-302, Revisions 0 and 2, July 9, 2001 and March 29, 2006
- P414, Estimation of Activity in Waste Containers, ANLE AGHCF-OPS-304, Revision 0, April 20, 2001
- P575, Work Plan for the Examination of Fuel Plates from the RERTR-4 Experiment in ATR, Revision 1, R.V. Strain IPS-400-01-00, February 22, 2002
- P587, Program Scoping Plan for the Fast Flux Test Facility, A Nuclear Science and Irradiation Services User Facility, PNNL-12245, Revision 1, August 1999
- P599, the Defense Programs Origin of Transuranic Waste at Argonne National Laboratory-West, H.F. McFarlane, ANLE-NT-192, November 2001
- P604, Criticality Hazards Control Statement, Alpha-Gamma Hot Cell Facility, Special Facility FF12, and Addendum 1, Use of a Safe Vac Vacuum Cleaner in Alpha-Gamma Hot Cell Facility Areas 1 and 3, James A. Morman, IPS-6-00-09; IPS-6-01-10; Revisions 9 and 10, March 1990 and July 2001

- P611, Waste Handling Procedures Manual-Appendix I, Radioactive Waste Management Basis, ANL, RWMB-01, Revision 1, April 6, 2004
- U001, AGHFC Position Statement Regarding Defense Versus Non Defense TRU Waste, no author cited, April 7, 2000
- U013, Waste Stream Fissile Content [AGHCF], March 23, 1990
- U015, RH-TRU 1995, Book 5 Drums 798 to 809, no author cited, January 1, 1995
- U027, Report of Analytical Results; CMT-84 (10-84), August 1, 1990
- U036, Acceptable Knowledge for ANL RH-TRU Waste, R.T. Klann, K.N. Grimm, and B.A. Brush, ANL-E-U036, undated
- U040, Spreadsheet Correlating Number Quota with Quota Title and Number Project, no author cited, July 31, 2002
- U041, Videotape Logs data [Cans 100, 102-187, 217-231, and 234-246], Cheryl L. Schulz (no title given), September 15, 2001
- U072, MSDS sheets, various components, no author cited, undated.
- U076, AGHCF Fissile Inventory Management System Database; referenced date July 16, 2001
- U305, Isotopic Data Report from H.B. Robinson Report; undated and source not cited
- U332, WMO-105 Radioactive and Mixed Waste Disposal Requisitions, ANL, no specific dates or authors cited
- U334, Handwritten Drum list of Drums with top and bottom can numbers, Terry Bray, 1976-2002
- U335, Various Excel Spreadsheets Regarding Fissile Material and Waste Management Tracking, no specific dates or authors cited
- U336, Various Inventory Spreadsheets from AGHCF, no specific dates or authors cited
- U882, Pre-Irradiated Fuel Composition, ANLE, June 22, 2006
- U887, Uncertainty Analysis for Drums, June 22, 2006

Table 4. Listing of BDRs

Drum	VE BDR	DTC BDR
00810	RHANLE VE 06001	ANLE RH DTC C06001
00815	RHANLE VE 06001	ANLE RH DTC C06001
00817	RHANLE VE 06001	ANLE RH DTC C06001
00820	RHANLE VE 06001	ANLE RH DTC C06001
00824	RHANLE VE 06001	ANLE RH DTC C06001
00826	RHANLE VE 06001	ANLE RH DTC C06001

Waste Stream AERHDM consists of waste both generated prior to an approved QA program, i.e., retrievably-stored waste, as well as wastes that will be packaged and generated in the future and will be considered newly-generated waste. CCP has proposed the use of confirmatory testing for the retrievably-stored component, while “qualification” of the AK via approved

characterization methodologies will be used for the newly-generated component. The retrievably-stored confirmatory testing and newly-generated AK qualification both assign TRU and Activity-related DQOs using DTC and AK-based scaling factors derived through ORIGEN2.2 modeling (previously examined as part of the RH baseline inspection at the Idaho National Laboratory and found adequate by EPA). Input parameters to this modeling were not individual drum AK data; rather, the individual fuel pins that contributed radionuclides to various waste drum lots were individually used as input to the ORIGEN2.2 code.

The evaluation presented in this section assesses the AK process and related activities dealing with the determination of physical and radiological waste composition, up to but not including model parameter determination, waste data input, and determination of scaling factors. Evaluation of individual model input parameters with respect to the related source documents was undertaken during activities presented in Section 8.3 that also address DTC for radiological waste characterization.

EPA's evaluation focused on the processes and related objective evidence. Therefore, EPA's summation, presented below, includes observations regarding the completeness of the AK Record and inclusion of data in that record. EPA believes that the record must be complete to ensure data and process traceability. Future examination of AK records may include personnel that are not as directly associated with the generation of the data as those who compiled the AK data examined during this inspection; therefore, the recommended changes described below are made with that future examination in mind.

Technical Evaluation

(1) Waste Stream AERHDM was examined with respect to whether the stream is adequately defined.

The RH waste characterization program implementation plan (WCPIP) defines waste stream as "waste material generated from a single process or activity, or as waste with similar physical, chemical, and radiological properties." Waste stream AERHDM is a debris waste stream that was generated in the ANLE hot cell and includes wastes that are currently in drums, as well as waste awaiting packaging that still resides in the hot cell.

As indicated in the AK Summary CCP-AK-ANLE-500, the waste stream consists of about 45 drums of waste generated in the cells from February 1993 through February 2002. In addition to these drummed wastes, some waste material created during this same time period remains in the hot cell, and will be packaged in the future as newly-generated waste. Between 50-100 drums of newly-generated waste may be packaged. The physical characteristics of each drum are recorded on waste can inventory records; information recorded includes the individual drum contents on a volume percent (glass bottles, cotton rags) that were assigned to EPA waste material parameters (WMPs) and converted to weight percentages. This analysis, documented in reference C333, showed that this waste stream consists of about 64% inorganics (ferrous/non ferrous metals) and 36% organics (cellulosics, plastics and rubber). Analysis showed the absence of organic matrix (e.g., organic sludges). CCP representatives were asked about waste-generating processes to be used for newly-generated waste, specifically for the purpose of determining whether the newly-generated component of the waste stream would be physically similar to the retrievably-stored component. CCP representatives indicated that the AGHCF currently contained cellulosics,

plastics, and rubbers (CPR) as well as large pieces of equipment and other metals/inorganics that would require size reduction prior to packaging. CCP provided photographs of the AGHCF and another hot cell showing the contents of each, and these are included in Figures 1, 2 and 3, below. Waste-generating procedures were not available for the newly-generated component of the waste stream. CCP representatives indicated that the newly-generated component will consist predominantly of inorganic materials consistent with the retrievably-stored drums, but the newly-generated waste may contain more decommissioning and demolition (D&D) materials. Based on this information and the process history associated with the stream, the waste stream has been appropriately assigned with respect to physical characteristics.

AK radiological data pertaining to content of waste drums is presented in several references. As indicated in the AK Summary, ANLE used an ORIGEN2.2-based methodology to assign drum-specific radiological content using methods similar to that employed by CCP, but conducted this analysis on a per-campaign rather than waste stream basis. As a result, the AK record (Reference C349) includes drum specific radiological data assigned by ANLE, using a method similar to that employed by CCP. Reference C349 states the range of reported external dose rates for the 45 containers as 0.58 R/hr to 180 R/hr, with an average of greater than 17 R/hr. It is not clear if this value represents a value on contact with each container or at one-meter, which seems more likely. The TRU alpha concentration is listed as greater than 1,900 nCi/g per container. This value is heavily weighted by a small number of containers that are listed with concentrations in excess of 10,000 nCi/g, but these containers also had identified quantities of ^{241}Am, ^{238}Pu, ^{240}Pu, ^{241}Pu, and ^{242}Pu that were not assigned to the other containers. Three of the 45 containers have an AK-assigned TRU alpha concentration of less than 100 nCi/g, but these containers did not have assigned values for ^{241}Am, ^{238}Pu, ^{240}Pu, ^{241}Pu, and ^{242}Pu, so their assigned TRU values are likely to be too low. Based on this information, every container is expected to be RH, and AK suggested that each also contains TRU material.

In addition to the above, EPA examined the isotopic composition of the stream based on AK data as summarized in references C359 and U332. Every container from the waste stream that was examined had an AK-assigned gram value for ^{239}Pu and ^{235}U, with the values assigned via use of scaling factors (see Item 3) to the following radionuclides: ^{113m}Cd, ^{144}Ce, ^{152}Eu, ^{154}Eu, ^{155}Eu, ^{241}Fe, ^{54}Mn, ^{147}Pm, ^{106}Ru, ^{125}Sb ^{151}Sm, ^{123}Sn, ^{126}Sn, ^{90}Sr, ^{99}Tc, ^{127}Te, and ^{93}Zr. CCP reference C359 reported the weight percent of ^{239}Pu and ^{235}U for each container, as well as other nuclides for which a calculated weight was provided. Data presented suggested that the per drum weight percent ^{239}Pu varied from 24%-72%, with an average of approximately 48%. For ^{235}U, the content varied from approximately 11% to 60%, with an average of approximately 50%. The remaining approximately 2% not accounted for by ^{235}U and ^{239}Pu is represented by the gamma emitters listed above, as well as by ^{241}Am, ^{242}Am, ^{243}Am, and other radionuclides reported for four of the 45 containers. This analysis shows that the per-drum ^{235}U and ^{239}Pu values are expected to vary, but should average approximately 50-50 on a weight percent basis. It should be noted that AK suggests that drum Nos. 76642-78117 (AK-assigned drum numbers) appear to have approximately 40% Pu and 60% ^{235}U, while drums 81790-81799 contain approximately 60% ^{239}Pu and 40% ^{235}U, indicating that these drums may have somewhat different isotopic signatures (see Item (3) for CCP's assessment of the validity of AK data). EPA recognizes that the accuracy of these values has been questioned by CCP, and EPA believes this analysis generally indicates a comparable isotopic composition within the stream. On this basis, EPA concludes that the waste stream was appropriately defined based on the similarity of radiological components.

Figure 1. Interior of AGHCF Showing Waste Material Still In Cell

Figure 2. Exterior View of AGHC

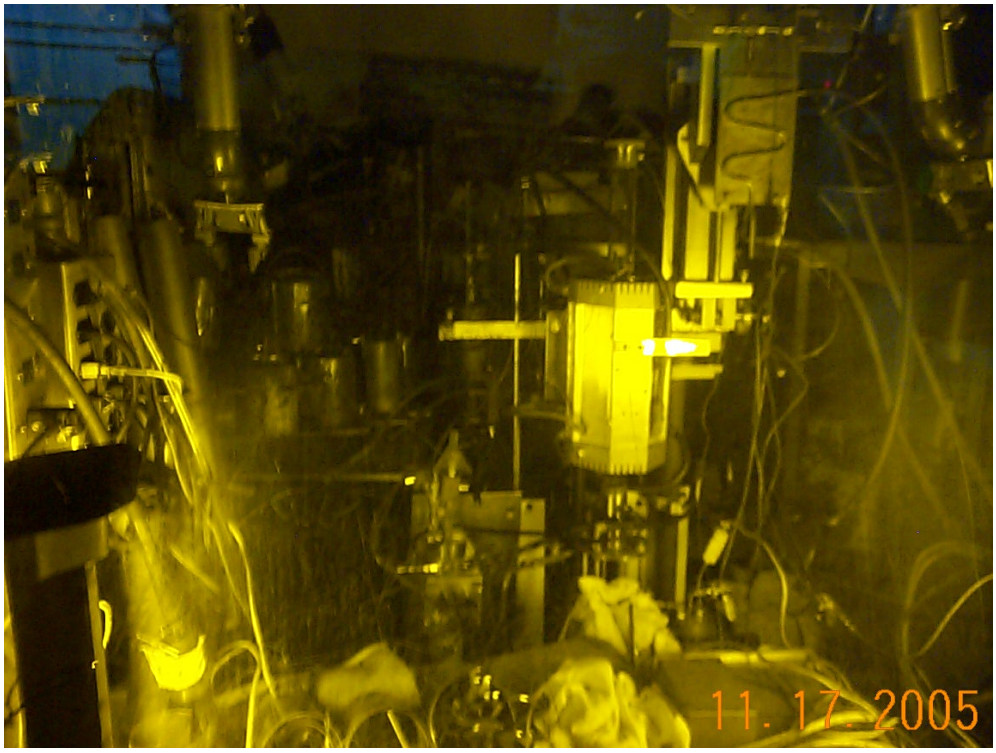

Figure 3. Interior View of a Hot Cell Showing Wastes Typical of AGHF

This examination was performed only for the purpose of verifying the waste stream assignment and not for the purpose of assessing the adequacy or appropriateness of the per-drum radiological values. The above analysis applies only to the retrievably-stored portion of the waste stream. The material remaining in the hot cell that will be newly-generated cannot be assigned to any waste generating campaigns, and will be most accurately defined from a radiological perspective on a waste stream basis.

(2) The Identification of HLW, TRU vs. LLW, and Spent Nuclear Fuel was examined.

CCP-AK-INL-500 indicates that while samples of spent nuclear fuel were assessed to determine composition (references P344, P349 and P602), the actual spent nuclear fuel is separate from the RH debris waste generated through testing of this fuel, and is therefore not included in this waste stream. CCP representatives interviewed indicated that HLW is by definition not included in this waste stream. See Item (16), below, for discussion of load management.

(3) The Drum-Specific AK data were assessed, including ANLE AK-based characterization methodology presented in CCP-AK-ANLE-500 for the retrievably-stored portion of the waste stream.

CCP is required to obtain and evaluate as much drum-specific information as possible for RH waste. Drum-specific AK data for each of the retrievably-stored containers was identified by CCP, including both physical and radiological characterization information. The physical composition was assessed as part of Item (1), above. The radiological AK data as it pertains to

waste stream identification was also evaluated under Item (1), above. Technical analysis with respect to how this AK data may be used is discussed herein.

CCP-AK-ANLE-500 presents a characterization activity performed by ANLE to assign radionuclide composition to each of the retrievably-stored waste containers in waste stream AERHDM. This method was formalized in 1996. Groups of cans were administratively combined into campaigns based on common waste generation dates. For each campaign, the Alpha Gamma Hot Cell Facility (AGHCF) activities performed in the cell during the campaign period were determined from ANLE's Fissile Inventory Management System (FIMS), and the ^{235}U and ^{239}Pu contents of the materials tested in the hot cells during the time period were ascertained. ANLE assumed that when fuel segments were mounted, 50% was lost as swarf (shavings and chippings of metal), and 75% of the swarf was ultimately collected with the remaining 25% considered to have been in the form of dust and associated small particle size debris. Of this 25%, it was assumed that 7.5% was fixed on the cell's surface and not in the waste, while the remaining 17.5% was assumed to be in the RH waste. ANLE assigned Pu and ^{235}U values to each drum, and also assigned fission products using surface dose rates and applied scaling factors derived from the AGHCF Safety Analysis Report. CCP representatives indicated that these scaling factors were based in part on the maximum allowable amount of fission products within the cell based on the facility's authorization basis. CCP representatives also indicated that derivation of the scaling factors was complex and difficult to follow based on the AK record. Data from this effort is presented in several references including C349 and U332. CCP representatives indicated that the method used by ANLE was incomplete, and did not include all of the materials managed in the hot cell during the specific campaign interval. Because the scaling factors were assigned based on the maximum allowable amount of fission products within the cell based on the facility's authorization basis, the AK data, while useful, was not accurate on a drum-specific basis. This determination was not documented in AK references or the AK Summary, so CCP created a freeze file changed to CCP-AK-ANLE-500 as follows:

> *Replace the last paragraph of Section 5.4.2.1 with the following:*
>
> *The stated purpose of the method employed by Argonne to estimate the radiological composition in individual waste containers was to address site accountability requirements and to comply with the maximum allowable fissile content of RH TRU drums. While the Argonne reported radiological content of containers in this waste stream was used to support the CCP waste stream delineation, RH, and TRU determinations, the Argonne methodology did not produce results adequate for the purposes of WIPP certification. For this reason, it is not appropriate to compare the Argonne estimates to the results of the CCP radiological characterization activities in AK accuracy evaluations. The approach employed by CCP to fully characterize this waste stream is described in Section 6.0 below, and the results of the CCP radiological characterization are documented in CCP-AK-ANLE-501 (Reference 13, C350, P051, P414).*

EPA compared the AK-derived values for ^{239}Pu, ^{235}U, ^{90}Sr, and ^{137}Cs with those that were derived by the dose-to-curie (DTC) method for drum Nos. 810, 815, 817, 820, 824, and 826. This comparison showed that the AK-derived values for ^{239}Pu and ^{235}U were generally approximately one order of magnitude lower than those determined by DTC, while the

AK-assigned values for ^{137}Cs and ^{90}Sr values were as much as two orders of magnitude lower. Differences in these values are expected because the ANLE values did not take into account all of the activities identified in the FIMS for the specified campaigns. The CCP process applies the same scaling factors to the whole waste stream, while the ANLE AK process considered waste on a campaign or container basis. CCP representatives stated during the inspection that ANLE's scaling factors would be "conservative", i.e., would result in higher than actual values, because the scaling is based on maximum allowed fission products in the cell, not measured values. If this is the case, the disparity between the true drum values and that obtained by DTC calculations may be greater than the AK-DTC comparison showed. Based on this analysis, use of the AK data as the absolute value of individual drum contents is not supported by the AK record, although comparison of the total waste stream contents as provided by AK with values derived through DTC would support the use of stream rather than drum-specific scaling factors. Performance of this analysis after full characterization of the approximately 45 drums in the stream would provide information directly relevant to the use of waste stream scaling factors in the future. EPA requests that CCP conduct this comparison upon completion of the analyses of the 45 drums in this waste stream and submit the results and completed DTC data for all drums to EPA with the next quarterly report as a T2 change. (See Table 1 where this is included as a T2 change.)

(4) Sufficiency of the AK Summary was evaluated, as well as implementation of AK as required in Attachment A of the WCPIP.

Attachment A of the WCPIP specifies that the following be included in AK Summaries: Executive Summary, Waste Stream Identification Summary, AK Data and Information description, Program Information, Waste Stream Information, Qualification of AK Information, and Container-Specific Information. Furthermore, Attachment A mandates a process that should be followed to collect and analyze AK data, similar to that used for CH waste. Both the content of the AK Summary and sufficiency of AK implementation were assessed.

CCP-AK-ANLE-500 represents ANLE waste generated in the AGHCF from 1993-2003; waste generated prior to this date was shipped to INL for storage and is described in CCP-AK-INL-500. Most of the references and technical content within the two AK documents are the same, although the general types of reactor pins managed prior to 1993 (fast fuel) are different than the predominant types tested after 1993 (light water reactors). The reason that shipment to INL ceased is not presented in either document, and its inclusion would help to clarify whether this change represents a process break or changes in pin composition, or is based on other, non-technical reasons.

Chapter 6 of CCP-AK-ANLE-500 presents the general characterization methodology as it relates to AK and the qualification methods for each DQO. This information is satisfactory to the extent that the DQO methods are identified for general AK, but the section does not differentiate between AK generated prior to an approved quality assurance (QA) program and requiring 194.22-based QA qualification, and that obtained after program approval. While the overall methods may be the same for this waste stream, future streams may employ different methods for different elements of the waste stream and the different AK confirmation requirements may apply.

The AK Summary does not address drum storage in sufficient detail to determine whether the containers could have become inundated, as was the case for RH wastes at INL (see Docket No: A-98-49, II-A4-69). During the inspection, CCP representatives provided data indicating that the drums were stored in surface vaults and that the likelihood of any secondary water infiltration is minimal. EPA expects every AK summary to address the storage and management of RH containers to ensure that secondary events that would impact the content or characteristics of the waste have not taken place. References were requested and examined with respect to the specific phrases in the AK Summary attributed to that reference. However, several documents listed as references in CCP-AK-ANLE-500 are not referenced in the text, and other references appear to have minimal relevance to AERHDM. EPA expects that CCP will continue to refine each AK Summary, streamlining the document to ensure relevancy of information in the future. Additionally, Chapter 7 discusses tracking of ongoing characterization data using a tracking spreadsheet, but the intent of the WCPIP requirement to collect drum-specific AK data is to ensure that AK data are assembled and assessed. Examination of the AK Source Document Summary and other reference lists in CCP-AK-ANLE-500 and -501 show that these two documents do not completely reference relevant and appropriate support documentation (e.g., P801-P832, U801-U838, C801-C817). In short, the AK Summaries appear to reference documents not specifically relevant to Waste Stream AERHDM and to exclude references that are relevant and are documented in the Acceptable Knowledge Source Document Reference List. It is understood that CCP is continually refining these documents to ensure completeness. CCP should address the above potential changes to the AK Summaries in forthcoming changes, and revisions to CCP-AK-ANLE-500 and CCP-AK-ANLE-501, as applicable, which must be provided to EPA as a Tier 2 change. (See Table 1 where this is included as a T2 change.)

CCP-AK-ANLE-500 included the content mandated by the WCPIP, and the general process outlined in the WCPIP for AK data assembly was followed. CCP submitted a freeze file change to this AK summary that documented CCP's analysis of drum-specific AK data, and why those data are not acceptable for use in AK Accuracy calculations (see Items (3) and (15)).

(5) Data traceability was examined.

As indicated in Item 1 above, reference U332 includes AK data for each drum in the waste stream, specifically WMO-195 Radioactive and Mixed Waste Disposal Requisitions that include detailed information regarding drum contents, including physical descriptions of drum contents in each 7-gallon container. Calculated isotopic compositions for each drum are also provided. When asked whether similar data would be generated for each newly-generated container, CCP representatives indicated that they had no information as to what the ANL personnel might generate based on site-specific requirements that are outside of the CCP program.

CCP representatives provided historic AK data for drums 810, 815, 817, 820, 824, and 826, represented by AK container IDs 76642, 76650, 76652, 78103, 78107, and 78109, respectively. AK data provided included Plutonium Fissile Gram Equivalence (FGE) Calculation sheets, as well as selected WMO-195 Disposal Requisitions pages as presented in U332. Visual Examination Data Forms completed by CCP as part of their characterization program were provided for each drum, showing that examination of VE tapes for the selected drums had been completed. Waste Container Dose-to-Curie Conversion (DTC) Records for each container that documented the DTC calculations were also provided. Based on this information, traceability of container data from the AK record through current analysis is demonstrated.

Scaling factors are assigned through the assembly, analysis, and modeling of fuel pin data, and traceability and technical viability of the data must be demonstrated. Traceability of the various PIN data to the AK record was assessed by examining the FIMS database, as documented in AK reference U335. CCP representatives performed additional data searches and identified more information that was not presented in the FIMS, or at least not in the portion of the FIMS that was originally examined. CCP indicated that a detailed data assembly process was followed to assess the information and obtain fuel pins relevant to the ANLE analysis, but this process is not formally documented. CCP summarized the process they used to assemble and assess pin data as follows:

> *The first set of pins was identified by Terri Bray by a query she did from her FIMS database. Incidentally, a FIMS database query is where the INL population of pins came from as well. George Fenske (from ANL) worked on this list of pins and provided us with a spreadsheet (U841) of all the relevant information. We collected the documentation files and made them part of the AK record (P801-P832; U801-U838; C801-C817).*
>
> *There were 2 different pin collection efforts going on simultaneously. INL was getting pin information on the INL population from Bud Fabian at Argonne, and we (CCP) were getting pin information on the ANL population from George Fenske. INL went through cutting and grinding logs and identified several additional pins of interest. INL documented those pins in an EDF (P614). We (CCP) went to Argonne and collected source documentation in order to identify composition, burnup, etc., for the pins that were identified for the INL population (U839).*
>
> *We also took a trip to ANL to go through the sectioning slips (U840 and U826), which they began using in 1994, to ensure that all applicable ANL pins had been identified. We identified several items of interest - we identified material type, etc., and sent the list to Jene. Jene went through the list and eliminated all but 9 of the pins, either because they were unirradiated or cladding, etc. These additional 9 pins plus the original list from George Fenske are all included in Jene's calc package (U882). Upon examination of these 9 pins, Jene determined that further data collection efforts were not needed because the necessary information was contained in the source documents that had already been collected (P801-P832; U801-U838; C801-C817).*

It should be noted that CCP did not prepare an Engineering Design File (EDF) or an equivalent document that specifically identifies the additional data assembled or the assembly process. None of the EDFs cited above are included or referenced in CCP-AK-ANLE-500 or CCP-AK-ANLE-501, which document the review process, and accordingly these EDFs were not examined during the inspection. While these references are included on the AK Source Document Reference List, relevance of the references to the pin data assembly process could not be ascertained until CCP clarified the process post-inspection. Also, the source document reference list included several references not included in document specific reference lists at the back of CCP-AK-ANLE-500 or CCP-AK-ANLE-501 (see Item (4), above, for additional discussion). While the process described above appears logical, it must be fully described, include reference to the appropriate document(s), and be placed in the AK Record. The AK record must be complete and accurately document the processes for which approval is granted.

Accordingly, the process by which fuel pin data were compiled and assessed that was provided to EPA post-inspection by e-mail should be formally documented in and submitted to the auditable record. The preparation and inclusion of this information and providing it to EPA constitute a T2 change. (See Table 1 where this is included as a T2 change.)

(6) Sufficiency of AK Support Documents and Related Document Tracking was evaluated.

An AK Source Document Reference List was prepared using unique identifiers for the different document types following the format used by CCP for CH wastes. The listing provided is based on CCP-TP-005 Revision 17, Attachment 4. The listing appears complete, and is easy to understand because it follows the same format that CCP uses for CH waste streams. It should be noted that EPA only examines support documentation specific to the technical element being referenced in the AK Summary that caused that support reference to be selected for examination. EPA does not perform a full analysis of all data, but instead only checks the document to be sure that it addresses the technical issue for which is it referenced in the text of the AK Summary.

(7) Interpretation of WCPIP, with respect to contents of the Certification Plan and Confirmatory Test Plan, was evaluated.

CCP provided a combined site-specific RH TRU Waste Certification Plan for 40 CFR 194 Compliance and Confirmatory Testing Plan (see Item (8), below, for commentary on this Plan) that describes how DQOs will be met. In the case of ANL and as stated in Chapter 6 of the AK Summary, the CCP intends to use a combination of methods to qualify AK data. EPA interprets this to mean that CCP commits to collecting AK data for every RH waste stream, and all AK for each DQO will be technically validated or verified by characterization methods presented in the WC PIP, primarily AK confirmation. While the reported methods on the whole state that AK is the basis for all DQOs that will be verified in various manners, it does not differentiate between the subsets of methods that will be used based upon the nature of the waste. For example, the newly-generated component of the waste will undergo actual visual examination, while the physical attributes of the retrievably-stored portion of the stream will be assessed through VE tape review. In the future versions of this and other AK Summaries, EPA expects to see this differentiation.

Also note that the WCPIP states that if AK is insufficient, “additional information” will be collected using the same characterization methods as used to “qualify” AK, but this data, in turn, will not require qualification. It is unclear whether any of the information collected to meet DQOs as presented in Table 6 of CCP-AK-ANLE-500 is considered this additional information.

(8) Content and technical adequacy of the Confirmatory Test Plan was evaluated.

The WCPIP requires the following to be included in the Confirmatory Test Plan (CTP):

- A description of the waste stream or waste stream lots to which the plan applies
- A description of the confirmatory testing proposed, including the percentage of waste containers that will be subject to confirmatory testing

- An explicit description of the waste characterization DQOs and QAOs that will be satisfied with the data being qualified
- A description of the DQOs and QAOs that will not be confirmed with the data being qualified and an explanation of how compliance with those DQOs and QAOs will be demonstrated
- A description of how the tested subpopulation will be representative of the waste stream or waste stream lot.

The WCPIP requires submission of a CTP when confirmatory testing is to be performed outside of that described in the PIP. CCP indicates that the CTP was provided because the DTC method deviates from that presented in the WCPIP, but that the CTP will always be used to communicate the full characterization methodology that will be used for a given CCP waste stream. Furthermore, CCP will combine the EPA Certification Plan with the CTP, to ensure that EPA is fully informed of the characterization process intended for a given CCP waste stream. This approach is acceptable.

As indicated in Item (7), above, CCP provided a combined Confirmatory Test Plan (CTP) and Site Specific Certification Plan (CP) for AERHDM. The Plan appears to address many of the required elements that must be in a CTP, but the following statement is made with respect to the DQOs for TRU Waste Determination and Activity Determination:

> *The required site methodology for comparing radionuclide information from the confirmation with the AK record is performed in two parts. The work required to develop the isotopic abundances has been completed and is described in CCP-AK-ANLE-501 (Reference 3). It establishes that there are no significant discrepancies between the AK information used in the modeling and the qualification of that AK (modeling and sampling)…*

It was not clear what CCP meant with regard to lack of discrepancies between AK information used in modeling and qualification of that data. Inclusion of the AK accuracy discussion under the Defense Determination DQO was found to be confusing, as it should be in a separate section. Also, sites are required to develop stream-specific AK accuracy evaluations with respect to radiological characteristics, and the discussion presented in the CCP-AK-ANLE-502 did not adequately address why ANLE AK drum-specific radiological data were not being used in AK accuracy determinations for TRU waste determinations and for Activity Determinations.

To address these concerns, CCP representatives prepared the following freeze file changes to CCP-AK-ANLE-502:

1. Move the AK accuracy report discussions from 4.1 to 4.0. The text begins with "An annual AK Accuracy Report…) and continues to the end of 4.1.
2. In the AK accuracy discussion, currently the 1st paragraph on page 12 beginning, "The radiological characterization…" Add as a new 2nd sentence "The process used to compile the AK information used as input data in the model (fuel characteristics and operating history), was evaluated by comparing this same type of information with mass spectrometry results on a specific set of fuel pins."

3. Add as a new paragraph (between "These two evaluations…." and "Consequently…"

   "Argonne had developed radiological information for containers in this waste stream primarily for the purposes of estimating the fissile content of individual waste containers to comply with accountability requirements and to comply with the maximum allowable fissile content of TH TRU drums. The Argonne methodology did not produce results adequate for the purposes of WIPP certification. For this reason, it is not appropriate to compare the Argonne estimates to the results of the CCP radiological characterization activities for purposes of AK accuracy evaluations."

4. Same section, in the paragraph "DQO for TRU Waste Determination." Add as new 3rd sentence, "The process used to compile the AK information used as input data in the model (fuel characteristics and operating history), was evaluated by comparing this same type of information with mass spectrometry results on a specific set of fuel pins." In the current 4th sentence, revise to "…of the reported measurement results as documented in the QA Equivalency report (Reference 4) (nanocuries per gram)…"
5. Same section, in the paragraph "DQO for Activity Determination." Add as new 3rd sentence "The process used to compile the AK information used as input data in the model (fuel characteristics and operating history), was evaluated by comparing this same type of information with mass spectrometry results on a specific set of fuel pins."
6. Same section, "DQO for Physical Form."

Providing a revised CCP-AK-ANLE-502 that reflects these changes is a Tier 2 change. (See Table 1 where this is included as a T2 change.)

The revised CTP also addresses DQOs, including a section on AK QAOs and application of AK Accuracy. The adequacy of DTC with respect to addressing related DQOs is addressed in Section 8.2, as are the QAOs for that method. The DQO for RH waste determination is satisfactory. The QAOs associated with VE at the time of packaging have not been evaluated, because CCP has not yet implemented this process and EPA has not evaluated this method for RH waste at CCP ANLE.

The specific relevancy of the LANL mass spectrometry data to the ANLE pins and overall characterization process was discussed with CCP representatives, because CCP-AK-ANLE-502 states that there are "no significant discrepancies between the AK information used in the modeling and the qualification of that AK (modeling and sampling)." CCP representatives stated that the "AK information used in the modeling" is the ANLE fuel pin data assembled and evaluated by Mr. Jene Vance. CCP also indicated that "qualification of that AK" refers to the qualification of fuel pin data (ANLE included) through a demonstration that fuel pin data (LANL) used in ORIGEN2.2 can be validated using mass spectrometry data for those same fuel pins. CCP representatives clarified that the LANL mass spectrometry data are only relevant in that the overall use of ORIGEN2.2 and related codes using fuel pin data were validated by the comparison of the fuel pin data with mass spectrometry data for the same fuel pins. The ANLE fuel pins are not "the same" as LANL or INL fuel pins; ANLE is predominantly RERTR and light water reactor related, while INL/LANL fuel pins are predominantly breeder reactor (e.g., EBR-II) pins. Therefore, the isotopic composition of the two is expected to be somewhat different, as evidenced by the development of different scaling factors for the ANLE and INL

waste streams. While LANL mass spectrometry data helped show the need for (and ways to create) adjustment factors, the LANL data are not direct inputs to ANLE specific adjustment factors. CCP representatives indicated that the intent of the demonstration was to show that because the same process was used to assemble and assess ANLE and INL pin data, the overall process has been demonstrated to be satisfactory. This clarification was helpful, but CCP should provide documentation of the pin assembly and review process prior to calculating package development [see Item (5), above].

(9) Content and technical adequacy of the Characterization Reconciliation Report was evaluated.

The content of CCP-TP-506, Revision 1, *CCP Preparation of the Remote-Handled Transuranic Waste Acceptable Knowledge Characterization Reconciliation Report*, was evaluated to determine whether this document reflected the assembly of information required in the WCPIP. The content of the Characterization Reconciliation Report (CRR) was examined to see whether this report reflected requirements of CCP-TP-506, to ensure that the CRR addressed requirement elements. The CRR Report was evaluated to determine the completeness and adequacy of its contents as required in the WCPIP, including but not limited to:

- Specification of applicable site and waste stream
- A listing of each DQO
- Data from the AK record that addresses each DQO
- AK source document references that support/provide the data
- A listing of AK record discrepancy resolutions, if any, that are relevant to each DQO
- Documentation, including specific references, of how the AK data for each DQO were qualified, such as batch data reports, corroborative data, proceedings of a peer review, etc.
- Radiography and/or visual examination summary to document that liquids greater than 1 percent are absent from the waste and to confirm AK concerning the physical properties of the waste
- A summary presentation of radiological measurement data used to meet the DQOs and to confirm AK
- A complete AK summary
- A complete listing of all container identification numbers used to generate the WSPF, cross-referenced to each batch data report
- A listing of AK discrepancies generated by an AK qualification process and the corresponding resolutions
- Signature of the SPM

The example examined included all of the above requirements when examined as a whole. The CRR DQO worksheet (Attachment 3 of CCP-TP-506) should include the 10 WIPP-tracked radionuclides as part of the DQO assessment process, because this is a DQO as supported by EPA's CRA review. Site representatives recognized this, and indicated that the CRR will be

revised when the revised WCPIP is in place. EPA's rule and CRA determinations have indicated that the 10 WIPP-tracked radionuclides presented in the CRA have specified quantities that serve as de facto repository limits. Therefore, these radionuclides should be included in the DQO analysis. Providing a revised CRR that includes the 10 WIPP-tracked radionuclides is a Tier 2 change. (See Table 1 where this is included as a T2 change.)

(10) Use of a Correlation and Surrogate Summary Form was evaluated.

Completion of a Correlation and Surrogate Summary form is required when AK information from a related CH waste stream is used in the RH waste characterization process. CCP representative indicated that CH data was not used in this manner. However, a Correlation and Surrogate Summary form was completed to support the correlation of LANL mass spectrometry data to ANL data for subsequent use in AK qualification. The form states:

> *Information and records retrieved from LANL were used not only in the radiological characterization of LANL's RH TRU waste, but also in the demonstration of the adequacy of the ANL-E input information and the overall modeling approach. A comparison between sampling data and ORIGEN 2.2 modeling at LANL demonstrated that the modeling approach used for ANL-E is a sound approach for determining scaling factors for use in characterizing the RH TRU debris waste stream…*

The use of a correlation and surrogate summary for this purpose is satisfactory, noting that it should reference detailed reports, memos, or other data sources that support the issue. See Item (5), above, for an evaluation of ANL-E input data traceability, data adequacy and the overall modeling approach.

(11) Personnel training was evaluated.

Training records for Kevin Peters (AKE), Steve Schaffer (AKE), Lisa Price (AKE), Larry Porter (SPM), Michael Walantine (SPQAO), and Jene Vance (SME/DTC) were evaluated during the INL inspection, with respect to: (1) training to the RH TRU WCPIP, (2) non conformance and corrective action processes, (3) the AK procedure presented in Attachment A of the WCPIP, (4) site specific training relative to the contents of the subject waste stream(s) and (5) determination of radiological contents of individual drums. Each person demonstrated training in the first four areas.

With respect to determination of radiological contents of each drum, the resumes of Jene Vance, Kevin Peters, and Steve Schafer were examined. Jene Vance's expertise had been examined at INL (see Docket No: A-98-49, II-A4-69) because he assembled and assessed INL and ANLE AK data that were used to derive scaling factors that were used in conjunction with DTC to determine radionuclide content. Although Mr. Vance did not show direct training with respect to this area, his resume showed sufficient expertise. Mr. Peters' and Mr. Shafer's resumes showed experience in the assembly and evaluation of AK data, including radiological information. It is expected that individuals associated with AK data assembly and interpretation, including SMEs, will have read all RH AK summaries and other summaries relevant to the waste stream being audited, and will have demonstrated experience or expertise in the assembly and interpretation of AK radiological, physical, and other data.

(12) The use of LANL mass spectrometry information was examined with respect to relevance to ANLE waste.

CCP has proposed the use of mass spectrometry data obtained from LANL to verify ORIGEN2.2 code results. The ANLE pins and resulting waste were contaminated from destructive examination of fuel pins from different reactors than the INL/LANL pins. Therefore, the mass spectrometry data are useful only in validating the use of ORIGEN2.2, and the mass spec data were not collected from pins common with the ANLE pins. CCP representatives indicated that they did not intend to demonstrate this relationship; instead, CCP intended to demonstrate the commonality of the type of data, data assembly/interpretation process, and relevant calculations between INL and ANLE to show that the same process used to calculate INL scaling factors can be used for ANLE waste. Therefore, traceability of LANL Mass Spectrometry data to the specific pins used to determine ANLE scaling factors is apparently not required for this particular waste stream. See Item (8), above, for additional analysis of fuel pin data, and Item (5) for the ANLE Pin Data traceability analysis.

(13) NCRs and Discrepancy Resolution Forms were examined.

CCP personnel provided the following: NCR-RHANL-0002-06, Revision 0, NCR dealing with waste can nos. 292 (Drum 00825), 257, and 260 (Drum 00829), dated July 12, 2006; Discrepancy Resolution (DR) DR013, Discrepancy Resolution Form Regarding the Argonne Waste Population of 44 drums versus 45 drums, S. Schafer, August 28, 2006; DR11; and, DR10. DR11 concerns waste requisition and video discrepancies, while DR10 concerns a discrepancy regarding the volume of a 7-gallon waste can. Based on this information, it appears that CCP can adequately prepare NCRs and DRs to document nonconforming items or containers, as well as the types of discrepancies presented for review. EPA was not provided a specific example of an AK-AK discrepancy resolution involving radiological composition of waste, even though CCP representatives indicated that drum/lot AK data had been assessed and was not called upon to provide absolute or even qualitative data on a drum or lot basis. CCP did propose, however, to include this analysis as a "freeze file" change to CCP-AK-ANLE-500 (see Item (3), above). AK-AK discrepancies should be included in the AK record, particularly if AK data are found to be insufficient.

(14) A Waste Stream Profile Form was examined.

An example Waste Stream Profile Form was examined for Waste Stream Number ANL-AERHDM. The form included required line items as presented in the WCPIP, Attachment 4; the CRR and RH AK Summary are also required for submission to CBFO to allow assessment of the waste stream profile form (WSPF). It is understood that this form is abbreviated because it was provided for audit purposes only, and it is expected that the completed form will include more AK data, checklists, etc. to better present the required information. See comments on the CRR and AK Summary for additional information. Providing the actual, completed WSPF and all related attachments to EPA is a Tier 2 change. (See Table 1 where this is included as a T2 change.)

(15) AK Accuracy was assessed.

The WCPIP requires AK accuracy be assessed in three areas: reassignment of the waste to a different Summary Category Group; reassignment of the waste to a different waste stream; and stream-specific assessment of radiological parameter accuracy. The AK Accuracy Report does not call for comparison of AK drum-specific radiological data as a measure of AK accuracy for TRU waste determination or radiological component/activity determination. CCP revised the AK summary to justify this exclusion, as CCP believes that the per-drum radiological AK data calculated by ANLE is inadequate and therefore cannot be used for comparison purposes. See Item (3), above, for EPA analysis of this conclusion. EPA initiated an EPA Inspection Issue Tracking Form for the concern discussed below (see Attachment B.4 for a copy of this form):

EPA Concern No. EPA-ANL-RH-CCP-AK-06-003C:
Section 4.1.1.2 of the WCPIP states the following: "The percentage of waste containers which require reassignment to a new SCG or new waste stream …will be reported as a measure of AK Accuracy". The AK Accuracy Report dated August 28, 2006, reports SCG accuracy, but not waste stream accuracy.

Resolution: This concern did not require an immediate response, noting that the AK accuracy document would be among those documents expected to require revising when the latest revision of the WCPIP is approved. EPA's concern stated that revising the AK Accuracy Report to address the above requirements may be completed when other revisions are in process, e.g., addition of the 10 WIPP-tracked radionuclides as a DQO.

Status of Concern: EPA considers this concern closed. Providing the revised AK accuracy memo to EPA is a Tier 2 change. (See Table 1 where this is included as a T2 change.)

(16) Load Management was assessed.

The possibility that containers may exhibit less than 100 nCi/g TRU was evaluated. AK data presented in U332 and summarized in C349 indicated that three of the 45 containers had AK-assigned TRU concentrations of less than 100 nCi/g based on ^{239}Pu, noting that none of these containers had assigned ^{241}Am, ^{238}Pu, ^{240}Pu, ^{241}Pu and ^{242}Pu values so the assigned value of 100nCi/g is likely to be too low. CCP representatives also indicated that based on the application of the scaling factors developed for this waste stream, a container with a measured one-meter dose rate of 3.8 mR/hr results in a TRU Alpha Concentration of 101 nCi/g, and containers with measured dose rates below this would be considered non-TRU and would be segregated for shipment in a different waste stream. The EPA inspection team verified this calculation using the spreadsheet shown in Section 8.2 and the input one-meter dose rate of 3.8 mR/hr.

The average reported contact dose rate in the AK record for each of the 45 containers is over 17 rem/hr with a range of 0.58 to 180 R/hr. The CTP states, "In the rare event that a waste container might be 200mRem/hr at its surface (and as such, RH waste), but less than 200 mRem/hr at the surface when three such containers are loaded into an RH-72B canister, the canister will still be considered RH waste as defined in the LWA." EPA expects that every container emplaced in the RH 72B canister will exhibit a contact external exposure rate (dose rate) equal to or greater than 200 mRem/hr prior to loading. If a container measures less than

this value, INL-CCP will consider the container to be that of contact-handled waste and will remove it from the RH waste stream. The implementation of load management for RH waste by CCP-INL is a Tier 1 change. (See Table 1 where this is included as a T1 change.)

(17) AK Qualification Method identification for each DQO was assessed.

CCP representatives indicated that the "qualification" method for all DQOs except for RH waste determination will be met through application of characterization methods to check AK. CCP indicates that confirmatory testing will be used for each DQO, but also implies that establishment of an equivalent QA program may be used to qualify the mass spectrometry data that are required to check ORIGEN2.2 runs.

EPA differentiates between the processes of *characterization/confirmation* and *qualification*, the later being wholly a QA function and beyond the purview of this EPA inspection. EPA's term *characterization* does not modify the process proposed by CCP, but is a distinct language difference in that EPA's characterization program does not perform QA data qualification. Rather, EPA examines the collection process whereby characterization data used to verify the AK data for relevant DQOs are assembled. Regardless, EPA notes that CCP has committed to verifying AK for each DQO. Verification includes the technical evaluation of confirmation methodologies, the results of the peer review process, and corroborating data, noting that corroborating data is not an allowed methodology in the version of the WCPIP in place at the time of the ANLE inspection.

(18) Attainment of DQOs through AK verification was evaluated.

As a result of the analysis presented in items (1) through (17), above, EPA was able to assess how each DQO will be addressed. The following DQOs must be addressed as per the WCPIP:

- Defense determination
- TRU waste determination
- RH waste determination
- Activity determination (TRU Alpha Activity per canister, including quantification and identification of 10 EPA radionuclides)
- Residual Liquids
- Physical Form, including metals and CPR

All of these DQOs, except for RH waste and defense determination, are based on acceptable knowledge that is confirmed through various WCPIP-allowed techniques or variants on those techniques. RH status is determined through direct dose rate measurement. DOE is responsible for making a defense determination as discussed in the AK documentation, and cannot be qualified or otherwise verified through confirmatory sampling, etc. The use of AK to determine all DQOs, with accompanying confirmation or other verification of AK data that EPA evaluated during this inspection, is acceptable to EPA and comports with the fundamental intent of the WCPIP.

Summary of AK Findings and Concerns

The EPA inspection team identified the concerns related to AK that are discussed above. Copies of the EPA Inspection Issue Tracking Forms are provided in Attachments B.4 through B.7. EPA considers all findings and concerns to have been adequately addressed, and there are no open finding or concerns related to AK resulting from this inspection.

Proposed Baseline Approval

EPA is proposing the approval of the AK process evaluated during this baseline inspection. Specifically, the proposed approval is limited to one (1) ANL RH retrievably-stored debris waste stream, AERHMD, consistent with the limitations described in CCP-AK-ANLE-500, Revision 3.

Proposed AK Tiers

Based on the inspection and the results discussed above, EPA proposes to assign the following tiers:

T1 AK changes that will require EPA review and approval prior to implementation and apply to any new waste category not evaluated during the baseline inspection include the following:

- Waste streams not approved under this baseline (e.g., soils)
- Addition of containers to the approximately 45 retrievably-stored containers. The 20 *additional* containers identified in the AK Summary as being present are not included in this waste stream approval.
- Implementation of load management
- Any change(s) to the following documents that have the potential to affect the characterization process: CCP-AK-ANLE-500, Revision 1; CCP-AK-ANLE-501, Revision 0; or CCP-AK-ANLE-502, Revision 0

T1 changes will be reported and documentation will be submitted when ANL-CCP is ready for EPA review. Upon initial review, EPA will inform ANL-CCP and CBFO whether a site inspection is necessary. EPA may request additional information, choose to conduct a desktop review, and/or confer with CBFO and ANL-CCP personnel. Upon AK evaluation with or without site inspection, EPA will issue a decision. Only upon receiving EPA written approval may ANL-CCP dispose of the new waste at the WIPP.

T2 AK changes that do not require EPA approval prior to implementation but require reporting and submitting documentation to EPA discussing changes include the following:

- Changes made to AK documents as a result of WCPIP revisions
- Complete waste stream data package for this waste stream once completed, and any modifications to that WSPF including the CRR and AK Summary. This includes modification of CCP-AK-ANLE-500 to address referencing, the freeze file changes discussed above, and other issues.

- AK accuracy reports, prepared annually at a minimum
- Changes to CCP-AK-ANLE-501 and 502, including changes with respect to referencing and the freeze file modifications discussed above
- Reference document discussing the ANLE Pin data review process up to calculation package preparation
- DTC results for all containers assayed in this waste stream for the purpose of conducting a comparison of DTC-derived and with AK-assigned values

Every three months following EPA approval, ANL-CCP will provide EPA with information concerning T2 changes. EPA will evaluate these changes and communicate with ANL-CCP as to whether the changes raise any concerns and require an ANL-CCP response, or whether ANL-CCP can continue to implement the changes.

8.2 Radiological Characterization

EPA inspected the method by which the required radiological constituents for each waste container were determined. The nature of RH TRU wastes presents considerable difficulty with respect to obtaining meaningful measurement data. Apart from the obvious ALARA considerations associated with external radiation fields in excess of 200 mrem/hr, RH TRU waste containers typically contain concentrations of ^{137}Cs that prevent a meaningful isotopic determination in the same manner as is done for CH TRU wastes. At this time ANL-CCP has not proposed to assay RH containers for radiological contents. An alternative approach is the use of a scaling factor, which allows the correlation of an easily measurable gamma emitter such as ^{137}Cs with difficult-to-measure actinides and TRU radionuclides. This is the essence of ANL-CCP's approach to radiological characterization. This method is a complex process and the inspection focused primarily on the following two aspects:

- The application of the Dose-to-Curie (DTC) technique to determine a container's external gamma exposure rate[4] (dose rate) by correlating the measured dose rate to an activity concentration for ^{137}Cs
- Using scaling factors to convert the derived ^{137}Cs activity to activity values for the other 9 of the 10 WIPP-tracked radionuclides, including the uncertainty for each

This section provides an overview of the ANL RH radiological characterization process and discusses EPA's evaluation of the adequacy of ANL-CCP's radiological characterization program. The checklist in Attachment A.2 identifies the objective evidence that was examined and used to complete the technical assessment for the DTC aspect. Evaluation of the scaling factors was not amenable to a checklist, and this aspect is discussed in the text directly.

[4] The external exposure rate is a numerical value expressed in units of rem per unit time (typically mrem/hr) that includes the contributions of all radiations, i.e., neutron, gamma, beta and alpha. The formal determination of a container's RH status is documented in mmem/hr but for the DTC procedure only a photon (gamma) determination is performed and this is referred to informally as a *dose rate*. For consistency the term *dose rate* is used throughout this report.

8.2.1 Overview of ANL Radiological Characterization Program

The radiological characterization aspect of the ANL RH WC program that EPA evaluated focused on techniques to characterize containers from a single RH TRU waste stream, AERHDM. This waste stream consists of 45 30-gallon drums of debris waste (S5000) that were generated at ANL between February 1993 and February 2002. ANL-CCP estimates that an additional 50 to 100 drums will be generated during the packaging of existing wastes at the AGHCF. Based on the nature of the waste materials and the types and quantities of information available, ANL-CCP chose the approach of developing a WC protocol that, in their opinion, was best suited for characterizing the population of all RH TRU waste containers within ANL waste stream AERHDM. Specifically, a single scaling factor was assigned to fuel pin-related wastes generated from a variety of fuel types, an approach which is essentially the same as that used for RH TRU wastes by INL-CCP. The report for EPA Baseline Inspection No. EPA-INL-CCP-RH-6.06-8 (Docket No: A-98-49, II-A4-69) describes this approach in detail.

The actual measurement aspect, formalized in CCP procedures, consists of four simple external gamma readings of each waste container (the average value is used), all of which are attributed to a single photon emitting radionuclide, ^{137}Cs. From a radiometric perspective, this is a simple task. The complexity of radiological characterization is contained in the development of the DTC approach that transforms each container's measured dose rate into a ^{137}Cs activity value which, in turn, is used in conjunction with scaling factors to produce concentrations for the remaining 9 of the 10 WIPP-tracked radionuclides and their corresponding uncertainties.

CCP generated the scaling factors using the Monte Carlo Neutron-Photon (MCNP5), ORIGEN2.2 and MicroShield computer codes and compared them to isotopic distribution values based on mass spectrometry (MS) data that were generated at LANL. Beginning in the 1970s, destructive analyses were performed on 400 fuel pins at LANL to determine the relative abundances of plutonium and uranium isotopics along with isotopes of neodymium. Neodymium-148 is a fission product that is used to calculate burnup in fuel and is analogous to the fission product ^{137}Cs. ANL-CCP refers to this use of the MS data as *qualifying the ORIGEN2.2 results* with the LANL MS data, and the scaling factors were adjusted as a result of the comparison. In general, MS is an excellent analytical technique, and use of the MS data to adjust the isotopic scaling factors provided the opportunity to verify the results of the application of the ORIGEN2.2 codes. A technical assessment of the LANL MS data used to verify the ORIGEN2.2 codes was performed as part of EPA Baseline Inspection No. EPA-INL-CCP-RH-6.06-8 (Docket No. A-98-49, II-A4-69) at INL in June 2006. Based on this evaluation, EPA determined that the MS data were technically adequate to support CCP's use in verifying the ORIGEN2.2 results. Accordingly, the use of MS data to support the ANL RH WC program is not addressed in this report.

Figure 4 presents a flow chart of the ANL-CCP radiological characterization process given in CCP-AK-ANLE-501, Revision 0. The conceptual basis for the DTC approach and development of the scaling factors is documented in the 23 calculation packages that are listed in Table 10-1 of CCP-AK-ANLE-501, as well as the others listed below.

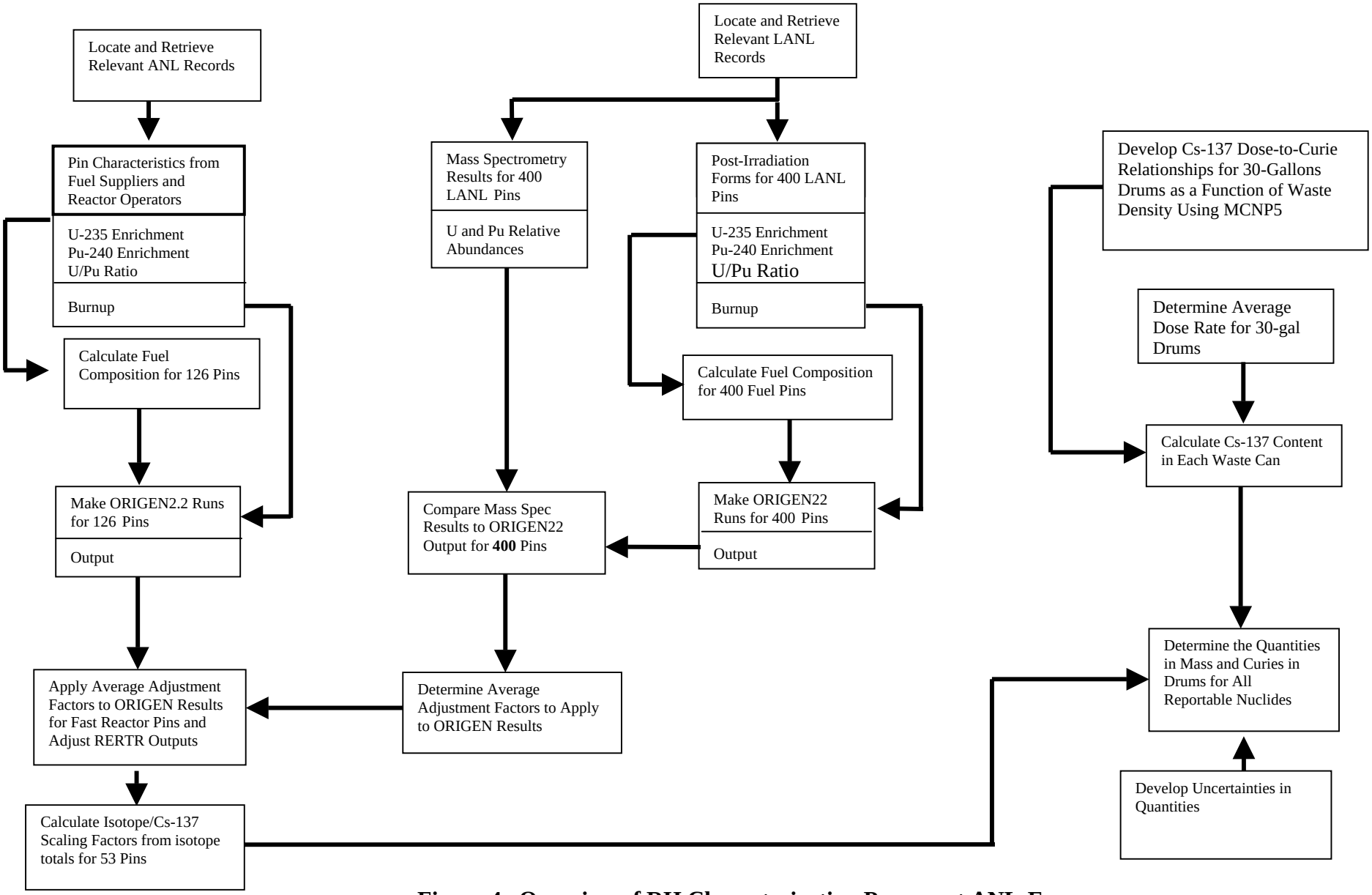

Figure 4. Overview of RH Characterization Process at ANL-E

Documents, Waste Containers, and Batch Data Reports Reviewed

The list of documents provided below includes all documents related to the ANL-CCP RH radiological characterization program that were evaluated to support this inspection:

- CPP-PO-002, CCP Transuranic Waste Certification Plan, Revision 17
- CCP-AK-ANLE-500, Central Characterization Project Acceptable Knowledge Summary Report for Argonne Remote-Handled Debris Waste, Revision 1, July 18, 2006
- CCP-AK-ANL-501, Central Characterization Project Remote-Handled Transuranic Radiological Characterization Technical Report for Remote Handled Transuranic Debris Waste from Argonne National Laboratory-East, Revision 0
- CCP-AK-INL-502 Central Characterization Project, RH TRU Waste Certification Plan for 40 CFR Part 194 Compliance and Confirmation Test Plan for ANL RH Waste Stream: AERHDM, Revision 0
- CCP-TP-504, Dose-to-Curie Survey Procedure for Remote Handled Transuranic Waste, Revision 3
- CCP-TP-506, CCP Preparation of the Remote-Handled Transuranic Waste Acceptable Knowledge Characterization Reconciliation Report, Revision 2
- DTC BDR No. ANLRHDTC06001
- Calculation Package Supporting Scaling Factor Derivation: ANLE-RH-01, Fuel Information Input Check, Revision 1
- Calculation Package Supporting Scaling Factor Derivation: INL-RH-02, Scaling Factor Development
- Calculation Package Supporting Scaling Factor Derivation: INL-RH-03, Dose-to-Curie Derivations for Cs-137 in 30 gallon Drums
- Calculation Package Supporting Scaling Factor Derivation: ANLE-RH-03, Modification of ORIGEN2.2 INPUT files for Specific Fuel Pins
- Calculation Package Supporting Scaling Factor Derivation: ANLE-RH-04, Scaling Factor Development
- Calculation Package Supporting Scaling Factor Derivation: ANLE-RH-05, Dose-to-Curie and Related Calculations for Drum Characterization, Revision 1
- Calculation Package Supporting Scaling Factor Derivation: ANLE-RH-06, Uncertainty Analysis for Drums
- Calculation Package Supporting Scaling Factor Derivation: INL-RH-06, DTC Spreadsheet for Drum Characterization
- Calculation Package Supporting Scaling Factor Derivation: ANLE-RH-07, Determination of Isotopes To Be Reported per WIPP WAC

- Calculation Package Supporting Scaling Factor Derivation: LANL-RH-08, Microshield 7.00 Verification

8.2.2 Radiological Characterization Element: Dose-To-Curie Procedure

DTC Overview

ANL-CCP's approach was based on translating the measurable external gamma radiation from ^{137}Cs into an activity value using the MCNP5 code, as documented in INL-RH-03. All of the gamma radiation measured from each drum of RH waste was attributed to ^{137}Cs, as discussed in LANL-RH-10, INL-RH-09, and INL-RH-08. This includes contributions from ^{60}Co and other gamma-emitting members of the ^{232}U decay series, e.g., ^{228}Ac and ^{208}Tl. Once the container's *measured* gamma dose rate was converted into a ^{137}Cs activity, activities for the other nine WIPP-tracked radionuclides were scaled to the ^{137}Cs activity using a single set of scaling factors that were applied to all waste containers within the waste stream AERHDM. An example calculation using the observed dose rate in the DTC procedure is presented in Section 8.2.3 along with a discussion of the development of radionuclide scaling factors.

ANL-CCP formalized the ^{137}Cs measurement in the DTC procedure, CCP-TP-504, *Dose-to-Curie Survey Procedure for Remote Handled Transuranic Waste,* Revision 3. This procedure was evaluated prior to and during the inspection. The DTC process was evaluated relative to the following:

- Capability of the DTC hardware to adequately determine a container's external gamma exposure (dose) rate
- Technical adequacy of the radiological characterization program's documents, procedures, and controls
- Knowledge and understanding of the personnel involved in the radiological characterization program

The external dose rate determination was done empirically using measurements that took place at ANL outside in the Area 398 Yard. This area was configured specifically for the purpose of performing the DTC measurements and it is shown schematically in Figure 5. The EPA inspection team did observe the DTC procedure, but had to do this from a considerable distance due to the area's safety requirements. The measurement assembly was inspected in detail prior to the measurements, but all non-essential personnel had to evacuate before the top of the RH cask was opened. ANL-CCP personnel did provide photographs of the process. The conceptual basis for the DTC approach is explained in CCP-AK-INL-501, Revision 1 and is formalized in procedure form in CCP-TP-504, Revision 3, both of which were reviewed for this inspection. The requirements of these two documents were used to formulate a basis by which the EPA inspection team evaluated the DTC process. Additionally, several of the calculation packages listed in Section 8.2.1 supported technical aspects of the DTC approach.

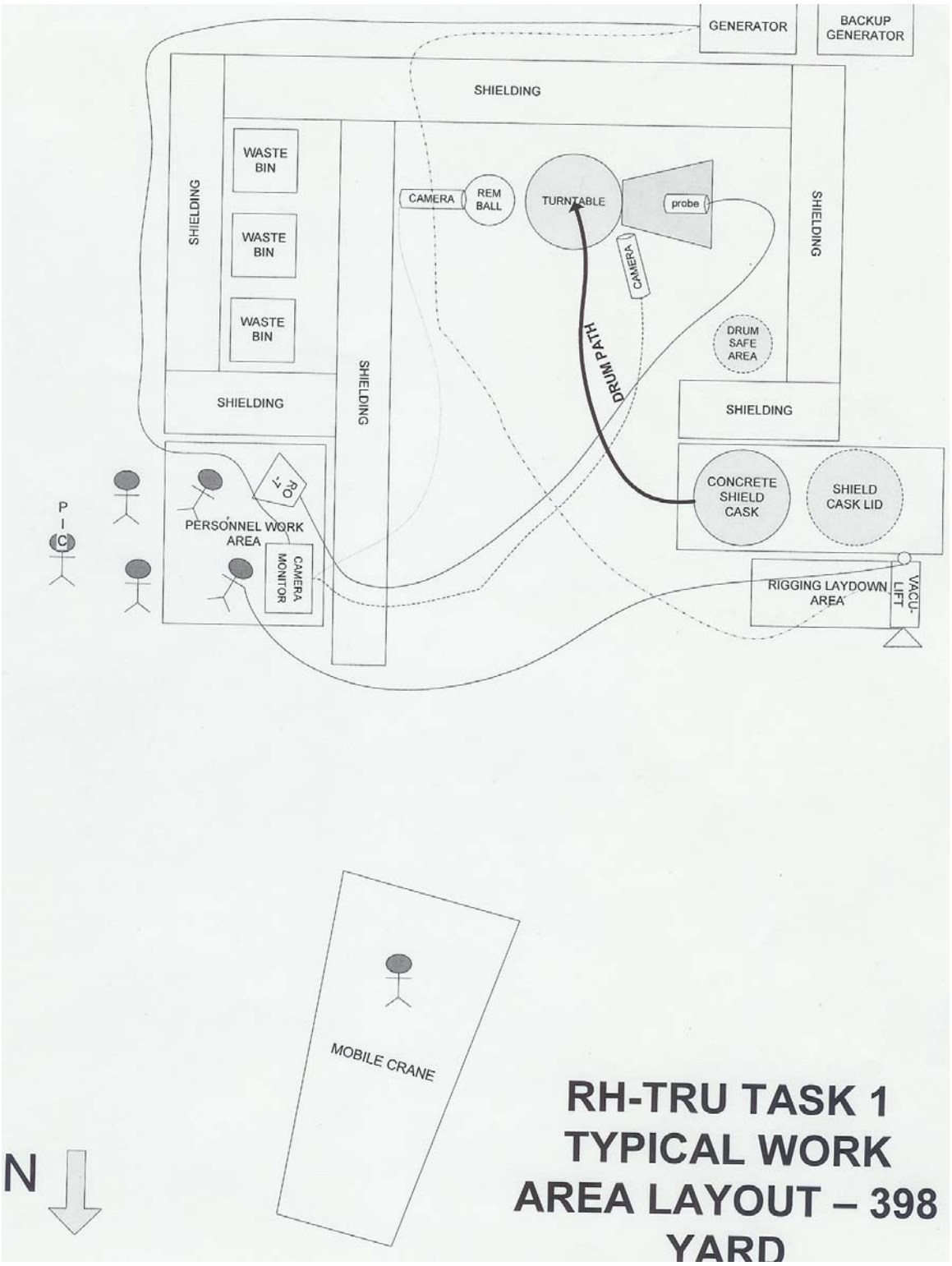

Figure 5. ANL DTC Measurement Facility

DTC Technical Evaluation

The EPA inspection team evaluated the following aspects:

(1) Instrumentation for making dose rate measurements

The EPA inspection team verified the following:

- There are two RO-7 Ion Chambers, SN 002003 and 002008. Each instrument had three (3) different probes: RO-7LD with a full-scale range of 1,999 mR/hr and a resolution of 1 mR/hr (Low Range); RO-7BM, with a full-scale range of 199,900 mR/hr and a resolution of 100 mR/hr (Medium Range); and RO-7BH with a full-scale range of 199,900,000 mR/hr and a resolution of 10,000 mR/hr (High Range). Calibrations of the ion chambers and probes are independent, allowing any probe and ion chamber combination as long as each was calibrated.
- Both RO-7 Ion Chambers and all six (6) probes had current calibrations as follows: RO-7 SN 002003, LD SN 727004, BM SN 726921 and BH SN 726656 were calibrated on February 28, 2006; and RO-7 SN 002008, LD SN 727010, BM SN 726938 and BH SN 726657 were calibrated on May 24,-2006.
- Both instruments had 60-ft cables that were used to measure the dose rate of containers for the DTC method and there was a spare 60-ft cable (SN 302582) in the equipment trailer on-site. The cable length is important since the probes provide an analog signal to the ion chamber, which in turn functions as an analog-to-digital converter (ADC).
- It was verified that the scale used to weigh the containers has been calibrated and that the scale has been checked daily.
- The battery and performance checks for the RO-7 used to measure the dose rate of containers for the DTC method had been performed and documented at least once per day prior to the first measurement of the shift.
- The background rate of 1 mR/hr was measured and recorded. Measurement personnel stated that they would take actions to reduce the background if the measured background radiation levels are greater than one-tenth of the expected container dose or exposure rate, as required by the WC PIP and CCP-TP-504, Revision 2.

(2) Execution of the dose rate measurements at ANL on September 14, 2006.

The EPA inspection team verified the following:

- For the waste containers observed (Drum No. 00829), the dose rate was measured four times, each at a distance of 1 meter and the container was rotated on the turntable 90° between each measurement, yielding readings of 160 mR/hr, 270 mR/hr, 250 mR/hr, and 185 mR/hr.

- The ANL-CCP personnel were working to the approved document, CCP-TP-504, Revision 2, and all measurements were taken at the center line of the drum's height and were lined up to the center height of the active volume of the ion chamber probe.
- The appropriate range probe for the ion chamber was used, i.e., Low Dose Probe SN 727010 with Ion Chamber SN 002008.
- The container number and measurement data were entered into the "Waste Container Dose-to-Curie Conversion Record" spreadsheet. Information entered included:

    - Date of the gamma measurements with the RO-7 Ion Chamber and Probe SN – September 14, 2006, Ion Chamber SN 002008 and Low Dose Probe SN 727010
    - Container Number – 00829
    - Expected Dose Rate – 800 mR/hr
    - Container Gross Weight – 60.8 kg
    - Four quadrant dose rate measurements – 160, 270, 250 and 185 mR/hr
    - Background Dose Rate – 1 mR/hr

(3) DTC BDR

The EPA inspection team verified DTC BDR No. ANLRHDTC06001 included the following:

- SPM Checklist, Attachment 8
- BDR Cover Sheet, Attachment 4
- DR Table of Contents, Attachment 5
- BDR Narrative Summary, Attachment 6
- ITR Review Checklist, Attachment 7
- Measurement Control Report, Attachment 1
- Container Data Sheets for seven (7) containers, Attachment 2
- Waste Container DTC Conversion Records for seven (7) containers, Attachment 3
- Evidence of signatures by the ITR on Attachment 7 and a SPM on Attachment 8
- Type of waste in each container on Attachment 3, all organic
- Fill height of each container on Attachment 3, all 90% full
- Estimated Can Size for each container on Attachment 3, all 7-gallon containers

(4) Meeting quality assurance objectives (QAOs)

The EPA inspection team verified that:

- Precision had been established and maintained within the manufacturer's specifications for the RO-7 Ion Chamber by successful source checks made prior to obtaining dose rate measurements on actual waste containers.
- Accuracy had been established and maintained by operating the instrument within the manufacturer's recommendations.
- Representativeness had been maintained by applying the dose rate measurement to the entire waste container.

- Completeness had been achieved by measuring the dose rate for every container in the BDR, i.e., one hundred percent assay.
- Comparability had been achieved by using standardized instructions to design and implement the DTC protocol, including the dose rate measurements.

(5) RH TRU Determination

It was not entirely clear at what point the formal determination regarding a waste container's status would be made relative to the criteria for RH TRU. The EPA inspection team evaluated the two following aspects:

- RH TRU containers must have a contact external dose equivalent rate in excess of 200 mrem/hr: The DTC measurements that were observed and are discussed in this section represent only the photon (gamma) contribution to a container's external radiation field. There was a neutron-sensitive instrument (Rem Ball) in the same area as the RO-7 that could be used to provide the necessary information to support a complete determination regarding a waste container's status relative to the 200 mrem/hr criterion. ANL-CCP personnel stated that the Rem Ball was used to measure each waste container but the results were used primarily for health physics/ALARA purposes. However, the RH determination based on the external dose rate is typically made on the basis of the transportation package and is therefore not within the purview of this inspection.
- RH TRU containers must have a concentration of TRU radionuclides greater than 100 nCi/g: CCP-TP-504 requires the container's dose rate to be at least a factor of ten greater than background, and the lowest reading possible on the RO-7 with the low dose probe is 1 mR/hr. This means that the minimum dose rate that can be measured at one meter is 10 mR/hr. Additionally, based on the factor of 20 difference between the contact and one meter readings[5], a container would have to read at least 10 mR/hr at 1 meter to qualify as RH, i.e., have a contact reading greater than 200 mR/hr. The EPA inspection team wanted to verify that it was possible to ensure that a container at a boundary condition, i.e., with a 1-meter dose rate of 10 mR/hr, did in fact contain greater than 100 nCi/g of TRU radionuclides. As a check, the spreadsheet shown in Figure 6 was used with input values for a hypothetical 1-meter dose rate of 10 mR/hr. For this case, the spreadsheet yields a TRU Alpha Concentration of approximately 184 nCi/g which meets the greater-than-100 nCi/g criterion for TRU waste. For comparison, the data for ANL waste container No.00820 that has an average 1-meter dose rate of 230.25 mR/hr are shown in Figure 7. Its calculated TRU Alpha Concentration of 8,660 nCi/g is discussed in greater detail in Section 8.2.3 (see Table 9).

The EPA inspection team did not have any technical concerns or issues with the execution of the DTC methodology observed at ANL-CCP during this inspection, or with the method's technical basis and documentation based on the objective evidence that was reviewed.

[5] The strength of the gamma intensity decreases as the square of the distance such that when the distance increases by a factor of two the gamma intensity decreases by a factor of four, i.e., two squared. This means that the container's contact dose reading is approximately 20 times greater than the reading at a distance of one-meter.

	A	B	C	D	E	F	G	H	
8				CCP-TP-504	Rev. 2				
9	Operating Procedure			6/1/2006					
10	Date of Survey			AERHDM					
11	Waste Stream Designation								
12	Container Number			70	Kg				
13	Container Gross Weight		Can #1	Can #2	Can #3				
14	Waste Cans		7	7	0	gallons			
15	Can Sizes		100	100	78.5	%			
16	Estimate Fill Percentages			46.5	Kg				
17	Container Net Weight								
18	Measured Container Dose Rate								
19	Quadrant #1			10	mR/hr				
20	Quadrant #2			10	mR/hr				
21	Quadrant #3			10	mR/hr				
22	Quadrant #4			10	mR/hr				
	Calculated Average Dose Rate			10	mR/hr				
	Waste Material Type			Organic		(organic, steel, cement)			

Figure 6. EXCEL™ (Version 2002, Release 10), DTC Spreadsheet Version 1.0 051006, Using Boundary Condition of a 1-Meter Reading of 10 mR/hr

	A	B	C	D	E	F	G	H	
8				CCP-TP-504	Rev. 3				
9	Operating Procedure			8/9/2006					
10	Date of Survey			AERHDM					
11	Waste Stream Designation			00820					
12	Container Number			41.6	kg				
13	Container Gross Weight		Can #1	Can #2	Can #3				
14	Waste Cans		7	7		gallons			
15	Can Sizes		90	90		%			
16	Estimate Fill Percentages			18.1	Kg				
17	Container Net Weight								
18	Measured Container Dose Rate								
19	Quadrant #1			214	mR/hr				
20	Quadrant #2			238	mR/hr				
21	Quadrant #3			252	mR/hr				
22	Quadrant #4			217	mR/hr				
	Calculated Average Dose Rate			230.25	mR/hr				
	Waste Material Type			Organic					

Figure 7. EXCEL™ (Version 2002, Release 10), DTC Spreadsheet Version 2.0 080406, Using Actual Data from Container No. 00820, Waste Stream AERHDM, Assayed August 10, 2006

8.2.3 Radiological Characterization Element: Scaling Factor Development

Scaling Factor Overview

As shown in the nine calculation packages listed in Section 8.2.1, this was a complex task that incorporated information from ANL-E, ANL-W, INL and LANL, including the following:

- Fuel pin type and characteristics from fuel suppliers and reactor operators
- ^{235}U enrichment
- ^{240}Pu enrichment (for mixed oxide fuels) and burnup
- Uranium/plutonium ratios (for mixed oxide fuels)
- Examination of 603 fuel pins at ANL
- Mass spectrometry results for destructive assay (DA) of 400 fuel pins
- Other records related to AGHCF activities, names of experimenters, etc.

The scaling factors were incorporated in a drum characterization spreadsheet that required the following input:

- Drum gross weight in kilograms (kg)
- Identification of the can sizes (5-, 7- or 10-gallon) and number of cans in the drum
- Estimates of the can fill heights in percent
- Dose rate measurements at four quadrant points in mR/hr

The drum's gross weight is calculated as:

Gross drum weight – (drum weight + packaging materials + can weights) **(1)**

The weight values used for the various drum items are listed in Table 5.

Table 5. Weights of Items Used to Calculate Waste Weight and Density

Waste Items	Weight, kg
30-gallon drum	16.36
Polyethylene liner	3.61
Plastic pouch	1.73
Cardboard sleeve	1.41
Plastic lid	0.39
Total minus cans	23.5
7-gallon drum	2.84
5-gallon drum	2.26
10-gallon drum	3.42

The container's apparent weight density in g/cm^3 is calculated as:

Net Waste Weight / (can #1 $\%H_{fill}$ + can #2 $\%H_{fill}$ + can #3 $\%H_{fill}$) **(2)**

Where the net waste weight is in units of grams and can fill volume is given by

$$C_{size} * \%H_{fill} * 3785\ cm^3/gal \quad \textbf{(3)}$$

Where:

C_{size} = can size in gallons

$\%H_{fill}$ = estimated fill height of each can in percent, expressed as a decimal

The inputs for the spreadsheet are shown in Figures 6 and 7 above for the hypothetical measured 1-meter dose rate of 10mR/hr and the actual measured dose rate of 230.25 mR/hr from Container No. 00820. Each uses a drum configuration of two 7-gallon cans each 90% full, net weights as shown, an organic matrix, and an apparent weight density. In both cases, the drum's ^{137}Cs content is derived as follows:

$$^{137}Cs\ Activity\ in\ Ci = dose\ rate / (11.91 * X^2 - 82.126 * X + 194.64) \quad \textbf{(4)}$$

Where:

X = apparent waste density, g/cm^3

The scaling factors for Container No. 00820 and the hypothetical example using the 10 mR/hr input discussed above are the same. All containers in this waste stream use the same scaling factors and the sample-specific variables are the container's measured dose rate and density. At a hypothetical value of zero density (X = 0), equation (4) becomes essentially a bare-source calculation; at higher densities the effects of the waste's self-shielding are evident. Equation (4) is taken from INL-RH-03 and is based on a total of eight (8) MCNP cases that were generated using a waste material density varying from 0.0 g/cm^3 to 1.4 g/cm^3 in intervals of 0.2 g/cm^3, a range that spans the expected range of waste densities in ANL drums. The results of the eight runs are presented in Table 6, below, and were used to generate a second-order polynomial curve to fit the data, shown in Figure 8. The constants and other values required for these calculations, i.e., Fissile Gram Equivalent (FGE) and Plutonium Equivalent Curies (PE Ci), were taken from the appropriate sources (CH WAC and TRAMPAC) and were checked for accuracy. These were found to be accurate and they are summarized in Table 7.

Determination of the ^{137}Cs activity for a container allows the calculation of the following quantities for each RH container measured:

- Activity in curies (Ci) and mass in grams (g) for each of the other nine WIPP-tracked radionuclides, i.e., ^{241}Am, ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{90}Sr, ^{233}U, ^{234}U, and ^{238}U
- FGE
- PE Ci
- Decay heat in watts
- Associated uncertainty for all values listed in previous bullets

Table 6. MCNP Input –
Observed Dose Rate As a Function of Waste Density

Waste Density	Dose Rate mR/hr
0.0	193.993
0.2	179.322
0.4	164.203
0.6	149.743
0.8	136.207
1.0	124.006
1.2	112.991
1.4	103.45

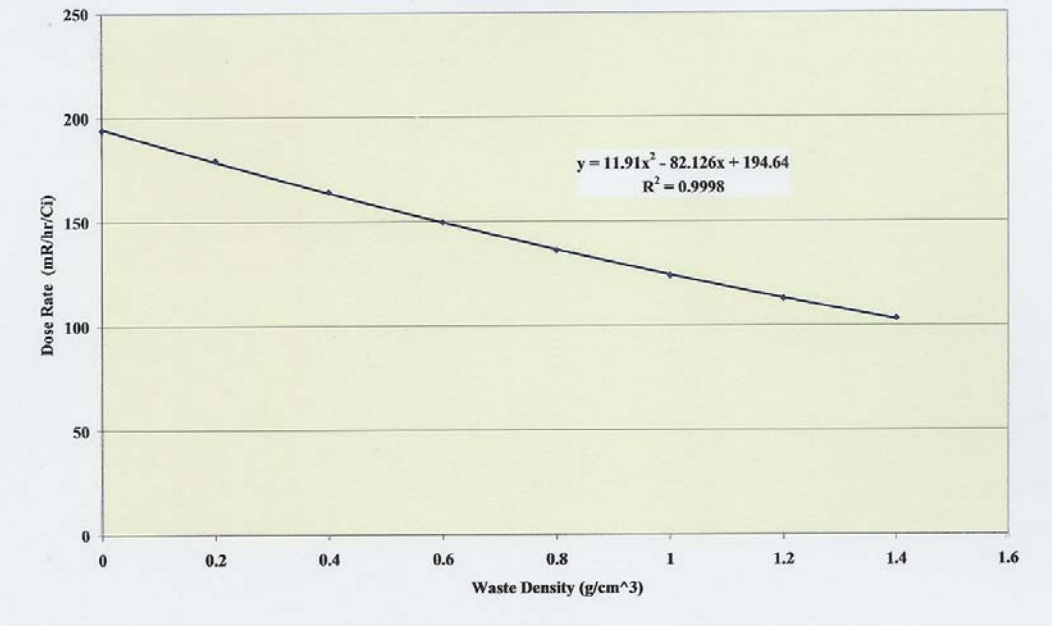

Figure 8. ANL DTC Correlation Dose Rate Versus Waste Density for Cs-137 in 30-gallon Drums

Table 7. Constants Used in Scaling Factor Development

Radionuclide	Specific Activity (Ci/g)	FGE/g	PE-Ci/Ci	Watts/g
U-233	9.76E-03	9.00E-01	3.90	2.84E-04
U-234	6.32E-03	0.00E+00	0.00	1.82E-04
U-235	2.19E-06	6.43E-01	0.00	6.04E-08
U-238	3.40E-07	0.00E+00	0.00	8.62E-09
Pu-238	1.73E+01	1.13E-01	1.10	5.73E-01
Pu-239	6.29E-02	1.00E+00	1.00	1.95E-03
Pu-240	2.30E-01	2.25E-02	1.00	7.16E-03
Pu-241	1.04E+02	2.25E+00	51.00	3.31E-03
Pu-242	3.97E-03	7.50E-03	1.10	1.17E-04
Am-241	3.47E+00	1.87E-02	1.00	1.16E-01
Cs-137	8.80E+01	0.00E+00	0.00	9.74E-02
Ba-137m	5.38E+08	0.00E+00	0.00	2.12E+06
Sr-90	1.38E+02	0.00E+00	0.00	1.60E-01
Y-90	5.44E+05	0.00E+00	0.00	3.01E+03

These values are shown below in Tables 8 and 9 for the hypothetical 10 mR/hr 1-meter dose rate and the observed average dose rate of 230 mR/hr for Container No. 00820, respectively. The reported values listed for radionuclides, FGE, PE Ci and decay heat values plus uncertainties are all produced as a function of the measured dose rates at 1 meter and the application of the scaling factors discussed below. The values in Table 9 are the actual data that ANL reported in BDR No. ANLRHDTC06001, based on the radiological characterization observed during the inspection.

Scaling Factor Technical Evaluation

The technical basis and degree to which the scaling factors are representative of the RH TRU wastes for which ANL-CCP requested approval were evaluated during this inspection. The following elements were evaluated and verified:

(1) Waste stream definition

This inspection focused on a group of wastes that ANL-CCP stated were contained in a single waste stream, which included fuel pins that were dissimilar with respect to their radionuclide content. Specifically, they consisted of three fuel types:

- Uranium, Low Enriched Uranium (LEU) and Highly Enriched Uranium (HEU)
- Uranium and Plutonium
- Thorium

Table 8. Summary of Reportable Values Using Boundary Condition of 10 mR/hr 1-Meter Dose Rate

Radionuclide	Curie Scaling Factors	Activity (Ci)	Mass Grams	FGE	PE-Ci	Watts	Uncertainty %	Uncertainty Curies	Uncertainty Grams
U-233	2.59E-09	1.87E-10	1.92E-08	1.73E-08	4.80E-11	5.45E-12	81.69%	1.53E-10	1.57E-08
U-234	6.48E-05	4.68E-06	7.41E-04	0.00E+00	0.00E+00	1.35E-07	60.71%	2.84E-06	4.50E-04
U-235	1.99E-06	1.43E-07	6.55E-02	4.21E-02	0.00E+00	3.96E-09	65.33%	9.37E-08	4.28E-02
U-238	2.32E-06	1.68E-07	4.93E-01	0.00E+00	0.00E+00	1.36E-04	51.44%	8.63E-08	2.54E-01
Pu-238	5.70E-02	4.12E-03	2.38E-04	2.69E-05	3.74E-03	1.36E-04	60.82%	2.50E-03	1.45E-04
Pu-239	1.08E-02	1.30E-03	2.06E-02	2.06E-02	1.30E-03	4.03E-05	79.45%	1.03E-03	1.64E-02
Pu-240	1.23E-02	8.91E-04	3.88E-03	8.72E-05	8.91E-04	2.77E-05	75.94%	6.77E-04	2.94E-03
Pu-241	8.11E-01	5.86E-02	5.63E-04	1.27E-03	1.15E-03	1.86E-06	55.78%	3.27E-02	3.14E-04
Pu-242	3.01E-05	2.17E-06	5.47E-04	4.10E-06	1.97E-06	6.40E-08	56.63%	1.23E-06	3.10E-04
Am-241	3.11E-02	2.25E-03	6.48E-04	1.21E-05	2.25E-03	7.51E-05	70.07%	1.57E-03	4.54E-04
Cs-137	1.00E+00	7.22E-02	8.21E-04	0.00E+00	0.00E+00	7.99E-05	31.77%	2.30E-02	2.61E-04
Ba-137m	9.46E-01	6.83E-02	1.27E-10	0.00E+00	0.00E+00	2.69E-04	31.77%	2.17E-02	4.04E-11
Sr-90	6.40E-01	4.62E-02	3.35E-04	0.00E+00	0.00E+00	5.36E-05	33.77%	1.56E-02	1.13E-04
Y-90	6.40E-01	4.62E-02	8.49E-08	0.00E+00	0.00E+00	2.56E-04	33.77%	1.56E-02	2.87E-08
Totals	—	3.00E-01	5.87E-01	6.41E-02	9.33E-03	9.40E-04	—	—	—

TRU Alpha Activity Concentration	1.84E+02 nCi/g
TRU Alpha Activity	8.56E-03 Ci
Total ^{239}Pu Equivalent Activity	9.33E-03 Ci
Total ^{239}Pu Fissile Gram Equivalent	6.41E-02 g
Total Decay Heat	9.40E-04 watts
Volume Activity	2.64E-03 Ci/liter

Table 9. Summary of Reportable Values Using Actual Data from Container No. 00820, Waste Stream AERHDM, Assayed August 10, 2006

Radionuclide	Curie Scaling Factors	Activity (Ci)	Mass Grams	FGE	PE-Ci	Watts	Uncertainty %	Uncertainty Curies	Uncertainty Grams
U-233	2.59E-09	3.43E-09	3.51E-07	3.16E-07	8.79E-10	9.98E-11	80.25%	2.75E-09	2.82E-07
U-234	6.48E-05	8.58E-05	1.36E-02	0.00E+00	0.00E+00	2.47E-06	58.76%	5.04E-05	7.97E-03
U-235	1.99E-06	2.63E-06	1.20E+00	7.71E-01	0.00E+00	7.24E-08	63.52%	1.67E-06	7.62E-01
U-238	2.32E-06	3.07E-06	9.03E+00	0.00E+00	0.00E+00	7.79E-08	49.12%	1.51E-06	4.44E+00
Pu-238	5.70E-02	7.54E-02	4.36E-03	4.92E-04	6.85E-02	2.50E-03	58.87%	4.44E-02	2.57E-03
Pu-239	1.08E-02	2.38E-02	3.78E-01	3.78E-01	2.38E-02	7.37E-04	77.97%	1.85E-02	2.95E-01
Pu-240	1.23E-02	1.63E-02	7.10E-02	1.60E-03	1.63E-02	5.08E-04	74.39%	1.21E-02	5.28E-02
Pu-241	8.11E-01	1.07E+00	1.03E-02	2.32E-02	2.10E-02	3.41E-05	53.65%	5.75E-01	5.53E-03
Pu-242	3.01E-05	3.98E-05	1.00E-02	7.52E-05	3.62E-05	1.17E-06	54.53%	2.17E-05	5.46E-03
Am-241	3.11E-02	4.12E-02	1.19E-02	2.22E-04	4.12E-02	1.38E-03	68.39%	2.81E-02	8.11E-03
Cs-137	1.00E+00	1.32E+00	1.50E-02	0.00E+00	0.00E+00	1.46E-03	27.87%	3.69E-01	4.19E-03
Ba-137m	9.46E-01	1.25E+00	2.33E-09	0.00E+00	0.00E+00	4.93E-03	27.87%	3.49E-01	6.49E-10
Sr-90	6.40E-01	8.46E-01	6.13E-03	0.00E+00	0.00E+00	9.81E-04	30.13%	2.55E-01	1.85E-03
Y-90	6.40E-01	8.46E-01	1.56E-06	0.00E+00	0.00E+00	4.68E-03	30.13%	2.55E-01	4.69E-07
Totals	—	5.50E+00	1.08E+01	1.17E+00	1.71E-01	1.72E-02	—	—	—

TRU Alpha Activity Concentration	8.66E+03 nCi/g
TRU Alpha Activity	1.57E-01 Ci
Total ^{239}Pu Equivalent Activity	1.71E-01 Ci
Total ^{239}Pu Fissile Gram Equivalent	1.17E+00 g
Total Decay Heat	1.72E-02 watts
Volume Activity	4.84E-02 Ci/liter

The following definition is taken from page 12 of the WC PIP:

> *A waste stream is defined as waste material generated from a single process or from an activity which is similar in material, physical form and radiological constituents. Only those containers that can be related to a particular waste stream will be contained in that waste stream.*

In light of the apparent differences among the three fuel types listed above, the consolidation of these drums in a single waste stream bears investigation. The radionuclide profiles of the three fuel types are clearly different; however, following irradiation these fuel types have a common, salient characteristic, i.e., the presence of fission and activation products. Of these, ^{137}Cs is the main interest due to its physical half-life (~30.2 years) and high transition probability photon emission at 662 keV. There are other fission and activation products but these are not an issue to this approach because they have short physical half-lives and have decayed or, more importantly, their contribution is insignificant relative to ^{137}Cs. In a sense, one could consider that these materials have been treated by their exposure to the intense neutron field produced during irradiation (fission). The materials' characteristics that have bearing on DTC have been reduced to a common element, i.e., the predominance of ^{137}Cs, after irradiation, and the differences of the fuel's pre irradiation composition do not affect the radiological characterization process. The EPA inspection team concluded that the assignment of all containers to a single waste stream was technically justified and technically supportable.

(2) Technical aspects and derivation of scaling factors

The EPA inspection team evaluated the following aspects:

- Activity values used are derived from modeling and statistical metrics that support their use, and the statistical metrics include mean and standard deviation values for each measured radionuclide.
- Isotopic activity values are normalized to the major radionuclide(s) responsible for the external container dose rate, i.e., ^{137}Cs.
- The calculated results are used to develop the scaling factors and convert the measured dose rate to radionuclide activity levels.
- The expected dose rates at a distance of 1 meter from the outer surface of the waste container, at the mid-height of the container have been calculated as a function of the waste's activity, and the calculation accounts appropriately for container properties i.e., fill height or (apparent) density, waste type, shielding effects of the container and/or liner wall.
- Calculations supporting the scaling factors are performed using appropriate shielding analysis techniques, i.e., MCNP5 and Microshield 7.00.
- Computer programs (ORIGEN2.2) used for calculations of the activities of the 10 WIPP-tracked radionuclides account for the following:

- The beginning conditions of the fuel used to produce the TRU isotopes
- Exposure of fuel to neutron fields in a nuclear reactor (fission)
- Change in radionuclides following irradiation
- Reactor neutron energy spectrum is known or calculated in order to determine the effective cross-sections of radionuclides leading to the creation of 10 WIPP-tracked radionuclides
- Appropriate cross-sections are used or generated for each reactor condition
- Fuel exposure history is used to calculate isotope generation and depletion

(3) Documentation of technical aspects

Development of the scaling factors is documented in nine (9) calculation packages that were prepared by Jene Vance and Jim Holderness (see Section 8.2.1). These packages address a variety of aspects, including:

- Verification of MCNP5, Microshield 7.00 and ORIGEN2.2
- Evaluation of all potential contributors to a container's dose rate, specifically ^{60}Co and other gamma emitting members of the ^{232}U decay series, e.g., ^{228}Ac and ^{208}Tl
- Uranium and plutonium relationship in the fuel pins from which the wastes originated
- The nature and history of the fuel pins, reactor cross-sections, and operating histories
- Potential sources of uncertainty, discussed below

The EPA inspection team members reviewed a subset of these packages in detail and discussed them with the documents' authors and Mark Doherty. During these discussions, several aspects were probed in detail and, apart from minor discrepancies with respect to specific documentation details the calculation packages were found to be technically adequate.

(4) Evaluation of Total Measurement Uncertainty (TMU)

The development of TMU for ID-ANLE-S5000 is based on the propagation of uncertainties present in all aspects of the determination of the radiological constituents of RH TRU waste. The TMU determination included the contributions of:

- Drum weight measurement
- Measurement uncertainty of ^{137}Cs
- MCNP5 issues
- MicroShield issues
- Other gamma emitters
- Individual pins to the total
- Specific pins in a single drum
- Burnup history
- Reported burnup
- Internal code issues
- Contributions from unirradiated pins
- Modeling

EPA raised a technical concern regarding TMU with respect to the appropriateness of the statistical model during the EPA RH Inspection at INL, see EPA Baseline Inspection Report No. EPA-INL-CCP-RH-6.06-8. This technical issue resulted in INL-CCP reissuing calculation package INL-RH-06 that provides the technical support for the calculation of TMU at both INL and ANL. The EPA Inspection Team reviewed the applicability of the reissued procedure to the ANL RH waste stream and determined that it was technically appropriate and it correctly addressed the TMU issue.

The EPA inspection team did not have any technical issues or concerns relative to the development and application of radionuclide scaling factors based on the objective evidence reviewed during this inspection.

Summary of Radiological Characterization Findings and Concerns

The EPA inspection team did not identify any findings or concerns related to radiological characterization during this inspection

Proposed Baseline Approval

EPA proposes to approve the radiological characterization process evaluated during this baseline inspection and described in this report in support of one (1) ANL RH retrievably-stored debris waste stream, AERHMD. This process includes the use of the DTC procedure in conjunction with the radionuclide scaling contained in CCP-AK-ANLE-501, Revision 0.

Proposed Radiological Characterization Tiers

Based on the inspection and the results discussed above, EPA proposes to assign the following tiers:

Tier 1 radiological characterization changes that will require EPA review and approval prior to implementation and apply to any waste stream not evaluated during the baseline inspection include the following:

- Use of any alternate radiological characterization technique other than DTC with established scaling factors as documented in CCP-TP-504, Revision 3 and CCP-AK-ANLE-501, Revision 0, respectively
- Addition of any new waste stream other than AERHMD

T1 changes will be reported and documentation will be submitted when ANL-CCP is ready for EPA review. Upon initial review, EPA will inform ANL-CCP and CBFO whether a site inspection is necessary. EPA may request additional information, choose to conduct a desktop review, and/or confer with CBFO and ANL-CCP personnel. Upon EPA's evaluation with or without site inspection, EPA will issue a decision. Only upon receiving EPA written approval may ANL-CCP dispose of the new waste at the WIPP.

Tier 2 radiological characterization changes that do not require EPA approval prior to implementation but require reporting and submitting documentation include the following:

- Revisions of CCP-AK-ANLE-501, Revision 0, or CCP-TP-504, Revision 2, that require CBFO approval

Every three months from the date of EPA approval, ANL-CCP will provide information concerning Tier 2 changes. EPA will evaluate changes and communicate with ANL-CCP whether the changes raise any concerns and require ANL-CCP response, or whether ANL-CCP can continue to implement the changes.

8.3 Visual Examination

WC Element Description

The VE process used for identifying contents of RH waste drums allows the review of existing audio/video recordings made at the time of packaging to generate VE data. Two VE operators identified and documented the waste contents of the containers examined by this technique. VE determines the following aspects of RH TRU waste:

- Confirmation that the waste matches the waste stream description
- Description of the container contents including waste material parameters (WMP)
- Confirm the presence or absence of residual liquid that exceed one percent of the volume of the waste container

Procedure CCP-TP-500 was used for conducting VE of RH TRU waste at ANL-CCP.

Documents Reviewed

The following documents were among those reviewed to assess whether VE operations follow appropriately the implemented procedures and meet VE requirements:

- CCP-TP-500, Revision 2, Remote-Handled Waste Visual Examination, June 19, 2006
- CCP-QP-002, Revision 21, Training and Qualification Plan, June 13, 2006
- Remote-Handled TRU Waste Characterization Program Implementation Plan, Revision 0D, October 30, 2003
- VE Batch Data Report (BDR): RHANLVE060001

A complete listing of all objective evidence that was evaluated during the inspection is provided below.

- VE Batch Data Report, RHANLVE060001
- Audio/visual recording for BDR RHANLVE060001

- Qualification cards for VE operators
- Qualification Card for SME/VEE
- VEE appointment letter, dated April 17, 2006
- List of Qualified Individuals (LOQI) for ANLE RH VE program
- Attendance Sheets for CCP-AK-ANLE-500 training
- Processing information for BDR RHANLVE060001
- AK tracking spreadsheet for containers in waste stream AERHDM
- Acceptable Knowledge Summary Report Training Certificates for Argonne Remote-Handled Debris Waste Stream – AERHDM

Technical Evaluation

During the inspection, the technical elements of the VE process were evaluated using the checklist contained in Attachment A.2. These areas are summarized below:

(1) Overall procedural technical adequacy and implementation

The visual examination procedure, documented in CCP-TP-500, Revision 2, provided instructions to VE personnel for performing VE by review of existing audio/visual recordings. The procedure was technically adequate and complete. Initially, the operators did not make a complete inventory of the waste items but the inventories were revised approximately two (2) months after the original VE events. At the time of the on-site inspection, the single BDR generated, RHANLVE060001, contained complete waste inventories.

(2) Characterization of WMPs and prohibited items was evaluated

EPA reviewed selected data sheets contained in BDR RHANLVE060001 in conjunction with the audio/visual recordings to ensure consistency between the visual and written records. The data sheets and audio/video recordings for container Nos. 00816, 00826, 00825, and 00815 were reviewed. EPA did not identify any discrepant information for these containers. During this review a VE operator explained the process and how decisions were made with regard to identification of WMPs. However, the operator interviewed could not explain how they were able to answer certain questions on the VE data sheet, e.g., "The waste is consistent with the waste stream description and waste matrix code (Summary Category Group)?" "Yes" had been entered on the data sheet for each container in BDR RHANLVE060001 in response to this question, but the operator was unable to provide the information about the waste stream description that was necessary to answer this question. EPA included this issue on an EPA Inspection Issue Tracking Form (see Attachment B.2 for a copy of this form), described below.

EPA Concern No. ANL-CCP-RH-VE-06-002C: The Independent Technical Reviewer (ITR) had not fully implemented the requirement for complete inventory put in place on June 15, 2006 at the time BDR #RHANLVE060001 was signed off on July 19, 2006. The ITR signed off on the checklist on 7/19/06, however, it was then corrected to reflect the "complete inventory"

requirement on August 25, 2006. The ITR initiated the change after he fully understood the expected criteria of "complete inventory" based on the issue at INL. At the time of the inspection, the VE data had been revised to include a complete inventory of the waste items in each container. EPA considers this concern closed. The audio/video recordings did not show the 7.5-gallon cans being loaded into the 30-gallon containers, but the cans and containers were associated through the original packaging information and this information was included in the BDR for each container. VE Operators confirmed the absence/presence of prohibited items in each can, and if operators were not able to verify this information, an NCR was to be generated and the containers were rejected.

Resolution: A formal response to this concern was not required.

Status of Concern: Based on discussions with ANL-CCP, EPA considers this concern to be closed.

(3) Documentation of VE activities was examined

Two (2) operators generated VE data for RH containers from review of audio/video recordings. The operators reviewed existing recordings and completed the required data sheets from their observations. The container inventories initially generated by the operators were incomplete, but this issue was identified by CCP and the inventories were revised. At the time of the on-site EPA inspection, all of the inventories for the non-rejected containers in BDR RHANLVE060001 were complete. At the end of the VE event, the operators assign percentages to each WMP and manually calculate the weight of each WMP using these percentages and the weight of the waste contained in the cans. Operators did not retain any records for the manual calculations they performed and these calculations were not verified during the ITR review. Completed data generation and project level review checklists were included in the data package that EPA reviewed. The Visual Examination Expert (VEE) who performed the ITR review on BDR RHANLVE060001 failed to recognize that not all data were recorded. This issue was documented on EPA Inspection Issue Tracking Form (see Attachment B.1 for a copy of this form) and the three aspects of this issue are presented below.

EPA Concern No. ANL-CCP-RH-VE-06-001CR, Part 1: The method of manually calculating the weights of Waste Material Parameters (WMP) is not contained within the existing procedure. Failure to document this process in the procedure may lead to the use of inconsistent and undocumented methodologies for this calculation.

Resolution: CCP revised procedure CCP-TP-500 and removed the requirement to estimate WMP weights because it is not required by the WCPIP. Upon completion of the procedural modification, CCP provided EPA a copy of the revised procedure that was reviewed and found to be acceptable.

Status of Concern: EPA considers this part of the concern to be closed.

EPA Concern No. ANL-CCP-RH-VE-06-001CR, Part 2: The VE ITR is required to review all manual calculations, but the calculation of WMP weights is not reviewed and the requirement to review it is not contained in any ITR checklist. Failure to do so removes the only required check of the calculation on which WMP quantities are based.

Resolution: Procedure CCP-TP-500 was revised and calculation of the WMP weights no longer requires verification. Upon completion of the modification to CCP-TP-500, ANL-CCP provided EPA a copy of the revised procedure that was reviewed and found to be acceptable.

Status of Concern: EPA considers this part of the concern to be closed.

EPA Concern No. ANL-CCP-RH-VE-06-001CR, Part 3: VE Operators are completing "Visual Examination Data Form" without the knowledge necessary to make the correct decisions regarding specific items. For example, checking *yes* in response to the question, "The waste is consistent with the waste stream description?" When questioned, a VE operator could not explain how he was able to answer this question. Confirmation of waste stream description is essential to AK confirmation required by 40 CFR 194.24(c). The VE Operator is responsible for deciding if the drum examined is part of the waste stream.

Resolution: CCP has provided additional training for VE operators. Upon completion of the training, CCP submitted objective evidence of the training to EPA and this was found to be acceptable.

Status of Concern: EPA considers this part of the concern to be closed.

(4) Training for VE personnel was examined.

The site maintains a list of qualified individuals, which is used to ensure that all training is current. During the inspection, the qualification packages for the three RH VE operators were reviewed and found to document adequate training for VE personnel. CCP's RH VEE was designated prior to generation of any RH VE data. The VEE was present at the site to train the operators but is not necessarily present when VE events take place. The VEE is, however, available for discussion with the operators either by telephone or e-mail.

The following records were reviewed:

- Visual Examination Operator/ITR/TS/FQAO Qualification Card for three (3) operators
- Qualification Card for one (1) VEE
- Letter designating RH SME/VEE
- List of qualified RH VE personnel
- Acceptable Knowledge Summary Report Training Certificates for Argonne Remote-Handled Debris Waste Stream – AERHDM

Summary of VE Findings and Concerns

The EPA inspection team identified the two concerns related to VE that are discussed above, along with ANL-CCP's response and the resolution for each concern. Copies of the EPA Inspection Issue Tracking Forms that document these concerns are provided in Attachments B.1 and B.2. EPA considers both concerns to have been adequately addressed and there are no open concerns related to VE resulting from this inspection.

Proposed Baseline Approval

The VE system for RH waste that the EPA inspection team evaluated during this baseline inspection consisted of the following:

- Trained personnel: VE operators, VEE
- Approved and controlled operating procedures CCP-TP-500, Revision 2; CCP-QP-002, Revision 21
- VE records and supporting data: Visual Examination Data Forms, CCP-TP-500 review checklists, and one (1) VE BDR
- Waste Stream AERHDM

Based on the results of this inspection of the VE system implemented by CCP at ANL for RH waste, specifically VE by review of existing audio/visual recordings, EPA proposes this process for approval for S5000 waste.

Proposed VE Tiers

Based on the inspection and the results discussed above, EPA proposes to assign the following tiers when the VE process is approved.

Tier 1 VE changes that require EPA approval prior to implementation:

- VE by review of existing audio/visual recordings for S4000 soils/gravel and S3000 solid wastes
- VE by any process other than review of existing audio/visual recordings for S5000 debris wastes

Tier 2 VE changes that do not require EPA approval prior to implementation but require reporting and submitting documentation include the following:

- Changes made to VE procedure(s) that require CBFO approval
- Addition of any new S5000 debris waste stream(s) to approved processes

Every three months from the date of EPA approval, ANL-CCP will provide information concerning T2 changes. EPA will evaluate changes and communicate with ANL-CCP whether

the changes raise any concerns and require CCP/ANL response, or whether ANL-CCP can continue to implement the changes.

8.4 Real-Time Radiography

The technical area of Real-Time Radiography (RTR) was not evaluated during this inspection. If ANL-CCP wishes to use RTR to characterize RH TRU wastes, EPA approval separate from what is contained in this report is required.

8.5 WIPP Waste Information System

The technical area of WIPP Waste Information System (WWIS) was not evaluated during this inspection. Prior to ANL-CCP using the WWIS to characterize RH TRU wastes, EPA approval separate from what is contained in this report is required.

9.0 RESPONSE TO COMMENTS

This section is reserved for public comments.

10.0 SUMMARY OF RESULTS

CCP responded to all EPA issues that required a response prior to the inspection closeout on site as well subsequent to the inspection. These are summarized in the preceding section. The EPA inspection team members evaluated all of CBFO's responses for completeness and adequacy, and concluded that each EPA issue requiring a response had been resolved satisfactorily. No EPA issues remain open at this time.

10.1 Findings and Concerns

The issues findings and concerns identified during the inspection as well as ANL-CCP's responses are discussed in the preceding sections of this report. Copies of the EPA Inspection Issue Tracking Forms that capture these issues are included in Attachment B. ANL-CCP responded to all EPA findings and concerns that required a response prior to the inspection closeout on site as well subsequent to the inspection. The EPA inspection team members evaluated all responses for completeness and adequacy, and concluded that each EPA issue requiring a response had been resolved satisfactorily. No EPA issues remain open at this time.

10.2 Conclusions

EPA's inspection team determined that ANL-CCP's RH WC program activities were technically adequate. EPA is proposing to approve the ANL-CCP-RH WC program in the configuration observed during this inspection, described in this report and documented in detail in the checklists in Attachment A. The proposed approval includes the following:

- The AK process for RH retrievably-stored TRU debris in one waste stream, Argonne National Laboratory Waste Stream No. AERHDM, as defined in CCP-AK-ANL-500, Revision 2, July 21, 2006
- The radiological characterization process using DTC and modeling-derived scaling factors for assigning radionuclide values to one RH waste stream for which the scaling factors are applicable, as described in CCP-AK-ANLE-501, Revision 2
- The VE process for one retrievably-stored RH S5000 debris waste stream AERHDM using the trained personnel, documentation, and procedures discussed in this report.

During the baseline inspection, CCP did not demonstrate the use of WWIS for tracking of RH waste components. Therefore, EPA is not including the WWIS in this approval. EPA, however, is proposing that DOE submit the WWIS as a Tier 1 change. EPA will review the WWIS database populated with actual RH waste content data when the RH modules have been completed and are available for evaluation by EPA. EPA may evaluate the adequacy of the implementation of CCP's WWIS procedure for RH waste during the comment period. However, EPA will not approve WWIS until after the Agency finalizes the proposed approval of CCP's RH waste characterization program at INL and ANL.

Any changes to the WC activities from the date of the baseline inspection must be reported to and, if applicable, approved by EPA, according to Table 10.

Table 10. Tiering of RH TRU WC Processes Implemented by ANL-CCP (Based on September 12–14, 2006 Baseline Inspection)

RH WC Process Elements	ANL-CCP RH WC Process - T1 Changes	ANL-CCP RH WC Process - T2 Changes*
Acceptable Knowledge (AK)	Any new waste streams not approved under this baseline; AK (1) & AK (3) Modification of the approved waste stream AERHDM to include additional containers beyond the approximately 45 included in CCP-AK-ANLE-500, Revision 3; AK (1) & AK (4) Substantive modification(s)*** that have the potential to affect the characterization process to CCP-AK-ANLE-500, CCP-AK-ANLE-501 or CCP-AK-ANLE-502; AK (8), AK (9), AK (13) & AK (14) Load management for any RH waste stream; AK (16)	Changes made to AK documentation as a result of WCPIP revisions**; AK (4) Waste stream data package for debris waste stream once completed, and any modifications to that WSPF including the CRR and AK Summary; AK (4), AK (13), AK (14) & AK (19) Updates to documents as follows: • All future revisions of CCP-ANLE-AK-500, CCP-ANLE-AK-501 and CCP-ANLE-AK-502; AK (4), AK (8) • Listing of the references that document the assembly of fuel pin data and review process; AK (5) • CCP-AK-ANLE-500 and CCP-AK-ANLE-502 to address freeze file changes; AK (8) Comparison of AK versus DTC-derived radiological data to support the use of waste stream-specific instead of drum-specific radiological data and the completed DTC results for all containers in this waste stream; AK (13) AK accuracy reports, prepared annually at a minimum; AK (15)
Radiological Characterization, including Dose-To-Curie (DTC)	Application of new scaling factors for isotopic determination other than those documented in CCP-AK-ANLE-501; RC (8.2.2 & 8.2.3) Use of any alternate radiological characterization procedure other than DTC with established scaling factors as documented in CCP-TP-504 or substantive modification*** of the DTC procedure; RC (8.2.2 & 8.2.3) Any new waste stream not approved under this baseline or addition of containers to waste stream AERHDM that require changing the established radionuclide scaling factors; RC (8.2.3)	Revisions of CCP-AK-ANLE-501 or CCP-TP-504 that require CBFO approval**; RC (8.2.2 & 8.2.3)
Visual Examination (VE)	VE by reviewing existing audio/visual recordings for S4000 and S3000 wastes; VE (1) & VE (3) VE by any process other than review of existing audio/visual recordings for	Changes made to any VE procedure(s) that require CBFO approval; VE (1) & VE (3) Addition of new S5000 debris waste streams; VE (2)

Table 10. Tiering of RH TRU WC Processes Implemented by ANL-CCP (Based on September 12–14, 2006 Baseline Inspection)

RH WC Process Elements	ANL-CCP RH WC Process - T1 Changes	ANL-CCP RH WC Process - T2 Changes*
	S5000 debris wastes; VE (1) & VE (3)	
Real Time Radiography (RTR)	Any use of RTR requires EPA approval	None
WIPP Waste Information System (WWIS)	Any use of WWIS requires EPA approval prior to RH waste disposal	None

* Upon receiving EPA approval, ANL-CCP will report all T2 changes to EPA every three months.

** Excluding changes that are editorial in nature or are required to address administrative concerns. New references that are included as part of the document revision may be requested by EPA.

*** *Substantive modification* refers to a change with the potential to affect ANL's RH WC process, e.g., the use of an inherently different type of measurement instrument or the use of the high range probe as described for CCP-TP-504 for radiological characterization.

11.0 REFERENCES

U.S. Department of Energy, Carlsbad Area Field Office, "Contact-Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant (CH-WAC)," Revision 3, DOE/WIPP-02-3122, Carlsbad, New Mexico, April 25, 2005.

New Mexico Environment Department, Waste Isolation Pilot Plant Hazardous Waste Facility Permit, NM48901 139088-TSDF, Santa Fe, New Mexico, 1989.

U.S. Environmental Protection Agency, "Criteria for the Certification and Recertification of the Waste Isolation Pilot Plant's Compliance with the Disposal Regulations: Certification Decision; Final Rule," *Federal Register*, Vol. 63, No. 95, May 18, 1998, pp. 27354, 27405.

U.S. Code of Federal Regulations, *Title 40*, *Protection of Environment*, Part 191, "Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes."

U.S. Code of Federal Regulations, *Title 40*, *Protection of Environment*, Part 194, "Criteria for the Certification and Re-Certification of the Waste Isolation Pilot Plant's Compliance with the 40 CFR Part 191 Disposal Regulations."

U.S. Department of Energy, Carlsbad Area Field Office, "Remote Handled TRU Waste Characterization Program Implementation Plan", DOE/WIPP-02-3214, Revision 0D, Carlsbad, New Mexico, October 30, 2003

U.S. Department of Energy, Title 40 CFR Part 191, Compliance Certification Application for the Waste Isolation Pilot Plant, DOE/CAO 1996-2184, Carlsbad, New Mexico, 1996.

U.S. Department of Energy, Title 40 CFR Part 191, SUBPART D AND C, Compliance Recertification Application 2004, DOE/WIPP/2004-3231.

U.S. Department of Energy, Carlsbad Area Field Office, "Quality Assurance Program Description (QAPD)", DOE/CBFO-94-1012, Revision 7, Carlsbad, New Mexico, July 2005.

U.S. Nuclear Regulatory Commission, "Contact-Handled Transuranic Waste Authorized Methods for Payload Control (CH-TRAMPAC)."

Attachments A.1 through A.3

ATTACHMENT A.1: ACCEPTABLE KNOWLEDGE (AK) RH CHECKLIST

EPA Inspection No.: EPA-ANLE CCP RH-09.06-8 **Inspection Date: September 12-14, 2006**

Required Technical Elements	Procedure Location/Adequacy	Verification of Activity	Objective Evidence/Adequacy
Implementation of Characterization Methods to Satisfy DQOs (WCPIP Section 4.2)			
How are the following DQOs being addressed—any of these that AK is used to determine must be qualified/verified as per section 4.3, except for the first bullet (defense): • Defense determination • TRU waste determination • RH waste determination • Activity determination (total and activity per canister) • Residual Liquids • Physical Form • Metals • Cellulosics, Plastics, Rubber	WCPIP Rev.0D, Section 4.2; CCP-P0-002, Rev. 16.	Interview of AKEs including Steve Shafer, Kevin Peters, Lisa Watson; examination of objective evidence.	Examples of objective evidence obtained include but are not limited to: CCP-AK-ANLE-500 Rev.1; CCP-AK-ANLE-501 Rev 0, CCP-AK-ANLE-502 Rev. 0, CCP-TP-506 Rev. 2, CRR-ANLE-AERHDM, AK Accuracy Report, WSPF, CRR. It is anticipated that the WCPIP will be revised in the future. One major change expected is the addition of a DQP requiring identification/quantification of the EPA 10 radionuclides. Revisions of several documents is anticipated including many of those listed above. Revisions to any documents reviewed as part of this inspection, but changed due to WCPIP revisions, must be provided to EPA.
Qualification/Verification of AK Data (WCPIP Section 4.3)			
Is AK Qualification/verification required because characterization information exists that was generated prior to an established QA Program?	WCPIP Rev. D, Section 4.3, CCP-P0-002, Rev. 16.	Interview of AKEs including Steve Shafer, Kevin Peters, Lisa Watson; examination of objective evidence	Examples of objective evidence obtained include but are not limited to: CCP-AK-ANLE-502 Rev.0; CCP-AK-ANLE-500
a. If yes, what Qualification approach is used and for which characterization data (e.g. Peer Review, Confirmatory Testing, Equivalent QA)	WCPIP Rev. D, Section 4.3, CCP-P0-002, Rev. 16.	Interview of AKEs including Steve Shafer, Kevin Peters, Lisa Watson; examination of objective evidence	Examples of objective evidence obtained include but are not limited to: CCP-AK-ANLE-502 Rev.0; CCP-AK-ANLE-500
b. If Peer Review performed, does it follow requirements presented in Section 4.3.1 of the PIP?	WCPIP Rev. D, Section 4.3, CCP-P0-002, Rev. 16.	Interview of AKEs including Steve Shafer, Kevin Peters, Lisa Watson	Examples of objective evidence obtained include but are not limited to: CCP-AK-ANLE-502 Rev.0; CCP-AK-ANLE-500

Required Technical Elements	Procedure Location/Adequacy	Verification of Activity	Objective Evidence/Adequacy
			No Peer Review Performed.
c. If Confirmatory Testing is performed, does it follow requirements presented in Section 4.3.3 of the PIP and which methods are used? • 100 percent VE at time of packaging • 10-10-all • Representative sample collection to confirm isotopic distribution • 100% NDA • DA • DTC • Other as described in a Confirmatory Testing Plan: - VE by review of a percentage of audio/video tapes - Analysis of representative samples for radiological data - VE/radiography of a subpopulation of waste - Qualification of existing radiological sampling and analytical info via modeling (e.g. ORIGEN) • Did the generator submit a confirmatory test plan as described in Section 4.3.3 of the PIP? If so, has CBFO audited and approved the process? Did it contain the following and was it adequate: - Description of the waste stream or waste stream lots to which the plan applies - Explciit description of DQOs and QAOs that will be satisfied with the data being qualified - Description of DQOs and QAOs that will NOT be confirmed with the data being qualified and an explanation of how compliance with those DQOs and QAOs will be demonstrated - Description of the confirmatory testing proposed, including the percentage of waste containers subject to confirmatory testing	WCPIP Rev. D, Section 4.3, CCP-P0-002, Rev. 16.	Interview of AKEs including Steve Shafer, Kevin Peters, Lisa Watson	Examples of objective evidence obtained include but are not limited to: CCP-AK-ANLE-502 Rev.0; CCP-AK-ANLE-500; AK Tracking Spreadsheet, CCP-AK-501, DTC conversion Records, CRR-ANLE-AERHDM, BDRs for containers 00810, 817, 820, 824, 826. CCP performed DTC and examination of all VE tapes/records for each container. CTP described process including required contents of PIP including DQO and QAO identification (see checklist discussion below).

Required Technical Elements	Procedure Location/Adequacy	Verification of Activity	Objective Evidence/Adequacy
- Description of how the tested subpopulations will be representative of the waste stream or waste stream lot - Quantitative acceptance criteria for determining that the AK information in question can be qualified as characterization data.			
General Checklist Questions			
Is the scope of the waste for which approval is sought defined? What is it?	WCPIP Rev.0D, CCP-P0-002, Rev. 16.	Interview of AKEs including Steve Shafer, Kevin Peters, Lisa Watson	Examples of objective evidence obtained include but are not limited to: CCP-AK-ANLE-500; CCP-AK-ANLE-502. Approval sought for single waste stream AERHDM as defined in CCP-AK-ANLE-500. This includes approximately 45 drums and 50 newly generated waste containers sourced from the AGHCF, and does not include other wastes such as the additional 20 containers identified in the AK Summary but not currently considered part of the waste stream. Changes to the stream to include these new wastes would require EPA notification as would addition of any new waste streams.
Is the waste TRU by definition as presented in the LWA? (P.L.102-579)	WCPIP Rev. 0D, CCP-P0-002, Rev. 16.	Interview of AKEs including Steve Shafer, Kevin Peters, Lisa Watson	Examples of objective evidence obtained include but are not limited to: CCP-AK-ANLE-500, CCP-AK-ANLE-501, TRU WAC, C349, P002, U332, U334, U335, U336. CCP does not intend to load manage this stream, but if this is performed EPA notification is required. This includes the inclusion of CH containers in the RH canister.

ATTACHMENT A.1: ACCEPTABLE KNOWLEDGE (AK) RH CHECKLIST

EPA Inspection No.: EPA-ANLE CCP RH-09.06-8 **Inspection Date: September 12-14, 2006**

Required Technical Elements	Procedure Location/Adequacy	Verification of Activity	Objective Evidence/Adequacy
Are any wastes considered (or previously considered HLW? HLW are prohibited. (P.L.102-579) Are any wastes considered (or previously considered) Spent Nuclear Fuel? (P.L.102-579)	WCPIP Rev. D, CCP-P0-002, Rev. 16.	Interview of AKEs including Steve Shafer, Kevin Peters, Lisa Watson; review of objective evidence.	Examples of objective evidence obtained include but are not limited to: CCP-AK-ANLE-500, CCP-AK-ANLE-501; P593, P592, C121, C332, P001, P002, P023, P032, P055, P380, P412, U013
Personnel and Training			
Who are the AK Personnel? Upon interview, do they perform the duties presented in Attachment A, Section 3? Who is the Site Project Manager (SPM)? ? Upon interview, do they perform the duties presented in Attachment A, Section 3? Who is the Site Project Quality Assurance Officer (SPQAO)? ? Upon interview, do they perform the duties presented in Attachment A, Section 3? Are the above trained in the following: • The RH TRU WCPIP • Non conformance and corrective action processes • The AK Procdcure presented in Attachment A of the PIP • Site-specific training relative to the contents of the site's waste streams • Determining radiological contents of individual containers	WCPIP Rev. D Attachment A; CCP-P0-002, Rev. 16; CCP-QP-001, Rev. 20	Interview of AKEs including Steve Shafer, Kevin Peters, Lisa Watson, Larry Porter, A.J. Fisher; review of objective evidence.	Examples of objective evidence obtained include but are not limited to: Qualification cards and training records including resumes for Kevin Peters, Steve Shafer. Lisa Watson interviewed. During interview, ascertained that personnel were knowledgeable in areas required by the WCPIP.
Compiling AK Documentation and Defining the Waste Stream(s)			
AK documentation must be compiled. What documents have been compiled? Are they among the following: • Published documents/controlled databases	WCPIP Rev. D Attachment A	Interview of AKEs including Steve Shafer, Kevin Peters, Lisa Watson, Review of AK Summary and AK Source	Examples of objective evidence obtained include but are not limited to: CCP-AK-ANLE-500, CCP-AK-ANLE-501, Source Documents Reference List for

Required Technical Elements	Procedure Location/Adequacy	Verification of Activity	Objective Evidence/Adequacy
• Unpublished data • Internal procedures and notes (log books, correspondence, etc) • Engineering Documents • Mission Statements • Other Documentation is among the data used to define the waste stream. Has the waste stream been adequately defined as per the definition of waste stream as presented in the WCPIP: Waste stream is a waste material generated from a single process or from an activity which is similar in material, physical form and radiological constituents.		Summary and AK Source Document Reference List; examination of selected Objective Evidence	AERHDM. Dozens of examples of Correspondence (C), Published (P), and Unpublished (U) documents were provided by CCP that included various databases, internal procedures/notes, engineering documents, mission statements, Safety Analysis Reports, etc. Waste stream was adequately defined. Note that the source documents reference list included several references not cited in CCP-AK-ANLE 500 or 501, and the reference list did not include a document that tracked or recorded the efforts made to compile and assess AK radiological data for use in DTC. A reference that documents Pin data assembly and assessment for use in DTC is required by EPA.
Does additional documentation used to characterize waste and delineate the waste stream include the following: • Previous NDA, radiochemistry, dosimetry, and non destructive examination data • Waste generating procedures • Physical, chemical and radionuclide inputs to the process • Time period that the process took place • Facilities involved • Types of waste generated (waste material parameters) • Process descriptions and flow diagrams • Packaging logs and video tapes • MSDS • Procurement records	WCPIP Rev. D Attachment A	Interview of AKEs including Steve Shafer, Kevin Peters, Lisa Watson, Review of AK Summary and AK Source Document Reference List; examination of selected Objective Evidence	Examples of objective evidence obtained include but are not limited to: CCP-AK-ANLE-500, CCP-AK-ANLE-501, Source Documents Reference List for AERHDM; U336, U335, U334, U332, C349, U305, U072, P575, P414, P380, P032, P002, C306

Required Technical Elements	Procedure Location/Adequacy	Verification of Activity	Objective Evidence/Adequacy
• Administrative/Process controls used as the basis for the absence of residual liquids • Container-specific information (AK data, i.e. waste container input forms, etc). Were correlations made between CH and RH TRU Waste operations at a site including related CH waste characterization data? If so, are correlations documented on a Correlationa nd Surrogate Summary Form and is this form adequate and included in the AK Summary?			
Were correlations and similarities with the RH TRU waste operations at other generator/storage sites made, including characterization information for that RH TRU waste stream? If so, are the correlations documented on the the Correlationa nd Surrogate Summary Form and is this form adequate and included in the AK Summary?	WCPIP Rev. D Attachment A	Interview of AKEs including Steve Shafer, Kevin Peters, Lisa Watson, Review of AK Summary and AK Source Document Reference List; examination of selected Objective Evidence	Examples of objective evidence obtained include but are not limited to: CCP-AK-INL-500, CCP-AK-INL-501, CCP-AK-ANLE-500, CCP-AK-ANLE-501, Correlation/Surrogate Summary Form, P593, P592, C060, P002, U305 If containers from this stream are found to be CH rather than RH, then NDA of the drums would occur and the isotopic data would be presented on a Correlation and Surrogate Summary Form that must be provided to EPA.
Has an AK Source Document Reference list been assembled for each AK Summary/waste stream, and have references been assigned unqiue identifier (Attachment 2 of the Attachment A of the PIP)	WCPIP Rev. D Attachment A	Interview of AKEs/SPM including Steve Shafer, Kevin Peters, Lisa Watson, Review of AK Summary and AK Source Document Reference List	Examples of objective evidence obtained include but are not limited to: CCP-AK-ANLE-500, Source Document Reference List. Reference list is complete and easy to follow.
Have Source Document Summaries been developed per Attachment 5 and are these adequate? Do they identify data limitations?	WCPIP Rev. 0D Attachment A	Review of Source Document Summaries	Examples of objective evidence obtained include but are not limited to: See all Source Documents (C), (P), and (U) provided (e.g. D349, P002, U332, etc). Each source document has a source

Required Technical Elements	Procedure Location/Adequacy	Verification of Activity	Objective Evidence/Adequacy
			document summary attached to the front of the reference that summarizes document contents and provides a location for documenting data limitations.
AK-AK Discrepancy Resolution			
How are AK-AK discrepancy resolutions documented and does the documentation: • Identify the affected waste stream(s) • Identify all relevant AK source documents • State the nature of the discrepancy Has there been an instance where an AK AK discrepancy cannot be resolved or if the resolution results in a failure of a DQO? If so, the waste cannot be shipped to WIPP without further evaluation.	WCPIP Rev. 0D Attachment A	Interview of AKEs/SPM including Steve Shafer, Kevin Peters, Lisa Watson, Larry Porter, Mark Doherty. Review of AK Summary and AK Source Document Reference List; examination of selected Objective Evidence	Examples of objective evidence obtained include but are not limited to: No AK-AK radiological DRs provided; EPA expects these to be included in the AK record as they are identified. DR010, DR011, DR013 show ability of CCP to document and resolve discrepancy resolutions. No examples of major issues identified thus far.
Characterization of the Waste – DQO Assessment / Preparation of the AK Summary Report			
What DQOs are assigned by AK? How are each to be qualified/verified (peer review, confirmation, equivalent QA program) • Defense determination • TRU waste determination • RH waste determination • Activity determination (total and activity per canister) • Residual Liquids • Physical Form • Metals • Cellulosics, Plastics, Rubber For each DQO related to AK, AK personnel must identify the DQO, supporting AK information, justify the assignments/conclusions, reference the AK Source Documents and applicable pages supporting the assessment, method of 40 CFR 194.22(b) will be qualified	WCPIP Rev. 0D Section 4	Interview of AKEs/SPM including Steve Shafer, Kevin Peters, Lisa Watson, Larry Porter, Mark Doherty. Review of AK Summary and AK Source Document Reference List; examination of selected Objective Evidence	Examples of objective evidence obtained include but are not limited to: CCP-AK-ANLE-500; CCP-AK-ANLE-502. CCP added a Chapter to the AK Summary that addresses DQO assessment.

EPA Inspection No.: EPA-ANLE CCP RH-09.06-8 **Inspection Date: September 12-14, 2006**

Required Technical Elements	Procedure Location/Adequacy	Verification of Activity	Objective Evidence/Adequacy
Have applicable DQOs been addressed as follows: • Has adequate review of AK information been performed to determine whether the waste was generated by defense activities or is commingled with RH TRU waste generated by defense activities. This determination will be established by the AK data compiled. • Review the AK Information to determine the nuclear properties of the waste stream. The nuclear properties relevant to RH TRU waste include: TRU activity of the waste stream greater than 100 nCi/g of waste. Is this TRU waste? Will load management take place? • What information is included in the AK Record and AK AK Summary to demonstrate that the waste is RH waste? Dose equivalent rate equal to or greater than 200 mrem/hr and less than 1,000 rem/hr at the surface of the payload container. • Does the AK Record adequately present, support and report activity of the 10 required radionuclides (TRU isotopes 238Pu, 239Pu, 240Pu, 242Pu, and 241Am; and non-TRU isotopes 137Cs, 90Sr, 233U, 234U, and 238U). Further, Does AK provide information to determine the total activity in each canister. Must be less than 23 curies per liter • Are AK records used to calculate, compute, or otherwise derive the total activity and/or TRU activity of the waste and the records? If so, were they qualified by peer review, confirmation, or equivalent QA (see relevant checklists/analsysis for these elements, if performed). Were data collected under an EPA approved program? If so, the records alone may be used to satisfy DQOs.; otherwise, the above characterization objectives must be met by collecting additional data during	WCPIP Rev. 0D Section 4	Interview of AKEs/SPM including Steve Shafer, Kevin Peters, Lisa Watson, Mark Doherty, Larry Porter. Review of AK Summary and AK Source Document Reference List; examination of selected Objective Evidence	Examples of objective evidence obtained include but are not limited to: CCP-AK-ANLE-500, CCP-AK-ANLE-502, CCP-AK-ANLE-501 Rev 0, CCP-AK-ANLE-502 Rev. 0, CCP-TP-506 Rev. 2, CRR-ANLE-AERHDM, U001, P599, C331, C330, U015, C349, P002, U332, U334, U335, U336, P593, P592, C121, C332, P001, P002, P023, P032, P055, P380, P412, U013, C332, C333, P306 AK record includes defense determination supporting documents. AK record includes data that support TRU and RH designation of waste noting that the RH determination is will be made through measurement rather than the AK record. Data pertaining to the EPA 10 radionuclides is present in the AK record, and ANLE did a separate radiological analysis similar to that performed by CCP but performed on a per campaign rather than waste stream basis; this analysis provide some isotopic information. Note that confirmation is used for all verification except for the defense determination. WMPs identified via waste disposal records and can be used to assess waste stream assignments; examination of VE tapes/records is performed separate from the AK effort. Note that EPA expects the AK record to include information pertaining to waste storage that would identify whether any residual liquids due to post container inundation or management might have occurred. Also, load management is not planned, but would require direct notification of EPA if it was done

Required Technical Elements	Procedure Location/Adequacy	Verification of Activity	Objective Evidence/Adequacy
packaging, etc. Was data collected, that would be considered AK collected under an EPA qualified program, assembled and used? If so, what was it and how was it used? (e.g. identification of SCG for use in DTC, etc). • Has AK been used to compile information regarding the waste stream waste material parameters to provide a detailed description of the waste stream in accordance with the format of the AK Summary Report? • Has AK information been used to to determine the absence of residual liquids. This review may include waste packaging procedures and other documented administrative controls, such as training records, that identify control of residual liquids. It may also include previous waste characterization data or information from waste-container-specific packaging logs. The criterion in the DQO is that residual liquids must be less than 1 percent by volume of the waste container.			notification of EPA if it was done.
AK Summary Report Preparation			
Has an AK Summary been prepared and does it follow the format specified in Attachment 1. The report shall include the following: • Program and waste stream narrative • Sections as defined in the WCPIP. • Detailed description of the waste stream including information on, for example, specific waste matrix materials and fill volumes. • The report shall address all of the DQOs as noted in previous steps with appropriate justifications and references in the text.	WCPIP Rev. 0D Attachment A	Interview of AKEs including Steve Shafer, Kevin Peters, Lisa Watson, Review of AK Summary and AK Source Document Reference List; examination of selected Objective Evidence	Examples of objective evidence obtained include but are not limited to: CCP-AK-ANLE-500. The Report includes required sections, but some references in the back of the report are not applicable to Argonne and some references pertinent to ANLE on the Source Document Reference List are not included in the AK Summary. Additionally, CCP committed to a freeze file change to the text to address why AK-DTC data comparison with respect to AK Accuracy is not appropriate. Further, it is expected that this document might be among those changed when a new WCPIP is implemented. Therefore, provision to

ATTACHMENT A.1: ACCEPTABLE KNOWLEDGE (AK) RH CHECKLIST

EPA Inspection No.: EPA-ANLE CCP RH-09.06-8 **Inspection Date: September 12-14, 2006**

Required Technical Elements	Procedure Location/Adequacy	Verification of Activity	Objective Evidence/Adequacy
			EPA of all revisions to CCP-AK-ANLE-500 is required.
Have the following documents been completed in addition to the AK Summary; are they available for EPA review and are they technically adequate? • AK Waste Summary Report, • AK Source Document Reference List, • Correlation and Surrogate Summary Form, • AK discrepancy resolution documentation and the • AK source document summaries	WCPIP Rev. 0D Attachment A	Interview of AKEs including Steve Shafer, Kevin Peters, Lisa Watson, Review of AK Summary and AK Source Document Reference List; examination of selected Objective Evidence	Examples of objective evidence obtained include but are not limited to: CCP-AK-ANLE-500; AK Source Document Reference List, Correlation and Surrogate Summary Form, DR010, DR011, DR013. Source Document Summaries are placed on each correspondence (C), published (P), and unpublished (U) document.
Have all of these been provided to the SPM for review as required in Section 6.7 of the WCPIP Attachment A? Did the AK personnel recommend how the SPM should assess and qualify the information? (6.8)	WCPIP Rev. 0D Attachment A	Interview of AKEs including Steve Shafer, Kevin Peters, Lisa Watson, Review of AK Summary and AK Source Document Reference List; examination of selected Objective Evidence	Examples of objective evidence obtained include but are not limited to: Characterization Reconciliation Report and Waste Stream Profile form. Interview with SPM indicated he had all information cited in Section 6.7 available for review. It was not determined that AK personnel recommend how the SPM assess data, as the SPM did so independently.
Reconciling Compiled AK Information			
Has the SPM Reviewed the AK Summary Report, AK Source Document Reference List, Correlation and Surrogate Summary Forms, the referenced source document summaries, if applicable, batch data reports from any confirmatory activities such as VE or NDA and, if applicable, supplemental data collected during repackaging using an approved technique, to determine if the AK record is reconciled and is adequate to characterize the waste stream or waste stream lot and	WCPIP Rev. 0D Attachment A	Interview of Larry Porter; review of the AK Summary Report, Correlation and Surrogate Summary forms, BDRs and other supporting verification activities.	Examples of objective evidence obtained include but are not limited to: CCP-AK-ANLE-500; CCP-AK-ANLE-502, AK Source Document Reference List, Correlation and Surrogate Summary Forms; source document summaries (as included for each source document provided), BDRs for drums C810,

Required Technical Elements	Procedure Location/Adequacy	Verification of Activity	Objective Evidence/Adequacy
satisfy the relevant DQOs?			
Discrepancies between the AK record and confirmatory test results identified during this reconciliation process must be resolved and documented. What is the AK-measurement discrepancy resolution process employed and is it satisfactory? Does it involve reevaluation of the AK record, reassignment of waste stream parameters and a revision to the AK Summary Report.	WCPIP Rev. 0D Attachment A	Interview of AKEs/SPM including Steve Shafer, Kevin Peters, Lisa Watson, Mark Doherty, and Larry Porter. Review of AK Summary and AK Source Document Reference List; examination of selected Objective Evidence	Examples of objective evidence obtained include but are not limited to: WSPF, CRR. No discrepancies between the AK Record and the confirmatory test results were found. However, ANLE performed a detailed analysis of the stream based on AK using a similar process as that used by CCP. Comparison of results will bolster use of the waste stream scaling factor assuming that the results are comparable. Therefore, EPA requires provision of all DTC radiological data (DTC conversion records) summarizing DTC results for the purposes of AK-DTC comparison.
AK Accuracy			
Has the SQAO, consistent with the requirements of Section 4.1.1.2 of the WCPIP, reviewed the AK Summary Report, confirmatory test data and identified AK discrepancies, and prepared an AK Accuracy Report. This report will identify the percentage of containers that have been assigned to another SCG as well as radiological issue.	WCPIP Rev. 0D Attachment A	Interview of A.J.Fisher; examination of AK Accuracy report.	Examples of objective evidence obtained include but are not limited to: AK Accuracy Report for initial containers, stream AERHDM. The report did not consistently indicate that accuracy would be based both on waste stream and summary category group reassignment as required by the WCPIP. EPA noted this in concern No. EPA-ANL-RH-CCP-09-001C, and expects that the concern will be reconciled in the next AK Summary that may also include modifications to address WCPIP changes.
How did the SQAO determine what is to be considered a "significant" radiological discrepancy and is this determination technically sufficient and adequate?	WCPIP Rev. 0D Attachment A	Interview of A.J.Fisher; examination of AK Accuracy report.	Examples of objective evidence obtained include but are not limited to: AK Accuracy Report; CCP-AK-ANLE-502. CCP committed to freeze file changes to CCP-AK-ANLE-502 and CCP-AK

Required Technical Elements	Procedure Location/Adequacy	Verification of Activity	Objective Evidence/Adequacy
			to CCP-AK-ANLE-502 and CCP-AK-ANLE-500 that both address why comparison of AK and DTC data, with respect to accuracy, is not appropriate. CCP-AK-ANLE-502 was also revised to clarify how the mass spectrometry data are used in the comparison process.
Has the AK Accuracy report been updated annually? Even if the report is only updated annually, will they continually assess AK Accuracy?	WCPIP Rev. 0D Attachment A	Interview of A.J.Fisher; examination of AK Accuracy report.	Examples of objective evidence obtained include but are not limited to: AK Accuracy Report. CCP, in the past, has performed AK Accuracy on a lot basis. Provision of AK Accuracy reports to EPA as prepared, is required.
Has the AK Accuracy fallen below 90%? If so, the site shall document this as a significant condition adverse to quality as defined by the CBFO QAPD. The site shall notify the CBFO of this condition and implement appropriate corrective actions before proceeding with further characterization activities on the affected waste stream(s).	WCPIP Rev. 0D Attachment A	Interview of A.J.Fisher; examination of AK Accuracy report.	Examples of objective evidence obtained include but are not limited to: Accuracy reports, as revised to address WCPIP and EPA concerns is required, but it is anticipated that these revisions will not show that the accuracy has fallen below 90%.
Preparation of the CRR			
Has the SPM reviewed the qualified AK characterization information and the corresponding required DQOs and documented this review in an RH TRU waste AK Characterization Reconciliation Report (CRR)? . At a minimum the CRR shall include: • Specification of applicable site and waste stream. • A listing of each DQO • Data from the AK record that addresses each DQO • AK source document references that support/provide the data	WCPIP Rev. 0D Attachment A; CP-TP-506 Rev. 2	Review of the CRR for select ANLE RH waste stream; Interview of Larry Porter, SPM	Examples of objective evidence obtained include but are not limited to: WSPF and CRR; BDRs for containers 00810, 815, 817, 820, 824, 826. CRR shall be revised to include WCPIP revisions that recognize identification of EPA 10 nuclides as a DQO. The CRR included information required by the WCPIP Attachment A.

Required Technical Elements	Procedure Location/Adequacy	Verification of Activity	Objective Evidence/Adequacy
• A listing of AK record discrepancy resolutions, if any, that are relevant to each DQO • Documentation, including specific references, of how the AK data for each DQO were qualified, such as batch data reports, corroborative data, proceedings of a peer review, etc. • Radiography and/or visual examination summary to document that liquids greater than 1 percent are absent from the waste and to confirm AK concerning the physical properties of the waste • A summary presentation of radiological measurement data used to meet the DQOs and to confirm AK • A complete AK summary • A complete listing of all container identification numbers used to generate the WSPF, cross-referenced to each batch data report. • A listing of AK discrepancies generated by an AK qualification process and the corresponding resolutions • Signature of the SPM			
Has the SPM verified that the applicable QAOs (accuracy, completeness, representativeness, and comparability) associated with the AK process have been met.	WCPIP Rev. 0D Attachment A; CCP-TP-506 Rev. 2	Review of the CRR for select ANLE RH waste stream; Interview of Larry Porter, SPM	Examples of objective evidence obtained include but are not limited to: WSPF, CRR. Applicable QAOs have been included on the CRR.
Preparation of the Waste Stream Profile Form			
Has the SPM completed the Waste Stream Profile Form (WSPF) (Attachment 4) based on AK characterization and confirmation results and other relevant characterization data? Is the form complete and adequate/accurate?	WCPIP Rev. 0D Attachment A	Review of the WSPF and related attachments; interview of Lary Porter, SPM	Examples of objective evidence obtained include but are not limited to: Draft WSPF and related attachments (AK Summary and CRR). See comments pertaining to the AK Summary and CRR. Note that the WSPF was a draft version prepared for audit

Required Technical Elements	Procedure Location/Adequacy	Verification of Activity	Objective Evidence/Adequacy
			purposes only; EPA must be provided the final version of the WSPF once it is completed and approved. EPA also requires provision of all forthcoming DTC results, not just those that might be summarized in the CRR, including the radiological data (identification/quantification) of the EPA nuclides so that EPA may compare this information with AK data.
Have the WSPF, the RH AK Summary Report and the Characterization Reconciliation Report, resulting from waste characterization activities, been transmitted to the Department of Energy Carlsbad Field Office (DOE/CBFO). Only RH TRU waste that is characterized in accordance with the EPA requirements and WCPIP will be accepted for disposal at the WIPP.	WCPIP Rev. 0D Attachment A	Review of the WSPF and related attachments; interview of Lary Porter, SPM	Examples of objective evidence obtained include but are not limited to: Draft WSPF, CRR, AK Summary for CCP-AK-ANLE-500. Only draft version were available at the inspection; EPA must be provided the final version of the WSPF and related attachments once completed and approved.
Records			
Have the following records been generated and what is the disposition of these records? • AK Summary Report (Attachment 1) • AK Source Document Reference List (Attachment 2) • Correlation and Surrogate Summary Form (Attachment 3) • Waste Stream Profile Form (Attachment 4) • AK Source Document Summary (Attachment 5) • Characterization Reconciliation Report	WCPIP Rev. 0D Attachment A	Interview of AKEs Kevin Peters, Steve Shafer, Lisa Watson; examination of required references as listed (objective evidence)	Examples of objective evidence obtained include but are not limited to: CCP-AK-ANLE-500, CCP-AK-ANLE-501, AK Source Document Reference List, Correlation and Surrogate Summary Form, draft WSPF including the CRR, requested C, U, and P source documents, training records for K.Peters and S.Shafer, DR010, DR011, DR013, Ak Accuracy Report (current containers waste stream AERHDM). Lisa Watson verified that all documents are included at the CCP Files in Carlsbad, NM.

ATTACHMENT A.1: ACCEPTABLE KNOWLEDGE (AK) RH CHECKLIST

EPA Inspection No.: EPA-ANLE CCP RH-09.06-8 **Inspection Date: September 12-14, 2006**

Required Technical Elements	Procedure Location/Adequacy	Verification of Activity	Objective Evidence/Adequacy
• AK Source Documents • AK Training Records • AK Discrepancy Resolution Documentation • AK Accuracy Report			
Confirmatory Test Plan			
	WCPIP Rev. 0D Attachment A	Interview of AKEs Kevin Peters, Steve Shafer, and Mark Doherty, and examination of objective evidence.	Examples of objective evidence obtained include but are not limited to: CCP-AK-ANLE-502 Rev 0. The test plan requires revision to move the AK Accuracy assessment discussion to a more appropriate location, clarify the use of mass spec data, and to clarify why AK-DTC data comparisons as part of AK Accuracy are inappropriate. CCP committed to these changes in a Freeze File change. EPA requires provision of revisions to CCP-AK-ANLE-502 to verify that these freeze file changes were made, and to assess changes implemented to address WCPIP modifications.

ATTACHMENT A.2: RH RADIOLOGICAL CHARACTERIZATION CHECKLIST: DOSE-TO-CURIE

EPA Inspection No.: EPA-ANL-CCP-RH-9.06-8 **Inspection Date: September 12–14, 2006**

Required Technical Elements	Y/N	Location	Verification of Activity	Y/N	Objective Evidence
Technical Documents/Procedures					
Identify all ANL-CCP documents that provide technical information relative to performing and documenting the implementation of the DTC method, including operational procedures, and indicate the current revision of each.	Y	DOE/WIPP-02-3124, Revision 0D	All ANL-CCP documents were reviewed before, during or directly following this inspection. The correct revisions for each are noted in Objective Evidence in the cell to the left in this row.	Y	Documents include: CCP-TP-504, Revision 3; CCP-AK-ANEL-500, Revision 1; CCP-AK-ANLE-501, Revision 0; and, 9 Calculation packages prepared by J. Vance & J. Holderness cited in Section 8.2.1
Dose-To-Curie Instruments					
Verify the following: • Specifications for the instruments used for dose rate measurements of RH TRU waste containers are provided in ANL-CCP documents • Performance and measurement control criteria for dose rate instruments have been specified and integrated in ANL-CCP operating procedure(s) • The instruments used to make dose rate measurements of RH containers are identified • The instrument identified in previous bullet have been appropriately calibrated • The scale used to weigh the containers has been calibrated and that the scale has been checked each operational day	Y	CCP-TP-504, revision 3, Section 4.1	These technical aspects were verified by examination during the inspection	Y	CCP-TP-504, Revision 3; CCP-AK-ANLE-501, Revision 0; ANL-CCP DTC Batch Data Report No. ANLRHDTC06001 that contains copies of Attachment 1, *Measurement Control Report*, Attachment 2, *Container Data Sheet*, from CCP-TP-504 and Attachment 3, *Waste Container Dose-to-Curie Conversion Record*, from CCP-TP-504, Revision 3, for each container in the BDR that was assayed
Verify that the instruments used for dose rate measurements of RH TRU containers are properly calibrated to provide data that are consistent with those used in the calculation of the radionuclide-specific activity.	Y	CCP-TP-504, Revision 3, Section 4.1	Calibration sheets for the ion chambers used were examined.	Y	ANL-CCP DTC Batch Data Report No. ANLRHDTC06001
Verify that the position of the detector relative to the waste container and any	Y	CCP-TP-504, revision 3, Section 4.1	Detector position relative to the waste container and shielding is addressed	Y	ANL-CCP DTC Batch Data Report No. ANLRHDTC06001

ATTACHMENT A.2: RH RADIOLOGICAL CHARACTERIZATION CHECKLIST: DOSE-TO-CURIE

EPA Inspection No.: EPA-ANL-CCP-RH-9.06-8 **Inspection Date: September 12–14, 2006**

Required Technical Elements	Y/N	Location	Verification of Activity	Y/N	Objective Evidence
intervening shielding is consistent with that used in the calculation of the expected radiation dose.		Section 4.1	appropriately.		Report No. ANLRHDTC06001

ATTACHMENT A.2: RH RADIOLOGICAL CHARACTERIZATION CHECKLIST: DOSE-TO-CURIE (DTC)

EPA Inspection No.: EPA-ANL-CCP-RH-9.06-8 **Inspection Date: September 12–14, 2006**

Required Technical Elements	Y/N	Location	Verification of Activity	Y/N	Objective Evidence
General Technical Requirements					
DTC must provide information to support the reporting of quantitative values and uncertainties for ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{241}Am, ^{233}U, ^{234}U, ^{238}U, ^{90}Sr and ^{137}Cs.	Y	DOE/WIPP-02-3124, Revision 0D, Attachment C, Section 8.0	Quantitative values and uncertainties for ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{241}Am, ^{233}U, ^{234}U, ^{238}U, ^{90}Sr, and ^{137}Cs are reported.	Y	ANL-CCP DTC Batch Data Report No. ANLRHDTC06001
Verify that a waste container is classified as RH TRU only if the dose equivalent rate at the exterior of the surface of the container is between 200 mrem/hr and 1000 rem/hr and the concentration of alpha emitting TRU radionuclides is greater than 100 nCi/g waste.	Y	DOE/WIPP-02-3124, Revision 0D, Attachment C, Section 12.0	All containers in RH TRU waste stream AERHDM meet the criteria for TRU (concentration of alpha emitting TRU radionuclides greater than 100 nCi/g waste) and RH (dose equivalent rate at the exterior of the surface of the container between 200 and 1000 rem/hr)	Y	ANL-CCP DTC Batch Data Report No. ANLRHDTC06001
Assess the technical adequacy of the calculations involving the application of scaling factors and/or correlation techniques.	Y	DOE/WIPP-02-3214, Revision 0D, Attachment C, Section 7.0	The technical adequacy of the calculations involving the application of scaling factors and/or correlation techniques is addressed in Section 8.3.	Y	See Section 8.2 of this report, also INL-RH-02; INL-RH-03; ANEL-RH-03; ANLE-RH-05; ANLE-RH-06; ANLE-RH-07
Measurements: Dose Rate and Background					
Verify the following: • Dose rates are measured four (4) times at a detector-to-container distance of 1 meter, with the container rotated 90° between each of the four measurements • The appropriate ion chamber and probe are used • The radiation field is measured at least two locations about the container at the mid-height of the container and a distance of one-meter from the surface of the container.	Y	DOE/WIPP-02-3214, Revision 0D, Attachment C, Section 7.0	ANL-CCP Batch data Report No. ANLRHDTC06001examined for this inspection documented technically appropriate collection of container-specific dose rate information	Y	ANL-CCP DTC Batch Data Report No. ANLRHDTC06001, copies of copies of Attachment 1, *Measurement Control Report* and Attachment 2, *Container Data Sheet* and Attachment 3, *Waste Container Dose-to-Curie Conversion Record*, from CCP-TP-504, Revision 3
Verify that the background rate is measured and recorded and that actions are taken to reduce the background if the measured background radiation levels are greater than	Y	CCP-TP-504, Revision 3, Section 4.1	ANL-CCP Batch data Report No. ANLRHDTC06001examined for this inspection documented technically appropriate background measurement	Y	ANL-CCP DTC Batch Data Report No. ANLRHDTC06001, copies of Attachment 2, *Container Data Sheet* from CCP-

Required Technical Elements	Y/N	Location	Verification of Activity	Y/N	Objective Evidence
one-tenth of the expected container rate.			data.		TP-504, Revision 3
Measurement Documentation					
Verify that container number, waste stream identifier and all pertinent container-specific measurement data are entered into the "Waste Container Dose-to-Curie Conversion Record" spreadsheet, including: • Date of the gamma measurements • Waste Stream Designation • Container Number • Container Gross Weight • Estimated Can Size for Cans #1, #2, #3 • Estimated Fill Percentage for Cans #1, #2, #3 • Four (4) quadrant dose rates • Average of four (4) dose measurements • Expected container dose rate • Waste Material Type (matrix)	Y	DOE/WIPP-02-3124, Revision 0D; CCP-TP-504, Section 4.2	ANL-CCP Batch data Report No. ANLRHDTC06001examined for this inspection contained all required documentation	Y	ANL-CCP DTC Batch Data Report No. ANLRHDTC06001, copies of Attachment 2, *Container Data Sheet* and Attachment 3, *Waste Container Dose-to-Curie Conversion Record*, from CCP-TP-504, Revision 3
Verify that DTC BDR ANLRHDTC06001 contains the following items: • Batch Data Report Cover Sheet, Attachment 4 • Batch Data Report Table of Contents, Attachment 5 • Batch Data Report Narrative Summary, Attachment 6 • ITR Review Checklist, Attachment 7 • Measurement Control Report, Attachment 1 • Container Data Sheet(s), Attachment 2 • Waste Container Dose-to-Curie Conversion Record(s), Attachment 3 • Copy of NCRs, if applicable • Evidence of a review by an ITR and	Y	CCP-TP-504, Revision 3, Section 4.3	ANL-CCP DTC Batch Data Report No. ANLRHDTC06001examined for this inspection contained all required elements	Y	ANL-CCP DTC Batch Data Report No. ANLRHDTC06001

ATTACHMENT A.2: RH RADIOLOGICAL CHARACTERIZATION CHECKLIST: DOSE-TO-CURIE (DTC)

EPA Inspection No.: EPA-ANL-CCP-RH-9.06-8 **Inspection Date: September 12–14, 2006**

Required Technical Elements	Y/N	Location	Verification of Activity	Y/N	Objective Evidence
SPM, as appropriate.					
Verify that records generated in support of DTC are available for inspection. Records include the following, at a minimum: • Site specific procedures developed to implement the DTC method • Technical basis for the determination of the waste stream's "Standard Mix", shielding calculations for waste containers • Technical basis for determination of radionuclide scaling factors • TMU technical support documents	Y	DOE/WIPP-02-3214, Revision 0D, Attachment C, Section 15.0	All records related to DTC were available for this inspection on-site at INL and in CBFO Headquarters in Carlsbad, NM	Y	ANL-CCP DTC Batch Data Report No. ANLRHDTC06001

ATTACHMENT A.2: RH RADIOLOGICAL CHARACTERIZATION CHECKLIST: DOSE-TO-CURIE (DTC)

EPA Inspection No.: EPA-ANL-CCP-RH-9.06-8 **Inspection Date: September 12–14, 2006**

Required Technical Elements	Y/N	Location	Verification of Activity	Y/N	Objective Evidence
Technical Basis					
Verify the following: • Results of sampling and calculation form the basis for the development of radionuclide scaling factors used to convert measured dose rates to radionuclide-specific activities • Dose rates are measured at a distance of one meter from the outer surface of the waste container at the mid-height of the container • Calculations appropriately present the relationship between a container's measured dose rate and the waste's activity • Calculations account for all relevant container properties, specifically fill height (apparent density), waste type (matrix) and attenuation (shielding) of the container and/or liner wall • Calculations are performed using technically appropriate shielding analysis techniques	Y	DOE/WIPP-02-3214, Revision 0D, Attachment C, Section 7.0; CCP-AK-INL-501, Revision 0; CCP-TP-504, Revision 3, Section 4.3	These technical aspects were examined before, during and following this inspection in consultation with CTAC technical personnel.	Y	CCP-AK-ANLE-501, Revision 0; INL-RH-02; INL-RH-03; ANEL-RH-03; ANLE-RH-04; ANLE-RH-05; ANLE-RH-06; ANLE-RH-07; INL-RH-09; INL-RH-10; INL-RH-12
Verify that waste containers contain only matrices for which the DTC methodology has been established. Verify that the type of waste (waste matrix) in each container is recorded along with the height of the waste in the container.	Y	DOE/WIPP-02-3214, Revision 0D, Attachment C, Section 5.0	RH waste cans contain metals (steel), concrete, or organics with a minimum of mixing of dissimilar types of materials. Fill heights are specified for all containers, i.e., less than 25% full, 25% to 66% full, 66% to 90% full, more than 90% full).	Y	ANL-CCP DTC Batch Data Report No. ANLRHDTC06001; DTC spreadsheets in BDR
Verify that all DTC-related calculations have been subjected to a technical review and that all technical review comments and their resolutions are documented.	Y	DOE/WIPP-02-3214, Revision 0D, Attachment C, Section 14.0	With minor exceptions, all calculation packages contain evidence of a technical review.	Y	Examination of the 9 calculation packages that supported the development of radionuclide scaling factors prepared by J. Vance & J. Holderness, see

Required Technical Elements	Y/N	Location	Verification of Activity	Y/N	Objective Evidence
					Section 8.2.1
Verify that the ratio of actual measured dose rate to the calculated dose rate is used to calculate a scaling factor that is applied to the "Standard Mix" or subset thereof, that was used to estimate individual radionuclide activities.	Y	DOE/WIPP-02-3214, Revision 0D, Attachment C, Section 11.0; CCP-TP-504, Revision 3, Section 4.2	The "Standard Mix" was not used to generate scaling factors for this waste stream. The technical documentation of the scaling factor development supports the use of dose rate measurements.	Y	CCP-AK-ANLE-501, Revision 0; INL-RH-02; INL-RH-03; ANEL-RH-03; ANLE-RH-04; ANLE-RH-05; ANLE-RH-06; ANLE-RH-07
Total Measurement Uncertainty (TMU)					
Verify that a method for estimating total measurement uncertainty (TMU) has been developed and documented for RH TRU waste stream AERHDM.	Y	DOE/WIPP-02-3214, Revision 0D, Attachment C, Section 13.0	This checklist addresses the aspects of TMU attributable to DTC. The aspects of TMU related to the development and application of radionuclide scaling factors are addressed in Section 8.3.	Y	CCP-AK-ANLE-501, Revision 0; INL-RH-02; INL-RH-03; ANEL-RH-03; ANLE-RH-04; ANLE-RH-05; ANLE-RH-06; ANLE-RH-07
TMU is based upon the propagation of uncertainties present in all aspects of radiological characterization, including DTC.	Y	DOE/WIPP-02-3214, Revision 0D, Attachment C, Section 13.0	TMU includes the contributions of all applicable aspects of the DTC process	Y	CCP-AK-ANLE-501, Revision 0; INL-RH-02; ANLE-RH-05; ANLE-RH-06
Verify that the approach for TMU determination incorporates the contributions of all applicable components of DTC, including: • Measured sample isotopic activities • Relative uncertainties associated with each measured radionuclide • Measurement of the container's dose rate • Determination of waste mass • Modeling errors or biases.	Y	DOE/WIPP-02-3214, Revision 0D, Attachment C, Section 13.0	TMU includes the contributions of all applicable aspects of the DTC process	Y	CCP-AK-ANLE-501, Revision 0; INL-RH-02; INL-RH-03; ANEL-RH-03; ANLE-RH-04; ANLE-RH-05; ANLE-RH-06; ANLE-RH-07
Verify that the TMU approach has been formally submitted to CBFO for review and approval.	Y	DOE/WIPP-02-3214, Revision 0D, Attachment C, Section 13.0	The TMU approach was evaluated by the CTAC Technical Specialists (D. Stuenkel and J. Oliver) during this inspection.	Y	INL-RH-02; INL-RH-03; ANEL-RH-03; ANLE-RH-04; ANLE-RH-05; ANLE-RH-06; ANLE-RH-07

ATTACHMENT A.3: VISUAL EXAMINATION (VE) CHECKLIST

EPA Inspection No.: EPA-ANL-CCP-RH-9.06-8 **Inspection Date: September 12-14, 2006**

Establishment of Required Technical Elements in Procedures	Y/N Location	Execution of Procedures	Y/N	Objective Evidence/Comment
RHVE-1 Site procedures identify required training and qualifications for RHVE personnel.	WCPIP, Revision 0D, Section 4.1.2.2 CCP-QP-002, Revision 21	• Formal training elements include: project requirements, container identification and labeling, applicable state and federal regulations • Site-specific training program: OJT, identification of summary category groups, WMPs, packaging configurations, residual liquids.	Y	During the on-site inspection, EPA interviewed two (2) of the three (3) qualified operators and the designated SME/VEE. The operators had received training on the AK summary (CCP-AK-ANLE-500) for the waste stream being examined (AERHDM). This is a debris (S5000) waste stream. Operators were also required to read the WCPIP, which includes EPA regulations and requirements. The VEE for ANL is also the VEE for INL and spends his time between the two sites. The VEE is also the OJT/SME and provided the OJT for the operators. The operators passed the required written test on 5/22/06. The operators reviewed revision 1 of the AK summary on 8/14/06. Objective evidence: 1. Qualification cards for VE operators. 2. Qualification Card for SME/VEE 3. VEE appointment letter, dated April 17, 2006 4. List of Qualified Individuals (LOQI) for ANLE RH VE program 5. Attendance Sheets for CCP-AK-ANLE-500 training 6. Acceptable Knowledge Summary Report Training certificates for Argonne Remote-Handled Debris Waste Stream – AERHDM.
RHVE-2 Operator qualification and re-qualification requirements are described	WCPIP, Revision 0D, Section 4.1.2.2 CCP-QP-002, Revision 21, Section 4.2.5	• To become qualified the RHVE operator must pass a comprehensive written test based on training objectives with a minimum score of 80% • Demonstrate capability in the presence of the site VEE during OJT • RHVE operators re-qualified every 2 years based on continued satisfactory performance	Y	EPA reviewed the Qualification Cards for the three (3) qualified operators and the designated VEE. The VEE is the OJT/SME and provided the OJT for the operators. The operators passed the required written test on 5/22/06. The Qualification Cards reviewed were completed as required. As this program is new, the re-qualification of operators has not been required. Objective evidence: 1. Qualification cards for VE operators.

ATTACHMENT A.3: VISUAL EXAMINATION (VE) CHECKLIST

EPA Inspection No.: EPA-ANL-CCP-RH-9.06-8 **Inspection Date: September 12-14, 2006**

Establishment of Required Technical Elements in Procedures	Y/N Location	Execution of Procedures	Y/N	Objective Evidence/Comment
		• Unsatisfactory performance – failed to identify prohibited item during OJT of score of less than 80% on exam		2. Qualification Card for SME/VEE 3. VEE appointment letter, dated April 17, 2006 4. List of Qualified Individuals (LOQI) for ANLE RH VE program
RHVE-3 Each site has a designated VE expert (VEE)	WCPIP, Revision 0D, Section 4.1.2.2 CCP-PO-001, Revision 12	• VEE designation is documented • VEE has knowledge of the RH TRU waste being characterized • Responsible for overall direction and implementation of VE at the facility • Certification Plan specifies the selection, qualification, and training requirements of VEE	Y	VEE training and designation were reviewed during the on-site inspection. The VEE was designated as such in a letter from the SPM, dated 4/17/06. The letter design Although the VEE has overall responsibility for the VE process, the VEE and operators are not necessarily at the same location when container audio/visual recordings are processed. The VEE and the operators have copies of the VE recordings so that problems encountered by the operators can be discussed, reviewed and resolved with the VEE by electronic or telephonic communication. Objective evidence: 1. Qualification Card for VEE 2. List of Qualified Individuals (LOQI)
RHVE-4	CCP-TP-509, Revision 0, Section 4.4	• Operators review AK Tracking Spreadsheet to verify that correct containers examined • Rejected containers are placed in a shielded container with a CCP Hold Tag attached • Provide container processing information to SPM/VPM	Y	Prior to commencing VE operations, the operators review the AK Tracking Spreadsheet to determine which containers will be examined. During the on-site inspection EPA inspected the hold tags applied to the shielded containers, located in 331 yard, Building 331 Dome, and 398 yard, for the rejected containers from BDR RHANLVE060001. A hold tag was correctly attached to each container. The processing information for each BDR is contained within the WTS system and identifies the container number and the NCR number for rejected containers. An Excel spreadsheet, "DGL Container Management", is populated with the VE data by the operators. Only completed BDRs are uploaded to the spreadsheet. The spreadsheet is accessed by the SPM to obtain the container information.

Establishment of Required Technical Elements in Procedures	Y/N Location	Execution of Procedures	Y/N	Objective Evidence/Comment
				Objective evidence: 1. AK tracking spreadsheet for containers in waste stream AERHDM 2. BDR # RHANLVE060001 3. Processing information for BDR RHANLVE060001
RHVE-5 Procedures and technical guidance documents provide complete instructions for performing RHVE.	WCPIP, Revision 0D, Sections 4.1.2, 4.1.2.1, 4.3.3 CCP-TP-500, Revision 2, Sections 4.1-4.2, Attachment 1	Procedures are sufficiently detailed to enable the operator to determine if a waste container meets the criteria of '194.24 with regard to identifying applicable parameters with waste limits (194.24, c, (4) – demonstrate that a system of controls has been and will continue to be implemented to confirm that the total amount of each waste component that will be emplaced in the disposal system will not exceed the upper limiting value or fall below the lower limiting value described in the introductory text of paragraph c) of this section) • All existing VE tapes will be reviewed and the VE data will be documented • Existing waste container packaging records will be qualified by VE or RTR • 100% of containers will be subject to VE at the time of packaging • Waste Stream Description and WMC verified • Presence/absence of prohibited items	Y	In this waste stream, 44 containers were already packaged and CCP has audio/visual tapes for all of these. CCP estimates that there will be an additional 50 ± 100 drums that still need to be packaged. Packaging will take place in 7.5-gallon cans and two cans will be placed in each 30-gallon container. Two (2) operators generated VE data for RH containers from review of audio/visual recordings. The operators reviewed existing recordings and completed the required data sheets from their observations. Operators were given training on the waste stream prior to processing containers. CCP had generated only one (1) Batch Data Report (BDR) that had been through project level review at the time of the inspection. Of the ten (10) containers in BDR RHANLVE060001, four were rejected and six (6) met the required VE QAOs. At the end of the VE event, the operators assigned percentages to each WMP and manually calculate, from these percentages and the weight of the waste contained in the cans, the weight of each WMP. Operators did not retain any of the manual calculations performed. The ITR did not perform the required check of these manual calculations and the requirement to perform this verification was not included in the ITR checklist. When interviewed an operator could not provide this basis for answering at least one of the data form questions. EPA generated concern ANL-CCP-RH-VE-06-001CR to address these issues.

EPA Inspection No.: EPA-ANL-CCP-RH-9.06-8 **Inspection Date: September 12-14, 2006**

Establishment of Required Technical Elements in Procedures	Y/N Location	Execution of Procedures	Y/N	Objective Evidence/Comment
				ANL-CCP-RH-VE-06-001CR: 1. Method of manual calculation of WMP weights is not contained within the existing procedure. Failure to document this process in the procedure may lead to inconsistent and undocumented methodologies being used for this calculation. Resolution: CCP will remove the requirement to estimate WMP weights from procedure CCP-TP-500 as it is not required by the WCPIP. 2. ITR is required to review all manual calculations but WMP weight calculations are not reviewed, nor is the need to review the item contained in any ITR checklist. Failure to do so removes the only required check on the calculation on which WMP quantities are based. Resolution: When procedure CCP-TP-500 is revised, WMP weights will not be calculated and therefore will not require verification of the calculation. 3. Operators are filling out some "Visual Examination Data Form" items without the knowledge necessary to make the correct decision. Example: Checking off yes for "The waste is consistent with the waste stream description?" When questioned, a VE operator could not explain how they were able to answer this question. Confirmation of waste stream description is essential to AK confirmation required by 40 CFR 194.24(c). Operator is responsible to decide if the drum examined is part of the waste stream. Resolution: CCP will provide additional training for the operators. EPA considers this concern closed. RH drums are stored in shielded containers and, if a container is rejected, CCP/ANL personnel place a hold tag on that outer container. The hold tags on all of the rejected containers in BDR # RHANLVE060001 were inspected by EPA.

Establishment of Required Technical Elements in Procedures	Y/N Location	Execution of Procedures	Y/N	Objective Evidence/Comment
				EPA reviewed the data sheets and audio/video recordings for containers 00816, 00826, 00825, and 00815 to ensure consistency between the written and visual records. EPA did not identify any discrepant information for these containers. The audio/video recordings do not show the 7.5 gallon cans being loaded into the 30 gallon containers but the cans and containers can be associated through the original packaging information. This information is included in the BDR for each container. Objective evidence: 1. BDR # RHANLVE060001 2. List of Qualified Individuals (LOQI) for ANLE RH VE program 3. Attendance Sheets for CCP-AK-ANLE-500 training 4. Acceptable Knowledge Summary Report Training certificates for Argonne Remote-Handled Debris Waste Stream – AERHDM.
RHVE-6	CCP-TP-500, Revision 2, Section 2.4.2	• Corrective actions are taken when necessary	Y	NCRs were written as needed during processing of the containers in batch RHANLVE060001. Containers 00831 and 00816 were rejected because CCP operators could not verify that containers were free of liquids. NCR NCR-RHANL-0001-06 was issued by CCP to document this condition. NCR NCR NCR-RHANL-0002-06 was generated for containers 00825 and 00829 because the operators were unable to determine the primary contents of the containers. All of the above containers were rejected by CCP. Objective evidence: 1. BDR # RHANLVE060001

EPA Inspection No.: EPA-ANL-CCP-RH-9.06-8 **Inspection Date: September 12-14, 2006**

Establishment of Required Technical Elements in Procedures	Y/N Location	Execution of Procedures	Y/N	Objective Evidence/Comment
RHVE-7 Site procedure(s) require data generation and project level reviews of Batch Data Reports (BDRs).	WCPIP, Revision 0D, Section 4.1.2.1 CCP-TP-500, Revision 1, ITR: Sections 4.3.5-4.3.8, Attachment 2, SPM: Section 4.4, Attachment 3	• ITR review Attachment 2 • SPM review Attachment 3	Y	The VEE signed off on the BDR RHANLVE060001 although the container inventories were incomplete. This was identified by CCP and the inventories were revised prior to the on-site inspection. As the sign off date for the BDR was after the additional training provided by CCP on 6/15/06 EPA generated concern ANL-CCP-RH-VE-06-002C to address this issue. ANL-CCP-RH-VE-06-002C: The ITR had not fully implemented the requirement for complete inventory put in place on 6/15/06 at the time BDR #RHANLVE060001 was signed off on 7/19/06. The ITR signed off on the checklist on 7/19 however, it was then corrected to reflect the "complete inventory" requirement on 8/25. Resolution: The ITR initiated the change after he fully understood the expected criteria of "complete inventory" based on the issue at INL. At the time of the inspection the VE data had been revised to include a complete inventory of the waste items in each container. EPA considers this concern closed. The SPM checklist listed the containers that were rejected in the batch and also provided the applicable NCR numbers. Objective evidence: 1. BDR # RHANLVE060001
RHVE- 8	CCP-TP-500, Revision 2, Section 5.0	• Lifetime/QA records – Attachments 1-5, Copy of NCRs • QA/nonpermanent records – VHS tape or DVD (primary and backup)	Y	Both the BDR and audio/visual recordings for RHANLVE060001 were available for review during the on-site inspection. Two copies of the original VHS recordings are made, one being sent to the VEE and one to the operators for processing. Objective evidence: 1. BDR # RHANLVE060001 2. Audio/visual recordings for container in BDR #

Establishment of Required Technical Elements in Procedures	Y/N Location	Execution of Procedures	Y/N	Objective Evidence/Comment
				RHANLVE060001
RHVE-9 Quality Assurance Objectives are defined and met	WCPIP, Revision 0D, Section 4.1.2.3	Data Accuracy: 194.22, b, (1) the degree to which data agree with an acceptable reference or true value WCPIP: maintained by requiring operators to pass a comprehensive test with a score of 80% and demonstrated satisfactory performance for initial qualification and re-qualification Data Precision: 194.22, b, (2) a measure of the mutual agreement between comparable data gathered or developed under similar conditions expressed in terms of a standard deviation WCPIP: – maintained by reconciling any discrepancies between 2 operators (or operator and ITR) with regard to physical form of waste, absence of residual liquid Data Representativeness: 194.22, b, (3) the degree to which data accurately and precisely represent a characteristic of a population, a parameter, variations at a sampling point, or environmental conditions WCPIP: – Contents placed in a container will be described on the data forms Data Completeness: 194.22, b, (4) a measure of the amount of valid data obtained compared to the amount that was expected WCPIP: – Relevant waste information must	Y	Data Accuracy: This QAO was met by using qualified operators and VEE to generate and review the VE data generated. Data Precision: This QAO was met by the two operators accepting and signing the data sheets. CCP has never encountered a situation where the two operators could not resolve an initial difference in what data should be recorded. The VEE who is also the ITR discusses and resolves any VE data discrepancies with the operatos Data Representativeness: To ensure that the Data Representativeness QAO was met, the VEE reviewed the visual recording and the data sheet for each container in the batch that did not have an NCR associated with it. The SPM checked WMP weights against the item descriptions to ensure that this QAO was met. Data Completeness: The VEE determined that the Data Completeness QAO was met by reviewing the data sheets to ensure that some information is present in each block. Data Comparability: Data Comparability QAO was met by the use of an approved training procedure (CCP-QP-002) and ensuring that operators and VEE were full qualified. This training and qualification was documented in the VEE and operator Qualification Cards.

Establishment of Required Technical Elements in Procedures	Y/N Location	Execution of Procedures	Y/N	Objective Evidence/Comment
		be collected and documented on a videotape and/or data form or other unalterable media Data Comparability: 194.22, b, (5) a measure of the confidence with which one data set can be compared to another WCPIP: – ensured by site meeting training requirements and complying with the minimum standards used to implement VE		
RHVE-10 VE as a method to qualify AK data	WCPIP, Revision 0D, Sections 4.3, 4.3.3	194.24, c, (4) – demonstrate that a system of controls has been and will continue to be implemented to confirm that the total amount of each waste component that will be emplaced in the disposal system will not exceed the upper limiting value or fall below the lower limiting value described in the introductory text of paragraph c) of this section If VE is used as a qualification method for AK all of the requirements in section 4.3 and 4.3.3 are met: • Quality and reliability of the measurement control program under which the data were generated (QC samples included in the VE process) • Extent to which the data demonstrate the properties of interest (VE process generates data for all items in containers) • Qualification of personnel generating data (training records for personnel on tapes performing the original VE event) • Technical adequacy of the procedures	Y	• CCP uses two (2) qualified operators and an approved procedure to generate VE data. • The data sheets in BDR # RHANLVE060001 were revised approximately two (2) months after the original VE examinations. This revision was due to the original container inventories being incomplete. The BDR reviewed by EPA at the time of the on-site inspection contained complete container inventories as required. • The two operators that generated the only completed BDR (RHINLVE60001) at the time of the on-site inspection were qualified and had passed the required examination when they generated the VE data. Training records for the three (3) operators and the VEE were complete and available for review. • Procedure CCP-TP-500, Revision 2 contains instructions for performing VE by review of original audio/visual recordings. The procedure was technically adequate.

Establishment of Required Technical Elements in Procedures	Y/N Location	Execution of Procedures	Y/N	Objective Evidence/Comment
		used to generate the original data (copies of original procedures)		
RHVE-11	CCP-AK-ANLE-502, R. 0, Section 3.2	Verify from the packaging records which smaller cans were place into any particular container.	Y	Packaging records are included in the BDR for each container. Objective evidence: 1. BDR # RHANLVE060001
RHVE-12	WCPIP, R. 0D, Section 2.2.3.2	DQO for Physical Form – "Generator sites must determine the uncertainty in the estimate of the weight of the waste".	Y	CCP SPM stated that this will be done when container information is entered into WWIS. At this time the RH WWIS modules are not complete and WWIS was not included in the scope of this inspection. All WMPs for debris waste will be entered into WWIS as plastic as required by the WCPIP.

Attachments B.1 through B.3

*****DRAFT*****

Upon further analysis, the EPA issue presented here may be included in the EPA Inspection Report as an EPA Finding or Concern and can be the basis for EPA approval/disapproval

Inspection No. EPA-ANL-CCP-RH 09.06-8	**Issue Number:** ANL-CCP-RH-VE-06-001CR, Rev. 1 **Date:** 9-13-06
Inspector: Dorothy E. Gill **Attachments?** ☐ YES ☒ NO	**Sample Size:** All Available BDRs **Population size (if known):** one (1)

A. Description of Issue:

1. Method of manual calculation for WMP weights is not contained within the existing procedure. Failure to document this process in the procedure may lead to inconsistent and undocumented methodologies being used for this calculation.

CCP Response: CCP will initiate the process to remove this requirement in the procedure to determine the WMP weights. The requirement is self imposed in the procedure is not required by the PIP or the WAP.

2. ITR is required to review all manual calculations but WMP weight calculations are not reviewed nor is the need to review the item contained in any ITR checklist. Failure to do so removes the only required check on the calculation on which WMPs quantities are based.

CCP Response: Based on resolution to comment 1, the ITR will no longer have manual calculations to review so the resolution to comment 1 also resolves comment 2.

3. Operators are filling out some "Visual Examination Data Form" items without the knowledge necessary to make a correct decision. Example:

Checking off yes for "The waste is consistent with the waste stream description?" When questioned, a VE operator could not explain how they were able to answer this question. Confirmation of waste stream description is essential to AK confirmation as required by 40 CFR194.24 (c). Operator is responsible to decide if the drum examined is part of the waste stream.

CCP Response: The VE operators were comparing the items listed in Table 2 of Section 5.4.1 of the AK Summary Report (posted in VE work area) to the items seen on the video. This table is more detailed than Section 2.0, Waste Stream Description and, therefore, the operators were adequately verifying that the waste items were consistent with the waste stream description. However, when the operators were asked the question with respect to the text description given in Section 2.0, they did not give a crisp clear explanation. Based on the comment, CCP will provide additional training to the operators.

B. Regulatory Reference: 40 CFR 194.24 (c)

*****DRAFT*****

Upon further analysis, the EPA issue presented here may be included in the EPA Inspection Report as an EPA Finding or Concern and can be the basis for EPA approval/disapproval

Inspection No. EPA-ANL-CCP-RH 09.06-8	**Issue Number:** ANL-CCP-RH-VE-06-001CR, Rev. 1 **Date:** 9-13-06

C. Site requirement(s):

1. CCP-TP-500, Revision 2, 4.1.2 [F]
2. DOE/WIPP-02-3214, WCPIP, Revision 0D, Section 3.5.1.2
3. CCP-TP-500, Revision 2, Section 4.1.2 [H.4]

D. Discussed with:

Site Personnel: Irene Quintana, Tommy Mojica
DOE/CTAC Personnel: Wayne Ledford, Karen Gaydosh
Other Personnel: Eric D'Amico, Larry Porter

E. Additional Comments: Before implementing this procedure at other CCP sites the impact of this concern should be evaluated for inadequacies.

F. Site Response Information:

Site Response Required? ☒ YES ☐ NO
Site Response Due Date: 10/05/06

*****DRAFT*****

Upon further analysis, the EPA issue presented here may be included in the EPA Inspection Report as an EPA Finding or Concern and can be the basis for EPA approval/disapproval

Inspection No. EPA-ANL-CCP-RH 09.06-8	**Issue Number:** ANL-CCP-RH-VE-06-002C **Date:** 09-13-06
Inspector: Dorothy Gill **Attachments?** ☐ YES ☒ NO	**Sample Size: All BDRs** **Population size (if known):** One (1)

A. Description of Issue: The ITR had not fully implemented the requirement for complete inventory put in place on 6/15/06 at the time BDR #RHANLVE060001 was signed off on 7/19/06. The ITR signed off on the checklist on 7/19, however, it was then corrected to reflect the "complete inventory" requirement on 8/25.

CCP Response: The ITR initiated the change after he fully understood the expected criteria of "complete inventory" based on the issue at INL.

B. Regulatory Reference: 40 CFR 194.24 (c)

C. Site requirement(s): DOE/WIPP-02-3214, WCPIP, Revision 0D, Section 4.1.2.1

D. Discussed with:

Site Personnel: Irene Quintana, Tommy Mojica
DOE/CTAC Personnel: Wayne Ledford, Karen Gaydosh
Other Personnel: Eric D'Amico, Larry Porter

E. Additional Comments:

F. Site Response Information:

Site Response Required? ☐ YES ☒ NO
Site Response Due Date: N/A

*****DRAFT*****

Upon further analysis, the EPA issue presented here may be included in the EPA Inspection Report as an EPA Finding or Concern and can be the basis for EPA approval/disapproval

Inspection No. EPA-ANL-CCP-RH 09.06-8	**Issue Number:** ANL-CCP-RH-AK-06-003C **Date:** 09-13-06
Inspector: Connie Walker **Attachments?** ☐ YES ☒ NO	**Sample Size:** **Population size (if known):** 1 AK Accuracy Report

A. Description of Issue: Section 4.1.1.2 of the WCPIP states that: The percentage of waste containers which require reassignment to a new SCG and new waste stream will be reported as a measure of AK Accuracy. The AK Accuracy Report dated August 28, 2006 reports SCG accuracy, but not waste stream accuracy.

CCP Response: CCP will be to ensure that "or new waste stream" is included in AK Accuracy Report to comply Section 4.1.1.2.

B. Regulatory Reference: 40 CFR 194.24 (c) (3)

C. Site requirement(s): DOE/WIPP-02-3214, WCPIP, Revision 0D, Section 4.1.1.2

D. Discussed with:
Steve Schafer, Kevin Peters
Eric D'Amico, A.J. Fisher

E. Additional Comments: It is noted that the AK Accuracy Report will be among those documents requiring revision when the latest revision of the WCPIP is approved. Revision of the AK Accuracy report to address the above requirements may be done at that time, when other revisions are being done (e.g. addition of the EPA 10 radionuclide identification as a DQO, etc).

F. Site Response Information:

Site Response Required? ☐ YES ☒ NO
Site Response Due Date: N/A