UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

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OFFICE OF
AIR AND RADIATION

Donald C. Gadbury
Manager, National TRU Program
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P.O. Box 3090
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Dear Mr. Gadbury:

On January 19, 2010, the Carlsbad Field Office (CBFO) requested that the U.S. Environmental Protection Agency (EPA) approve a proposed Tier 1 change containing eight containers of retrievably stored, remote-handled (RH) transuranic (TRU) debris waste from waste stream ID-MFC-S5400-RH for disposal at the Waste Isolation Pilot Plant (WIPP). The enclosed report (EPA Docket No. A-98-49; II-A4-126) provides more detailed background of our review. We approve the Tier 1 change request, and Idaho National Laboratory (INL) may dispose of this waste at the WIPP.

The Central Characterization Project (CCP) characterized this waste using remote-handled waste characterization processes approved by EPA in February 2007. In our current evaluation, EPA identified no concerns. EPA determined that the procedures and processes used by INL-CCP staff for characterizing this waste were adequate. As a result of our evaluation, we revised the tiering table (Table 1) in the enclosed report. Revisions were made to reflect the tiering changes needed to sufficiently address nondestructive examination (NDE) T1 changes.

If you have any questions regarding this approval, please contact Rajani Joglekar at (202) 343-9462 or Ed Feltcorn at (202) 343-9422.

Sincerely,

Tom Peake

Tom Peake, Director
Center for Waste Management and Regulations

Enclosure

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EPA DOCKET NO: A-98-49, II-A4-126

WASTE CHARACTERIZATION REPORT

EPA TIER 1 EVALUATION OF THE CENTRAL CHARACTERIZATION PROJECT (CCP) REMOTE-HANDLED TRANSURANIC WASTE CHARACTERIZATION PROGRAM AT THE IDAHO NATIONAL LABORATORY (INL): ADDITION OF WASTE STREAM ID-MFC-S5400-RH

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Office of Radiation and Indoor Air
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ATTACHMENTS

Attachment A: Approval Summary for INL-CCP RH Waste Characterization Program
Attachment B: Listing of Documents Reviewed

ACRONYMS

AK	acceptable knowledge
AKE	acceptable knowledge expert
AKSR	acceptable knowledge summary report
Am	americium
ANL	Argonne National Laboratory
ANL-W	Argonne National Laboratory– West
ATR	Advanced Test Reactor
BDR	batch data report
CBFO	Carlsbad Area Field Office
Ce	cerium
CFR	Code of Federal Regulations
CH	contact-handled
Ci	curie
CRR	Characterization Reconciliation Report
Cs	cesium
CSSF	Correlation and Surrogate Summary Form
CTP	Confirmatory Test Plan
CWI	CH2M-WG Idaho, LLC
DAW	dry active waste
DOE	U.S. Department of Energy
DQO	data quality objective
DR	discrepancy resolution
DTC	dose-to-curie
EBR	experimental breeder reactor
EPA	U.S. Environmental Protection Agency
FCF	Fuel Conditioning Facility
g	gram
g/cc	gram per cubic centimeter
g/cm^3	grams per cubic centimeter
HFEF	Hot Fuel Examination Facility
HLW	high-level waste

ID	Idaho
IFR	integral fast reactor
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
IWTS	Integrated Waste Tracking System
L&O	Laboratory and Office
LANL	Los Alamos National Laboratory
LLW	low-level waste
LWA	Land Withdrawal Act
LWBR	light-water breeder reactor
MCNP5	Monte Carlo N-Particle Transport Code RSICC Computer Code Collection, Oak Ridge National Laboratory
MFC	Materials and Fuel Complex
mR/hr	milli Roentgen per hour
MWD/MTIHM	megawatt days per metric ton of initial heavy metal
Nb	niobium
nCi/g	nanocurie per gram
NCR	non-conformance report
NDA	nondestructive assay
NRF	Naval Reactors Facility
NWPA	Nuclear Waste Policy Act
ORIGEN	Oak Ridge Isotope Generation
ORNL	Oak Ridge National Laboratory
Pu	plutonium
RERTR	Reduced Enrichment Research and Test Reactor
RH	remote-handled
RMWSF	Radioactive Mixed Waste Staging Facility
RTR	real-time radiography
RWMC	Radiological Waste Management Complex
SCG	Summary Category Group
SF	Scaling Factor
SNF	spent nuclear fuel
SPM	Site Project Manager

Sr	strontium
T1	Tier 1
T2	Tier 2
TREAT	Transient Reactor Test Facility
TRU	transuranic
TSFU	Total Scaling Factor Uncertainty
U	uranium
VE	visual examination
WC	waste characterization
WCPIP	Waste Characterization Program Implementation Program
WIPP	Waste Isolation Pilot Plant
WMC	waste matrix code
WMP	waste material parameter
WSPF	Waste Stream Profile Form
WWIS	WIPP Waste Information System
Zr	zirconium

1.0 EXECUTIVE SUMMARY

This report supports the U.S. Environmental Protection Agency's (EPA or the Agency) approval of retrievably-stored, remote-handled (RH) transuranic (TRU) heterogeneous debris (S5400) from one additional waste stream from the Department of Energy's (DOE) Idaho National Laboratory (INL). Specifically, this approval supports the addition of Waste Stream ID-MFC-S5400-RH.

On January 19, 2010, the Carlsbad Field Office (CBFO) requested that EPA review a proposed Tier 1 (T1) change addressing the addition of RH Waste Stream ID-MFC-S5400-RH.

This approval is specific to eight containers. Any addition of containers to the approved waste stream requires CBFO and INL-CCP to submit a T1 change request and receive EPA approval prior to their disposal at the Waste Isolation Pilot Plant (WIPP).

The Central Characterization Project (CCP) is responsible for characterizing the above wastes using the system of controls, which EPA evaluated during the baseline inspection conducted in July 2006 and approved in January 2007 and as described in documentation accompanying this Tier 1 request. A summary of EPA's approval of the INL RH TRU waste characterization program is included as Attachment A. Because there were no new equipment or processes on site at INL to examine, EPA conducted a desktop review of this change in April and May 2010.

This report presents the results of the T1 evaluation. Section 4.0 discusses EPA's evaluation of the addition of Waste Stream ID-MFC-S5400-RH. EPA did not identify any findings or concerns during this T1 evaluation and no open issues remain relative to this T1 change. EPA has not identified any tiering changes during the course of this evaluation, however, the tiering tables provided in previous INL RH reports did not sufficiently address nondestructive examination (NDE) T1 changes. Additionally, the scope of this evaluation did not explicitly include an evaluation of NDE but it became apparent that this was needed and NDE was assessed as part of this evaluation. Therefore, this report includes an up-to-date tiering table as Table 1 of this report. EPA determines that the procedures and processes used by INL-CCP for the characterization of Waste Stream ID-MFC-S5400-RH are adequate. EPA, therefore, approves the addition of eight containers from Waste Stream ID-MFC-S5400-RH to INL-CCP's RH baseline approval as a T1 change.[1] The addition of any other RH debris waste other than what is described in this report to this waste stream remains a T1 change requiring EPA approval.

[1] The scope of this T1 evaluation includes eight 55-gallon drums from Waste Stream ID-MFC-S5400-RH. These eight drums were originally 4 55-gallon drums containing 48 1 or 2- gallon cans whose contents were repackaged directly into 30-gallon drums, which were then overpacked into 55-gallon drums for a total of 8 drums. See Section 4.0.

Table 1. Tiering of RH TRU Waste Characterization Processes Implemented by INL-CCP (Revised May 12, 2010)[1]

RH Process Elements	INL-CCP RH Process - T1 Changes	INL-CCP RH Process - T2 Changes[2]
Acceptable Knowledge (AK)	Addition of containers to approved waste streams Any new waste streams not approved under this baseline Substantive modification(s)[3] that have the potential to affect the characterization process: CCP-AK-INL-500, CCP-AK-INL-501, or CCP-AK-INL-502 Load management for any RH waste stream	Notification to EPA when AKSRs, Radiological Characterization Reports and Certification Confirmation Test Plans (e.g., CCP-INL-AK-500, CCP-INL-AK-501, and CCP-INL-AK-502) updates are approved by CBFO Notification to EPA when changes to AK documentation as a result of WCPIP revisions have been made (e.g., CRR)[4] Notification to EPA when a Correlation or Surrogate Summary Form is completed for each of the RH containers in this waste stream identified as CH, based upon measured dose rates that present NDA results for assayed containers Notification to EPA once waste stream data package for debris waste stream and any modifications to the WSPF, including the CRR and AK Summary, are completed Notification to EPA that the final Dose-to-Curie (DTC) determination is complete for RH containers numbers 728 through 737, as identified in AK Reference P030 **AK accuracy reports (prepared annually, at a minimum)**
Radiological Characterization, including Dose-to-Curie (DTC)	Application of new scaling factors for isotopic determination other than those documented in CCP-AK-INL-501 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[3] Any new waste stream not approved under this baseline or addition of containers to Waste Stream ID-ANLE-S5000 that requires changing the established radionuclide scaling factors	Notification to EPA upon completion of revisions of CCP-AK-INL-501 or CCP-TP-504 that require CBFO approval
Visual Examination of audio/video media (VE)	**Use of VE to characterize additional debris waste streams or waste from other Summary Waste Categories**	None
Real-Time Radiography (RTR)	**Any new S5000 waste stream other than ID-ANLE-S5000 or wastes from an S3000 or S4000 waste stream** **Notification to EPA prior to addition of a new RTR unit(s)**	**Notification to EPA upon completion of changes to RTR procedure(s) that require CBFO approval**
WIPP Waste Data System, WDS (previously known as WWIS)	**None**	**Changes made to WDS procedure(s) that require CBFO approval**

Notes:

[1] This table has been modified by deleting the references to specific sections of the baseline inspection report where each T1 or T2 element is discussed; additions to the original tiering table from the 2007 baseline inspection appear in **bold**.

[2] INL-CCP will report all T2 changes to EPA every three months.

[3] *Substantive modification* refers to a change with the potential to affect INL-CCP'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 in CCP-TP-504.

[4] Excluding changes that are editorial in nature or are required to address administrative concerns.

2.0 PURPOSE OF TIER 1 EVALUATION

Certain changes to the waste characterization activities from the date of the site's baseline inspection must be reported to and, if applicable, approved by EPA according to the tiering requirements set forth in 40 CFR 194.8 regulations and incorporated in the INL-CCP RH Baseline Final Report cited in Attachment A.

Under the changes to 40 CFR 194.8 promulgated in the July 16, 2004 Federal Register notice, EPA must perform a single baseline inspection of a TRU waste generator site's waste characterization program (Vol. 69, No. 136, pages 42571–42583, July 16, 2004). The purpose of EPA's baseline inspection is to approve the site's waste characterization 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.

Following EPA's baseline approval, EPA is authorized to evaluate and approve changes, if necessary, to the site's approved waste characterization program by conducting additional inspections under the authority of 40 CFR 194.24(h). Changes requiring EPA notification and approval prior to implementation (T1), and those requiring post-implementation (T2) notification, are identified in the site-specific baseline inspection reports. When evaluating proposed T1 changes for approval, EPA may conduct a site inspection to observe first-hand the implementation of the change, or can opt to conduct a "desktop" review of information provided specific to a change. DOE may choose to characterize and dispose of, at risk of subsequent EPA disapproval, any previously approved TRU waste using processes/procedures/equipment implemented as T2 changes. EPA reviews T2 changes on a quarterly basis and EPA may conduct continued compliance inspections to evaluate implemented T2 changes to verify adequacy.

3.0 SCOPE OF THE TIER 1 EVALUATION

This T1 evaluation encompassed the addition of the following INL RH waste stream:

- Waste Stream ID-MFC-S5400-RH consisting of eight 55-gallon drums

The evaluation of this waste stream included four waste characterization areas: 1) AK, 2) radiological characterization, 3) RTR, and 4) VE, each of which is addressed separately in this report. The initial scope did not explicitly identify RTR or VE as areas to be assessed, however during the evaluation it became apparent that these areas were relevant. Accordingly, VE and RTR were assessed and the results of these assessments are included in this report. Personnel who participated in the T1 evaluation are listed in Table 2, along with each person's affiliation and function during the evaluation.

Table 2. T1 Evaluation Participants

Name	Affiliation & Function
Edward Feltcorn	Lead Inspector, U. S. EPA
Rajani Joglekar	Inspector, U. S. EPA
Kira Darlow	Technical Evaluator – Acceptable Knowledge, SC&A
Connie Walker	Technical Evaluator – Acceptable Knowledge, SC&A
Patrick Kelly	Technical Evaluator – Radiological Characterization, SC&A
Amir Mobasheran	Technical Evaluator – Radiological Characterization, SC&A
Dorothy Gill	Technical Evaluator – Real Time Radiography and Visual Examination, SC&A
Scott Smith	Acceptable Knowledge Expert, INL-CCP
Irene Quintana	Site Project Manager, INL-CCP
Jene Vance	Radiological Characterization Subject Matter Expert, CCP

4.0 EVALUATION OF NEW RH WASTE STREAM ID-MFC-S5400-RH

Waste Stream ID-MFC-S5400-RH consists of 48 cans (1-2 gallons in size) of RH TRU heterogeneous debris waste that was packaged into four 55-gallon drums from March to April, 1988. From August 14-17, 2009, the cans were repackaged into eight 30-gallon drums, each of which was then overpacked into a 55-gallon drum without a 90-mil rigid liner. The total volume of waste is approximately 1.7 cubic meters.

The wastes consist of bags, blotter paper, bottles/beakers, containers, equipment/tools, hardware, rags, tubing, etc. Waste Stream ID-MFC-S5400-RH may also contain lesser amounts (less than 50 percent volume in any container) of homogeneous solids. The materials were generated from analytical chemistry operations, including destructive examinations and cell decontamination, conducted in the Materials and Fuel Complex (MFC) Laboratory and Office (L&O) Building Analytical Laboratory hot cells from September 1987 to March 1988. The waste is currently stored at the Idaho Nuclear Technology and Engineering Center (INTEC) Radioactive Mixed Waste Staging Facility (RMWSF), Building CPP-1617.

Fuel pins examined in the Analytical Laboratory during this time period were from the Fast Breeder Fuel Program (EBR-II), Light Water Breeder Reactor Program (LWBR), Reduced Enrichment for Research and Test Reactors (RERTR) Program, and the Transient Reactor Test Facility (TREAT) [see AK sections (4) and (5) for discussions of TRU and defense waste designations]. The contaminants mainly consist of the waste generated during the examination of 15 fuel elements from the fast breeder fuel program (three from subassembly X421 and 12 from subassembly X423), four fuel elements from LWBR, and three (un-irradiated) fuel plates from the RERTR Program. For the fuel pins in subassembly X421, the burnup values ranged from 8.49% to 9.24%. For the fuel pins in subassembly X423, the burnup values ranged from 1.9% to 5.20%. The burnup for the LWBR pins ranged from 6,413 to 12,675 megawatt days per metric ton of initial heavy metal (MWD/MTIHM). Compared to the fast breeder or light water breeder reactor fuel pins, RERTR plates are smaller and generally contain significantly less fuel material. The contribution of the three RERTR fuel plates was reduced by a factor of 8.6 to a statistically equivalent basis, increasing the total number of fuel pins examined by 0.35 (35%).

The scope of this T1 evaluation includes eight 55-gallon drums from Waste Stream ID-MFC-S5400-RH. These eight drums were originally four 55-gallon drums containing 48 1- or 2-gallon cans whose contents were repackaged directly into 30-gallon drums, which were then overpacked into 55-gallon drums for a total of eight drums. A separate T1 change approval request will be needed for any additional drums.

Documents, Waste Containers, and Batch Data Reports Reviewed

Several attachments, source documents, required forms, and other data were provided to EPA, and relevant sources were examined as part of this T1 inspection. The listing of all documentation examined is in Attachment B, and the list of batch data reports (BDRs) examined is presented in Table 3.

Table 3. Batch Document Reports Examined

Drum Number	RTR/VE BDR Number	DTC BDR Number
IDAWANL880064A	RHINLVE090003	INLRHDTC09009
IDAWANL880064B	RHINLVE090003	INLRHDTC09009
IDAWANL880134A	INLRHRTR09009	INLRHDTC09009
IDAWANL880134B	INLRHRTR09009	INLRHDTC09009
IDAWANL880068A	INLRHRTR09009	INLRHDTC09009
IDAWANL880068B	INLRHRTR09009	INLRHDTC09009
IDAWANL880065A	INLRHRTR09009	INLRHDTC09009
IDAWANL880065B	INLRHRTR09009	INLRHDTC09009

4.1 Acceptable Knowledge

EPA examined the AK process and associated information to determine whether INL-CCP demonstrated compliance with 40 CFR 194.8 requirements for RH Waste Stream ID-MFC-S5400-RH.

Waste Characterization Element Description

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

- Definition and identification of the waste stream
- Radiological characteristics of the waste
- Physical composition of the waste, including the presence of liquids
- Identification of high-level waste (HLW), TRU versus low-level waste (LLW), spent nuclear fuel (SNF)
- Defense determination
- Compiling AK documentation and assembly of required information, including the AKSR and adequacy of WCPIP AK process implementation

- AK data traceability
- AK source document sufficiency
- The Certification Plan/Confirmatory Test Plan (CTP) and DQOs attained through AK Qualification (for RH waste)
- Correlation and Surrogate Summary Form (CSSF) and CH-RH correlation
- Personnel training
- The Waste Stream Profile Form (WSPF) and Characterization Reconciliation Report (CRR) (includes compliance with WCPIP)
- Non Conformance Reports (NCRs) and AK Discrepancy Resolutions (DRs)
- AK accuracy
- Load management

Technical Evaluation

(1) Waste Stream ID-MFC-S5400-RH was examined with respect to waste stream definition and was found to be adequate.

The WCPIP defines a waste stream as consisting of "waste material generated from a single process or activity, or as waste with similar physical, chemical, and radiological properties." The waste stream examined, ID-MFC-S5400-RH, is a heterogeneous debris waste stream generated in the hot cells of the L&O Building Analytical Laboratory during a discrete time period. EPA examined the information in the AKSR to determine whether the single process argument and/or commonality of physical, chemical, and radiological properties argument were valid for this waste stream. EPA found the waste stream justification to be adequate.

(2) The radiological characteristics of the waste stream were evaluated, and were found to be adequate.

The AKSR provides a description of the processes that produced the relevant radionuclides, including descriptions of the specific fuel elements. Using the radiological information provided by generators on waste packaging logs, INL-CCP was able to compile information about individual waste cans to determine the radiological characteristics of the whole waste stream. Table 7 of the AKSR summarizes the radiological data, including nuclide weight and activity percentages for the 10 WIPP-tracked radionuclides, for the 48 cans, as reported by the waste generators. According to the information provided by the waste generators, ^{239}Pu and ^{235}U are the two most prevalent radionuclides by mass, and ^{239}Pu, ^{144}Ce, ^{95}Nb, ^{137}Cs, and ^{95}Zr account for over 99% of the total activity for the reported isotopes.

However, examination of the AKSR, AK source documents, and CCP-AK-INL-541 leads to questions about consistency between the documented radionuclide-contributing fuel elements and the fuel elements utilized to determine the radiological characterization data inputs. AK source documents list fuel elements that definitely contributed radionuclides to this waste stream,

but were not mentioned in the AKSR or used in radiological characterization (C214, U009). The AKSR mentions fuel elements that should have been examined in the Analytical Laboratory during the time when Waste Stream ID-MFC-S5400-RH was produced, yet these are specifically excluded from the list of contributing fuel elements and are not used in radiological characterization.

This issue was discussed with INL-CCP AK personnel. INL-CCP provided an AKSR Freeze File (C438) with text revisions to more clearly explain the differences between the fuel elements listed as being examined during the waste stream generation period and the fuel elements used in radiological characterization. EPA finds the response to be adequate and expects the AKSR Freeze File to be included in the next formal revision of the AKSR. EPA expects a formal revision of the relevant AKSR to occur prior to the CCP's 2010 4th quarter submission of T2 changes to EPA for review and concurrence.

(3) Physical characteristics of the waste stream were examined, including the presence of prohibited items (liquids) and were found to be adequately addressed.

DOE is required to determine the physical form of the waste, apply the correct Summary Category Group (SCG), waste matrix code (WMC), and waste material parameters (WMP), and confirm the absence of residual liquids in excess of 1%. EPA reviewed the information provided by INL-CCP in support of the applied WMC (S5400) and WMP weight percentages. Waste Stream ID-MFC-S5400-RH contains various debris material including, but not limited to, bags, blotter paper, bottles/beakers, containers, equipment/tools, hardware, rags, and tubing. The waste stream may also contain less than 50 percent volume per container of homogeneous solid waste. The AKSR included a tabulation of waste material parameters by weight indicating that the waste stream is anticipated to be approximately 60% inorganic and 40% organic material, with other inorganic materials and plastics making up the majority of the waste stream by weight (38% and 23%, respectively).

EPA also evaluated the presence of prohibited items (liquids). The AKSR indicates that a prescreen RTR step identified liquids and other prohibited items in the cans which as part of the waste processing/repackaging would be removed and/or remediated and any liquid would be absorbed. INL-CCP indicated during this T1 review that each of the four drums has been repackaged into two drums since approval of the current AKSR. During repackaging, every drum was found to contain liquid. Remediation of the waste took place prior to placement in the new drums. The Drum Repackaging Data Sheets (Reference U287), which were provided during the review, document this discovery and the subsequent remediation. RTR and VE were used to verify the absence of liquids and other prohibited items in the repackaged drums (BDRs RHINLVE090093 and INLRHRTR09009). AK source document U287 is not currently in the AKSR reference list and EPA expects it to be added as the reference list is updated. EPA found the discussion of waste stream physical characteristics to be adequate.

(4) The identification of HLW, TRU versus LLW, and SNF was examined and was found to be adequate.

The WIPP *Land Withdrawal Act* (LWA) prohibits the disposal of SNF and HLW as defined by the Nuclear Waste Policy Act (NWPA) at the WIPP. SNF is defined in the NWPA as "fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing." INL-CCP indicates that while the waste stream contains debris waste contaminated during examination of fuel pins, no SNF is present in the waste stream.

HLW is defined in the NWPA as "the highly radioactive material resulting from the reprocessing of spent nuclear fuel." INL-CCP contends that as material within Waste Stream ID-MFC-S5400-RH is from normal operations of the Analytical Laboratory and no fuel reprocessing took place in the Analytical Laboratory, the waste is not HLW.

INL-CCP reports that based on generator-reported radionuclide data, the estimated average TRU alpha concentration in Waste Stream ID-MFC-S5400-RH is greater than 100 nCi/g, thus meeting the criteria of TRU waste. Radiological characterization activities performed on the 8 drums identified as Waste Stream ID-MFC-S5400-RH confirmed that all 8 drums are TRU waste, and not LLW. EPA examined the AKSR and dose-to-curie (DTC) batch data report and found the SNF, HLW, and LLW arguments to be adequate.

(5) Waste stream defense determination was evaluated and was found to be adequate.

The WIPP LWA allows only defense related waste to be disposed of at the WIPP facility. The AKSR provides several arguments supporting the defense-related status of Waste Stream ID-MFC-S5400-RH, summarized as follows:

- The Analytical Laboratory supported programs at MFC facilities – EBR-II and TREAT reactors as well as the Hot Fuel Examination Facility (HFEF), and Fuel Conditioning Facility (FCF) – all of which were involved in defense-related activities.
- The Analytical Laboratory also supported other defense-related facilities at INL [Radiological Waste Management Complex (RWMC), INTEC, Advanced Test Reactor (ATR), and Naval Reactors Facility (NRF)] and other defense-related DOE sites such as LANL.
- The waste included in Waste Stream ID-MFC-S5400-RH was produced during a time period when the Analytical Laboratory was primarily supporting the integral fast reactor (IFR) program, whose primary objective was to develop more efficient and environmentally sound reactor fuels and enhance nuclear non-proliferation.

EPA has determined that the waste stream defense determination is adequate.

(6) Sufficiency of the AKSR and implementation of the AK process were evaluated and were found to be adequate.

Attachment A of the WCPIP mandates a process that should be followed to collect and analyze AK data, similar to the process used for CH waste. Both the content of the AKSR and sufficiency of AK implementation were assessed.

EPA examined the AKSR and found that several areas were in need of revision, in addition to the radiological characterization edits discussed in Item (2) above. The AKSR discusses Waste Stream ID-MFC-S5400-RH in terms of four 55-gallon drums containing forty-eight 2-gallon cans of Analytical Laboratory waste, as reported in the AK source documents. After approval of CCP-AK-INL-540, Revision 1, the four 55-gallon drums were repackaged into eight 30-gallon drums containing 6 cans each and overpacked into 55-gallon drums. Also, during characterization activities, RTR scans indicated that the waste stream was packaged in 1-gallon cans instead of 2-gallon cans, which has not been acknowledged in the AKSR.

The AKSR is supposed to be a summary of all AK. The updated information about drum configuration is AK and utilized as such during radiological characterization. EPA discussed this issue with INL-CCP AK personnel, who subsequently addressed these concerns in the AKSR Freeze File (C438). EPA finds the response to be adequate and expects the AKSR Freeze File to be included in the next formal revision of the AKSR. EPA expects a formal revision of the relevant AKSR to occur prior to the CCP's 2010 4th quarter submission of T2 changes to EPA for review and concurrence.

(7) Data traceability was examined and was found to be adequate.

EPA evaluated all eight 55-gallon drum containers for traceability: IDAWANL880064A and B, IDAWANL880134A and B, IDAWANL880068A and B, and IDAWANL880065A and B. INL-CCP indicated that these drums originated from four original drums containing 48 hot cell DAW cans. Using RH TRU Drum Repackaging Sheets, Radioactive Waste Disposal Requests, and Hot Cell DAW Can records, the specific fuel elements present in Waste Stream ID-MFC-S5400-RH can be derived as shown in Table 4 below.

Table 4. Drum Traceability Information, Waste Stream ID-MFC-S5400-RH

Repack MFC Drum ID Number	Original ANL-W Container ID Number	Analytical Laboratory Hot Cell DAW Can Numbers	Fuel Elements Listed
IDAWANL880064A	ANL-880064	8, 10, 16, 18, 21, 28, 29, 31, 36, 37, 38, 39	X-421, X-423B, LWBR
IDAWANL880064B			
IDAWANL880134A	ANL-880134	1, 2, 3, 5, 6, 12, 19, 30, 41, 52, 53, 75	X-421, X-423B, TREAT, LWBR, XY-27+XY-24
IDAWANL880134B			
IDAWANL880068A	ANL-880068	7, 11, 14, 23, 33, 40, 42, 45; outside cans 1, 2, 3, 4	X-421, X-423B, X-423C, RERTR
IDAWANL880068B			
IDAWANL880065A	ANL-880065	4, 9, 13, 15, 22, 24, 25, 26, 27, 32, 34, 35	X-421, X-423B, LWBR, RERTR
IDAWANL880065B			

The Integrated Waste Tracking System (IWTS) (References U034-U037) is a site-specific system used by INL to track waste movement and to document general radiological information about the container. The original container Identification Numbers were obtained from this reference and the drum repackaging sheets, and were used to identify the corresponding hot cell DAW cans (References U006, U008-U010). These can numbers were used to identify the specific fuel assemblies analyzed by the Analytical Laboratory between September 1987 and March 1988; the fuel assembly IDs were then used to identify individual fuel pins as recorded in the analytical laboratory sample logbooks (U219-U221).

EPA used the above information to evaluate the type of data available for each drum, and the traceability of that information. EPA's review indicated that paperwork is available to trace the final INL-CCP drum to individual fuel pins. EPA concluded that the information examined suggests detailed information is available for each drum and can be traced from the point of generation through INL-CCP drum management.

(8) Sufficiency of AK support documents and related document tracking was evaluated and was found to be adequate.

INL-CCP provided numerous supporting documents and Attachment 4 (i.e., the full reference list), which listed all of the available support documents. Subsequent to the inspection, and as a result of EPA's concerns, INL-CCP increased the number of source documents used to generate the AKSR, updated Attachment 4 to include all pertinent references, and provided an updated AK reference list in the previously mentioned AKSR Freeze File (C348).

(9) The Certification Plan/Confirmatory Test Plan (CTP) and DQOs attained through AK Qualification (for RH waste)

EPA's March 26, 2004, RH WCPIP letter indicated that sites must generate a Certification Plan that explains how RH waste characterization will take place at each site, as well as a CTP when this plan is required as part of the AK qualification process. EPA's intent was that the sites specify and document exactly how characterization is to take place on a waste stream basis, followed by a detailed plan explaining implementation of confirmatory testing when this is to take place.

CCP-AK-INL-542, Revision 0 states that INL-CCP would use a combination of methods to qualify AK and meet the data quality objectives (DQOs). The DQOs for residual liquids and physical form will be met through 100% examination using VE and/or RTR. The DQO for defense determination will be met through AK documentation which does not need to be qualified. The DQO for RH determination is not included in this plan, because it will be met through actual measurements. The DQOs for TRU waste determination and activity level will be met based on isotopic ratios derived from Oak Ridge Isotope Generation (ORIGEN) modeling and confirmed by LANL mass spectrometry measurement data. The same process has been used at other RH sites and EPA has previously examined and approved the use of the LANL mass spectrometry data used by INL-CCP to qualify the fuel pin data at INL and other RH sites, so it was not necessary to revisit the actual data. However, EPA did examine the arguments posed regarding the use and applicability of this information to the ID-MFC-S5400-RH waste stream.

INL-CCP-AK-582 states that the fuel pins contributing to the MFC waste are sufficiently similar to those used to develop the LANL mass spectrometry measurements, and therefore the ORIGEN model applies here as well. As presented in CCP-AK-INL-541, Revision 1, approximately 80% of the irradiated fuel pins included in the MFC examination program were from the fast breeder program (IFR program, specifically) and, as such, had similar fuel types, common sponsors or experimenters, and an identical reactor (EBR-II) as did LANL. The remaining 20% of the fuel pins were irradiated in the Shippingport LWBR and share common sponsors and experimenters as the LANL work. Based on this information, EPA concluded that INL-CCP demonstrated applicability of the LANL mass spectroscopy data to the INL MFC fuel examination program by showing commonality of experiments, sponsors, and other data.

EPA evaluated the Certification Plan and CTP to determine whether it included the specific elements that the CTP must have as defined in the WCPIP and found the CTP to be complete in this regard. When evaluated as a whole, CCP-AK-INL-540, Revision 1, CCP-AK-INL-541, Revision 1, CCP-AK-INL-542, Revision 0, and the supporting source documents indicate that the DQOs, as specified in the WCPIP, have been met. Revision to CCP-AK-INL-540, Revision 1, CCP-AK-INL-541, Revision 1, or CCP-AK-INL-542, Revision 0 is a T2 change.

(10) Use of a CSSF was evaluated and was found to be adequate.

Completion of a CSSF is required when AK information from a related CH waste stream is used in the RH waste characterization process. The INL-CCP representatives indicated that CH data were not used in this manner, so a CSSF was not prepared for this stream.

(11) Personnel training was evaluated and was found to be adequate.

Scott Smith is the AKE who prepared the AKSR, and Irene Quintana is the SPM who prepared the Certification Plan/CTP. The AKE Qualification Cards were examined to determine whether the individual's training was up to date. It should be noted that the documentation examined did not indicate that INL-CCP individuals are trained to EPA requirements, nor are they trained with respect to radiological characterization aspects, both of which are required in the WCPIP. Since the WCPIP is currently under revision, EPA will examine future training against the modified WCPIP.

(12) The WSPF and CRR (includes compliance with WCPIP) were examined and both were found to be adequate.

INL-CCP representatives provided a draft WSPF, without required signatures or attachments. Notification of availability of the final WSPF is a T2 change.

The content of the CRR was examined to ensure that this report reflected requirements of CCP-TP-506, CCP Preparation of the Remote-Handled Transuranic Waste Acceptable Knowledge Characterization Reconciliation Report. Specifically, the CRR was evaluated to determine the completeness and adequacy of its contents, as required in the WCPIP.

INL-CCP representatives provided a pdf version of the CRR that was finalized for audit purposes only. This form included the necessary information, but did not include any signatures. Notification of availability of a final and/or revised CRR is a Tier 2 change.

(13) NCRs and DR Forms were examined and were found to be adequate.

INL-CCP provided a single DR associated with this waste stream that dealt with the assignment of hazardous waste numbers to a previously non-hazardous waste stream. INL-CCP representatives did not indicate that there were any other DRs available for review. The provided DR verified continued preparation of this document as part of the AK process. There are no NCRs associated with Waste Stream ID-MFC-S5400-RH; however, EPA has reviewed sufficient numbers of NCRs prepared by INL-CCP for previously approved waste streams to be confident that the correct process is in place.

(14) AK accuracy was assessed and was found to be adequate.

AK accuracy was assessed with respect to the required contents, as presented in the WCPIP. The WCPIP requires AK accuracy be assessed in three areas: reassignment of the waste to a different SCG; reassignment of the waste to a different waste stream; and waste stream-specific assessment of radiological parameter accuracy. INL-CCP provided a draft AK accuracy report that indicated no discrepancies were noted, and which listed verification of AK-based DQOs. Although not explicitly stated, presentation of the DQOs in this manner shows that the SCG assignment was not modified, the drums were not placed in a different waste stream, and some of the general radiological parameters (i.e., TRU and RH determination) were met through implementation of the WCPIP and comparison to the AK Record. Notification of availability of a final AK accuracy report for this waste stream is a T2 change.

(15) Load Management was assessed and was determined to not apply to this waste stream.

INL-CCP representatives indicated that load management will not be performed for this waste stream. Implementation of load management is a T1 change.

Summary of Acceptable Knowledge

Findings and Concerns

The EPA Inspection Team did not identify any findings or concerns relative to AK for the addition of Waste Stream ID-MFC-S5400-RH, which was the subject of this T1 change evaluation.

Tiering Changes

Based on the results of this T1 evaluation, there are no changes to the T1 and T2 designations that were assigned to AK for INL-CCP during the baseline and subsequent T1 approvals.

4.2 Radiological Characterization

EPA examined the radiological characterization process and associated information to determine whether INL-CCP demonstrated compliance with 40 CFR 194.8 requirements for RH Waste Stream ID-MFC-S5400-RH.

Radiological Characterization Overview

The nature of RH TRU wastes presents difficulties with respect to obtaining meaningful measurement data. As has been the case at the six RH TRU waste characterization sites that EPA has previously approved, RH radiological characterization relies on the development of scaling factors that correlate an easily measured parameter like a waste container's external exposure (dose) rate with isotopic distributions for specific TRU radionuclides. The development of radionuclide scaling factors for the MFC wastes was essentially the same as what EPA evaluated and approved during the INL-CCP baseline inspection. The development of the ^{137}Cs scaling factors was supported by the following five sources of information:

- Waste packaging records (ANL-W files): This information was used to identify specific fuel pins and reactor materials involved in the destructive examinations conducted in the L&O Building Laboratory over the time-period of interest and the nature of examination activities.
- AK source documents (Experiment design records and ANL-W files): This information provided relevant pre-irradiation fuel composition information and burnup data collected for each of the identified fuel pins.
- Westinghouse letter NRFE-LWBRE-1083, as documented in INL-RH-15 (U856)L: This information provided the pre-irradiation composition and burnup values for the LWBR fuel rods and pins.
- Measurement data from LANL: This information was used as confirmatory testing to qualify the input information on the fuel pins in the fast breeder program and confirm the analyses using the ORIGEN2.2 computer code.
- ORIGEN2.2 computer code output: This information was used to determine the curie amounts for the radionuclides of interest

The characterization methods used for the INL-CCP MFC waste were evaluated in terms of the technical adequacy of the approach, as supported by the program's documents, procedures, and controls, and the knowledge and understanding of the personnel involved in the RH waste characterization program. During this T1 evaluation, EPA examined the following elements of the INL-CCP radiological characterization program:

- Development of DTC relationships as a function of waste density using Monte Carlo N-Particle Transport Code (MCNP5) based on each drum's measured external exposure (dose) rate, assuming the main contributor to the external exposure was ^{137}Cs
- Derivation of radionuclide scaling factors for quantification of the 10 WIPP-tracked radionuclides, as supported by calculation packages and ORIGEN2.2 computer code.

Figure 1, below, provides a flow diagram for the Radiological Characterization of RH TRU debris waste from MFC.

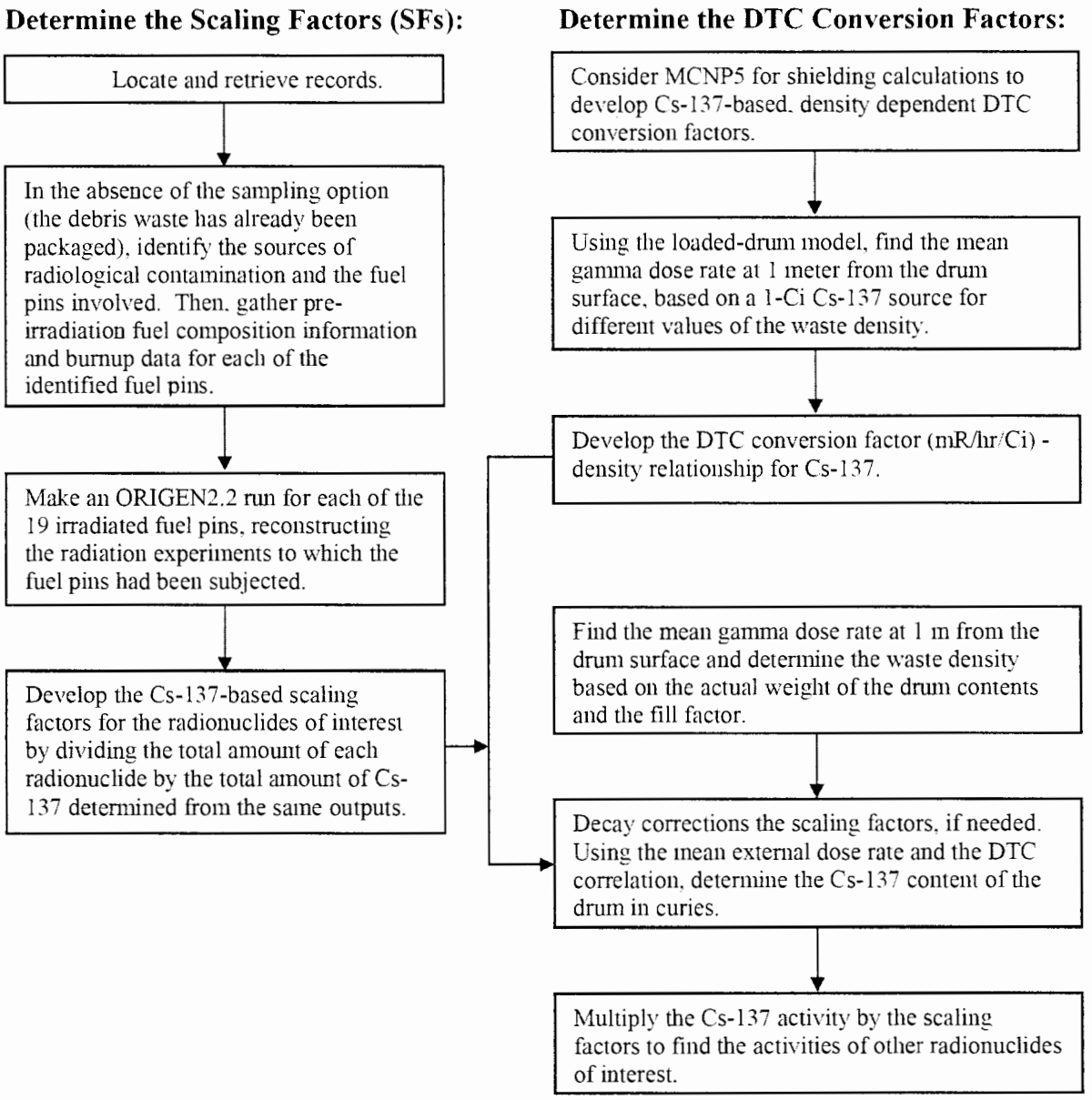

Figure 1. Flow Diagram for the Radiological Characterization of RH TRU Debris Waste from MFC (ID-MFC-S5400-RH) (CCP-AK-INL-541)

Technical Evaluation

The EPA inspection team evaluated the following aspects:

(1) The technical adequacy and documentation of the resources used to facilitate the identification of the types of fuel and general distribution of contaminants associated with this waste stream were evaluated and found to be adequate.

The Argonne-West Analytical Laboratory Waste Canister Logs and the Hot Cell dry active waste (DAW) Can records were used to identify the cans packaged within each drum and their attributes (e.g., packaging date, waste material description, waste origin and masses), the type of waste packaged within each can, and the subassemblies associated with the waste. There were no concerns regarding the technical adequacy and documentation of the resources used for the identification of the types and general distribution of the contaminants regarding the Waste Stream ID-MFC-S5400-RH.

(2) The technical adequacy and documentation of the resources used to identify fuel composition, burnup values, and masses, as input for the ORIGEN2.2 modeling, were evaluated and found to be adequate.

The records for the EBR-II reactor provided the fuel batch numbers, isotopic distribution, and elemental weights. The source document for the three identified X421 fuel pins was "Test Description for the Integral Fast Reactor Subassemblies X419, X420, and X421." For X423 subassembly fuel pins, the source used was "Quality Assurance Certification/As Built for X423" and "Reconstruction of the Irradiation History of Experiment X423." There were no concerns regarding the technical adequacy and documentation of the resources used for the identification of the types and general distribution of the contaminants regarding the Waste Stream ID-MFC-S5400-RH.

(3) The technical adequacy and documentation of the resources used to verify irradiation values were evaluated and found to be adequate.

"Burnup measurements on X421/T108, T128, T225," (ANL-W-C071) and "Reconstruction of the Irradiation History of Experiment X423" (ANL-W-C-174) were the source documents for X421 assembly and X423 assembly, respectively. The Westinghouse letter NRFE-LWBRE-1083, as documented in the source document entitled, "Derivation of Burnup and Composition for Thorium Pins" (U856), provided information on the LWBR fuel elements. The RERTR plates were un-irradiated. There were no concerns regarding the technical adequacy and documentation of the resources used for the identification of the types and general distribution of the contaminants regarding the Waste Stream ID-MFC-S5400-RH.

(4) The development of radionuclide scaling factors was evaluated and was found to be technically adequate and appropriately documented.

A radionuclide scaling factor provides a technically sound method of deriving a value for radionuclides that are difficult to measure on the basis of an easily measurable attribute like

external dose rate, assuming the measured dose rate can be correlated to a known constituent, i.e., ^{137}Cs, considered to be the dominant contributor to the gamma dose rate for MFC wastes. The measured dose rate, when used in conjunction with the waste density and the DTC correlation, leads to the quantification of ^{137}Cs, and the activities of other reportable radionuclides using their ^{137}Cs-based scaling factors.

The ORIGEN2.2 computer code was used to develop the scaling factors. Individual computer runs were made for each of the 19 unique EBR-II and LWBR fuel elements. There were no RERTR ORIGEN2.2 input data, as the three RERTR fuel elements from the HFEF-W at Oak Ridge National Laboratory (ORNL) were un-irradiated.

Scaling factors were determined by dividing the total activity of each radionuclide for the EBR-II and LWBR fuel rods by its associated total ^{137}Cs activity. A single set of ^{137}Cs-based scaling factors was determined for the characterization of all the waste generated. The scaling factors are shown in Table 5, below.

Table 5. Scaling Factors for the MCF Wastes in Units of Curies of Specific Radionuclide/Curies ^{137}Cs (Ci/Ci ^{137}Cs)

Radionuclide	Curie Scaling Factor
U-233	8.59E-04
U-234	1.31E-04
U-235	5.01E-06
U-238	1.83E-06
Pu-238	2.99E-03
Pu-239	6.70E-02
Pu-240	1.96E-02
Pu-241	2.85E-01
Pu-242	3.14E-06
Am-241	1.22E-02
Cs-137	1.00E+00
Sr-90	7.79E-01

EPA evaluated the following aspects:

- Activity values derived from modeling and statistical metrics, namely mean and standard deviation values for each measured radionuclide
- The appropriateness of the choice of physical constants and radionuclide-specific attributes (specific activity, physical half-life, decay heat, neutron cross-sections, photon transition probabilities, etc.) and the technical correctness of the values assigned to each attribute
- Isotopic activity values are correlated to the radionuclide whose physical half-lives possibly contribute to the measured external dose rate, i.e., ^{137}Cs
- Contributions of the short-lived radionuclides to the total measured dose rate

- Appropriate decay correction according to INL-CCP procedure (CCP-TP-504) of all radionuclide values for purposes of model development and routine assays performed via DTC
- The calculated results used to develop the scaling factors and convert the measured external dose rates obtained via DTC to radionuclide activity levels
- Activity and uncertainty values determined for the ten WIPP-tracked radionuclides (^{233}U, ^{234}U, ^{238}U, ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{241}Am, ^{137}Cs and ^{90}Sr)
- The determination of the contribution of all radionuclides to the radiological hazard[2]
- Shielding and other calculations supporting the scaling factors performed using MCNP5 to derive the appropriate DTC relationships as a function of waste density for the geometry appropriate to the MFC wastes following repackaging (55-gallon drum)
- There are no issues related to the technical adequacy or documentation of radionuclide scaling factors for the waste stream ID-MFC-S5400-RH.

(5) The technical basis of the DTC correlation and its documentation were evaluated and found to be unchanged from what EPA had inspected and approved previously, and both aspects were acceptable.

The DTC correlation was based on the following assumptions:

- The waste drum is 100 percent full with waste
- The radionuclides of interest are dispersed uniformly throughout the waste
- The waste matrix's density is considered to be unity (one), because photon attenuation is more influenced by material density, as opposed to specific composition or atomic number
- Waste densities range from 0.001 g/cc to 2.4 g/cm^3

Using MCNP5, INL-CCP developed a DTC correlation for a 55-gallon drum filled with RH TRU waste in terms of mR/hr for a 1-curie source of ^{137}Cs. Figure 6-2 in CCP-AK-INL-541, Revision 1, shows a plot of dose rate as a function of waste density at a distance of 1 meter for ^{137}Cs. A DTC spreadsheet similar to the DTC spreadsheet that EPA evaluated during the baseline inspection is used for MFC wastes as well, involving the MCF scaling factors. The spreadsheet contained the required information, specifically: cask identification number; container gross weight; estimated fill percentage; and results of the four dose rate measurements that are obtained via the application of DTC procedure CCP-TP-504. An example Waste Drum DTC Conversion Record (spreadsheet) is included as Table 6-4 in CCP-AK-INL-541, Revision 1. There were no concerns regarding the technical basis of the DTC correlation and its documentation for the INL-CCP MFC wastes.

[2] Although the determination of a waste container's radiological hazard is not an EPA requirement, this information may be useful in understanding other aspects of a container's radiological characterization.

(6) Technical aspects and documentation of the radiological characterization process were evaluated and found to be acceptable.

CCP-AK-INL-541, Revision 1, is the main document that describes the radiological characterization process that INL-CCP used for the MFC wastes. This document is supported by a series of calculation packages, some of which were reviewed in the process of evaluating the MCF wastes. These packages had been prepared and reviewed by several CCP radiological characterization team members who supported the INL-CCP RH baseline effort. Many of them had been since revised to incorporate the MCF wastes, as listed above. These packages documented the following:

- Evaluation of all potential contributors to a container's dose rate
- Contributions of short-lived radionuclides to the measured external dose rate
- Potential sources of uncertainty for MFC wastes
- Information input checks for MFC wastes
- Technical derivation of the DTC approach and documentation of the DTC spreadsheet

The EPA evaluation team reviewed these packages and Revision 1 of CCP-AK-INL-541 in advance of the formal T1 evaluation. Several documents had been revised more recently and these revisions were evaluated as they were provided by INL-CCP. During these discussions, the EPA evaluation team had the opportunity to discuss all technical concerns and apparent discrepancies with INL-CCP personnel and to question INL-CCP personnel regarding a variety of technical aspects related to the MFC wastes. None of the calculation packages required serious modifications. The EPA evaluation team found that CCP-AK-INL-541 adequately documented the radiological characterization process for MCF wastes, and the calculation packages cited above adequately supported the activities upon which the radiological characterization of MFC wastes was based. There were no issues related to the documentation of technical aspects of the INL-CCP radiological characterization approach for MFC wastes.

(7) The technical basis and derivation of Total Scaling Factor Uncertainty (TSFU) were evaluated and were found to be adequate.

The development of TSFU for Waste Stream ID-MFC-S5400-RH is based on the propagation of uncertainties present in all aspects of the determination of the radiological constituents of RH TRU waste. These aspects are assumed to be independent, which allows them to be added in quadrature. The TSFU determination included contributions of the following:

- Drum weight measurement
- Measurement uncertainty
- Scaling factor uncertainty
- MCNP5 code and modeling issues

- Contributions of other gamma emitters
- Drum-to-drum variation within each campaign

The treatment of TSFU is presented in CCP-AK-INL-541 and Calculation Package No. INL-RH-07. The principal sources of uncertainty in the ^{137}Cs scaling factors result from: ^{137}Cs activity uncertainty, ORIGEN2.2 benchmark uncertainty, and drum-to-drum uncertainty. The largest single contributor to the overall uncertainty is the drum-to-drum uncertainty, as shown in Table 6, below.

Table 6. Final Scaling Factor Uncertainty Listed by Radionuclide for MFC Wastes

Radionuclide	Cs-137 Activity Uncertainty	ORIGEN2.2 Benchmark Uncertainty	Drum-to-Drum Uncertainty	Total Uncertainty
U-233	27.0%	6.0%	97.4%	101.2%
U-234	27.0%	26.0%	50.1%	62.6%
U-235	27.0%	6.0%	56.7%	63.0%
U-238	27.0%	43.0%	66.8%	83.9%
Pu-238	27.0%	33.0%	20.0%	47.1%
Pu-239	27.0%	4.0%	103.0%	106.5%
Pu-240	27.0%	8.0%	99.2%	103.1%
Pu-241	27.0%	37.0%	58.0%	73.9%
Pu-242	27.0%	29.0%	103.8%	111.1%
Am-241	27.0%	37.0%	84.4%	96.0%
Cs-137	27.0%	-	-	27.0%
Sr-90	27.0%	14.0%	12.6%	32.9%

There were no concerns regarding the technical derivation and documentation of TSFU for the INL-CCP MFC wastes.

(8) RH and TRU determinations were assessed and were found to be adequate.

The determination that the RH containers meet the definition of TRU waste and RH waste was examined during the baseline inspection. Both of these aspects are directly involved with the DTC measurement at INTEC, as was observed during the baseline inspection. These were not assessed directly during this T1 evaluation, but EPA did verify that no aspects of these two determinations had changed. There were no technical or documentation-related concerns regarding the TRU and RH determinations for INL MFC wastes.

Summary of Radiological Characterization

Findings and Concerns

The EPA inspection team did not identify any findings or concerns related to radiological characterization. There are no open concerns related to radiological characterization resulting from this T1 evaluation.

Tiering Changes

Based on the results of this T1 evaluation, there are no changes to the T1 and T2 designations assigned to radiological characterization during the baseline approval.

4.3 Real-Time Radiography (RTR)

RTR was not initially included in the scope of this T1 evaluation. However, upon examination of the AK information it became clear that an assessment of RTR was necessary. Accordingly, EPA reviewed one RTR BDR for containers from Waste Stream ID-MFC-S5400-RH to verify that RTR data had been generated in accordance with procedure CCP-TP-508, Revision 3, CCP RH Standard Real-Time Radiography Inspection Procedure.

BDR INLRHRTR09009 contained data from six drums: IDAWANL880134A and B, IDAWANL880065A and B, and IDAWANL880068 A and B. These drums were examined on August 18, 2009, and the RTR operators had performed and recorded the required CCP RTR Measurement Control Report. The container data sheets recorded the audio/visual recording numbers, percent fill, presence/absence of a rigid liner, waste matrix code and layers of confinement. Attachment 2 of CCP-TP-508 recorded the absence of prohibited items and that the physical form of the waste was consistent with the Waste Stream Description/Waste Matrix Code. All Attachments were signed and dated by an RTR operator.

Quality Control examinations were performed as required. A replicate scan was performed on container IDAWANL880134B and an Independent Observation was performed on container IDAWANL880134A. There were no NCRs generated during examination of these containers. The BDR had been reviewed at both data generation and project level.

EPA reviewed the training records for the two qualified RH RTR operators. These operators are also qualified as Independent Technical Reviewers (ITRs). Their training records were complete and included evidence of the operators' successful completion of the required written examination and the required practical test.

EPA did not identify any issues with regard to the above BDR.

4.4 Visual Examination (VE)

VE was not initially included in the scope of this T1 evaluation. However, upon examination of the AK information it became clear that an assessment of VE was necessary. Accordingly, EPA reviewed one VE BDR for containers from Waste Stream ID-MFC-S5400-RH to verify that VE data had been generated in accordance with procedure CCP-TP-500, Revision 8, CCP Remote-Handled Waste Visual Examination.

BDR RHINLVE090003 contained VE data for two 30-gallon drums that had been packaged and then placed into 55-gallon drums. The 30-gallon drums had the same container ID number as the 55-gallon drums they were finally packaged in, namely IDAWANL880064A and IDAWANL880064B. The VE data sheet for 30-gallon container IDAWANL880064A showed

that it contained various debris items and was classified as an "organic material" container. This was packaged into a 55-gallon drum, also IDAWANL880064A, and the data sheet recorded this as a "steel" container due to the presence of the 30-gallon container. The 30- and 55-gallon containers for IDAWANL880064B were also classified as "organic material" and "steel" respectively.

The data sheets, Attachment 1 of the procedure, had been completed as required and signed by two VE operators (VEOS). No audio/visual recording is required for this type of VE. No prohibited items were packaged into the containers and the operators verified that the waste matched the Waste Stream Description/Waste Matrix Code for this waste stream. No NCRs were initiated during the VE event and the BDR had been reviewed at both data generation and project level.

EPA reviewed the training records for the three qualified RH VE operators. These operators are also qualified as Independent Technical Reviewers (ITRs). Their training records were complete and included evidence of the operators' successful completion of the required written examination and the required practical test.

EPA did not identify any issues with regard to the above BDR.

5.0 FINDINGS AND CONCERNS

The EPA inspection team did not identify any findings or concerns during the inspection.

6.0 CONCLUSIONS

EPA concluded that the waste characterization processes of AK, radiological characterization, RTR, and VE proposed for use by INL-CCP to characterize RH TRU wastes from the hot cells of the Analytical Laboratory at the MFC are adequate. There are no open issues relative to this T1 evaluation.

Approval

The T1 change that was evaluated consisted of the waste characterization techniques of AK, radiological characterization, RTR, and VE as applied to Waste Stream ID-MFC-S5400-RH consisting of 8 drums.

Based on the results of this evaluation, EPA approves these components of the T1 change. INL-CCP is approved to characterize and ship these RH TRU wastes, consistent with the limitations specified in this report.

Tiering Changes

Based on the results of this T1 evaluation, there are no substantive changes to the T1 or T2 designations assigned to INL-CCP during the baseline and subsequent T1 evaluations. The most up-to-date tiering table is included in Table 7, below.

Table 7. Tiering of RH TRU Waste Characterization Processes Implemented by INL-CCP (Revised May 12, 2010)[1]

RH Process Elements	INL-CCP RH Process - T1 Changes	INL-CCP RH Process - T2 Changes[2]
Acceptable Knowledge (AK)	Addition of containers to approved waste streams Any new waste streams not approved under this baseline Substantive modification(s)[3] that have the potential to affect the characterization process: CCP-AK-INL-500, CCP-AK-INL-501, or CCP-AK-INL-502 Load management for any RH waste stream	Notification to EPA when AKSRs, Radiological Characterization Reports and Certification Confirmation Test Plans (e.g., CCP-INL-AK-500, CCP-INL-AK-501, and CCP-INL-AK-502) updates are approved by CBFO Notification to EPA when changes to AK documentation as a result of WCPIP revisions have been made (e.g., CRR)[4] Notification to EPA when a Correlation or Surrogate Summary Form is completed for each of the RH containers in this waste stream identified as CH, based upon measured dose rates that present NDA results for assayed containers Notification to EPA once waste stream data package for debris waste stream and any modifications to the WSPF, including the CRR and AK Summary, are completed Notification to EPA that the final Dose-to-Curie (DTC) determination is complete for RH containers numbers 728 through 737, as identified in AK Reference P030 **AK accuracy reports (prepared annually, at a minimum)**
Radiological Characterization, including Dose-to-Curie (DTC)	Application of new scaling factors for isotopic determination other than those documented in CCP-AK-INL-501 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[3] Any new waste stream not approved under this baseline or addition of containers to Waste Stream ID-ANLE-S5000 that requires changing the established radionuclide scaling factors	Notification to EPA upon completion of revisions of CCP-AK-INL-501 or CCP-TP-504 that require CBFO approval
Visual Examination of audio/video media (VE)	**Use of VE to characterize additional debris waste streams or waste from other Summary Waste Categories**	None
Real-Time Radiography (RTR)	**Any new S5000 waste stream other than ID-ANLE-S5000 or wastes from an S3000 or S4000 waste stream** **Notification to EPA prior to addition of a new RTR unit(s)**	**Notification to EPA upon completion of changes to RTR procedure(s) that require CBFO approval**
WIPP Waste Data System, WDS (previously known as WWIS)	**None**	**Changes made to WDS procedure(s) that require CBFO approval**

Notes:

[1] This table has been modified by deleting the references to specific sections of the baseline inspection report where each T1 or T2 element is discussed; additions to the original tiering table from the 2007 baseline inspection appear in **bold**.

[2] INL-CCP will report all T2 changes to EPA every three months.

[3] *Substantive modification* refers to a change with the potential to affect INL-CCP'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 in CCP-TP-504.

[4] Excluding changes that are editorial in nature or are required to address administrative concerns.

ATTACHMENT A

APPROVAL SUMMARY FOR INL RH WASTE CHARACTERIZATION PROGRAM

Approval Summary for INL RH Waste Characterization Program

Specific INL RH Approval	Date	EPA Docket Number
INL RH Baseline Approval	January 2007	A-98-49; II-A4-72
Tier 1 Change – Approval of Visual Examination	January 2007	A-98-49; II-A4-75
Tier 1 Change – Approval of Real Time Radiography	February 2007	A-98-49; II-A4-80
Tier 1 Change – Approval of K Cell Wastes	January 2008	A-98-49; II-A4-97
Tier 1 Change – Approval of High Range Gamma Probe for DTC	April 2008	A-98-49; II-A4-98
Tier 1 Change – Approval of Visual Examination Technique	September 2009	A-98-49; II-A4-118
Tier 1 Change – Addition of Twelve Containers to Waste Stream ID-ANLE-S5000 and Addition of Waste Stream ID-HFEF-S5400-RH	January 2010	A-98-49, II-A4-122

ATTACHMENT B

LISTING OF DOCUMENTS REVIEWED FOR THIS EVALUATION

Listing of Documents Reviewed for this Evaluation

AK Tracking Spreadsheet Excerpts for Waste Stream ID-MFC-S5400-RH, provided to EPA on May 6, 2010

CCP-AK-INL-540, Central Characterization Project Acceptable Knowledge Summary Report for Remote-Handled Transuranic Debris Waste from Materials and Fuels Complex at the Idaho National Laboratory, Waste Stream ID-MFC-S5400-RH, Revision 1, August 6, 2009

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