



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

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Dear Mr. Stroble:

This letter provides the results of the U.S. Environmental Protection Agency's (EPA) unannounced continued compliance inspection at the Advanced Mixed Waste Treatment Project (AMWTP) facility in Idaho Falls, ID. On November 17-18, 2010, EPA inspected AMWTP's waste characterization (WC) program for contact-handled (CH) transuranic (TRU) waste. As a result of this unannounced continued compliance inspection, EPA confirmed that AMWTP continues to characterize CH TRU waste consistent with the conditions and limitations from EPA's baseline approval granted in October 2006 (EPA Air Docket No. A-98-49; II-A4-66). The enclosed report (EPA Air Docket No. A-98-49; II-A4-143) gives the details of the evaluation.

In accordance with 40 CFR 194.8(b), during this on-site inspection, EPA evaluated samples of the following waste characterization activities used to characterize CH TRU debris waste from Hanford:¹

- Acceptable knowledge (AK)
- Nondestructive assay (NDA)
- Real-time radiography (RTR) for CH retrievably-stored TRU debris waste (S5000)
- Visual examination (VE for newly generated TRU waste)

During the inspection, EPA raised an issue concerning AMWTP's use of AK documents prepared by the Hanford-Central Characterization Project for the Hanford debris waste managed by AMWTP as BN510.1 waste. To address this EPA issue, AMWTP staff revised Hanford

¹ Hanford is sending approximately 800 55-gallon drums of debris waste belonging to four waste streams that were characterized by Hanford prior to termination of the non-CCP Hanford waste characterization program in 2008.



debris waste specific AK documents. This revision incorporated AK for the subject waste stream that Hanford generated which EPA approved as part of the baseline approval of August 2008 (EPA Air Docket No. A-98-49; II-A4-106).

EPA has determined that the AMWTP implemented CH waste characterization program in the configuration observed during this unannounced inspection is consistent with the limitations described in the October 2006 baseline inspection report cited above.

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

Sincerely,



Tom Peake, Director
Center for Waste Management and Regulations

Enclosure

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EPA DOCKET NO. A-98-49; II-A4-143

WASTE CHARACTERIZATION INSPECTION REPORT
EPA UNANNOUNCED CONTINUED COMPLIANCE INSPECTION
NO. EPA-AMWTP-CH-UA-10.10.24 OF THE CONTACT-HANDLED
WASTE CHARACTERIZATION PROGRAM
AT THE ADVANCED MIXED WASTE TREATMENT PROJECT

November 17-18, 2010

U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Center for Waste Management and Regulations
1200 Pennsylvania Avenue, NW
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ACRONYMS AND ABBREVIATIONS

AK	acceptable knowledge
AKE	Acceptable Knowledge Expert
AKSR	Acceptable Knowledge Summary Report
Am	americium
AMWTP	Advanced Mixed Waste Treatment Project
BC	Battelle Columbus
BDR	batch data report
BN	AMWTP (prefix)
CBFO	Carlsbad Field Office
CCP	Central Characterization Project
CFR	Code of Federal Regulations
CH	contact-handled
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
DU	depleted uranium
EA	Expert Analyst
EPA	U.S. Environmental Protection Agency
ES&H	Environment, Safety, and Health
EU	enriched uranium
FGE	fissile gram equivalent
FR	Federal Register
HLW	high-level waste
HS	heat source
IDC	Item Description Code
INL	Idaho National Laboratory
ITR	Independent Technical Reviewer
IWAS	Integrated Waste Assay System
LWA	Land Withdrawal Act
MD	Mound

nCi/g	nanocuries per gram
NCR	nonconformance report
NDA	nondestructive assay
NWPA	Nuclear Waste Policy Act of 1982
PFP	Plutonium Finishing Plant
PK	process knowledge
PPE	personal protective equipment
Pu	plutonium
RCRA	Resource Conservation and Recovery Act
RF	Rocky Flats
RFETS	Rocky Flats Environmental Technology Site
RL	Hanford
RTR	real-time radiography
SDOP	six-drum overpack
SHENC	Super High Efficiency Neutron Counter
SNF	spent nuclear fuel
SPM	Site Project Manager
T1	Tier 1
T2	Tier 2
TBD	to be determined
Th	thorium
TRU	transuranic
U	uranium
VE	visual examination
WAC	Waste Acceptance Criteria
WG	weapons-grade
WIPP	Waste Isolation Pilot Plant
WMC	waste matrix code
WMP	waste material parameter
WSPF	waste stream profile form
WTS	Waste Tracking System

1.0 EXECUTIVE SUMMARY

In accordance with 40 CFR 194.8(b), the U.S. Environmental Protection Agency (EPA or the Agency) conducted unannounced continued compliance Inspection No. EPA-AMWTP-CH-UA-10.10.24 of the waste characterization program for contact-handled (CH) transuranic (TRU) wastes at the U.S. Department of Energy (DOE) Advanced Mixed Waste Treatment Project (AMWTP). This on-site inspection occurred at the AMWTP¹ on November 17–18, 2010, and covered selected aspects of AMWTP's approved TRU waste characterization processes. In accordance with the provisions of 40 CFR 194.8(b), as issued in a July 16, 2004, *Federal Register* (FR) notice (69 FR 42571–42583), EPA conducted an unannounced continued compliance inspection of the site's program to characterize wastes proposed for disposal at the Waste Isolation Pilot Plant (WIPP). Following the inspection, while reviewing AMWTP provided documents, EPA inspectors identified one issue requiring December 6, 2010 discussion. AMWTP had used Acceptable Knowledge (AK) information prepared by the Hanford Central Characterization Project which EPA had not approved. For this Hanford waste, AMWTP should have used AK generated under the old Hanford program that EPA approved in August 2008 (EPA Docket No. A-98-49; II-A4, 106). AMWTP revised relevant AK reports which EPA received in February. As a result of this unannounced continued compliance inspection, EPA confirmed that the AMWTP CH TRU waste characterization program continues to maintain its approval to characterize CH TRU waste consistent with the conditions and limitations that are discussed in the baseline inspection report (see EPA Docket No. A-98-49; IIA4-66). There were no changes to the Tier 1 (T1) or Tier 2 (T2) designations indicated in the initial AMWTP approval table as a result of this unannounced continued compliance inspection. The approval table has been updated to reflect format changes and the revised AMWTP approval table is provided as Table 7 of this report.

During this inspection, the Agency evaluated samples of the following waste characterization activities used to characterize CH TRU debris waste from Hanford:²

- Acceptable knowledge (AK)
- Nondestructive assay (NDA)
- Real-time radiography (RTR) for CH retrievably stored TRU debris waste (S5000)
- Visual examination (VE) for newly generated TRU waste

2.0 PURPOSE OF CONTINUED COMPLIANCE EVALUATIONS

Under the changes to 40 CFR 194.8 promulgated in the July 16, 2004, *Federal Register* notice, EPA has the authority to conduct continued compliance inspections to verify that the site continues to use only the approved waste characterization processes to characterize the waste and remains in compliance with all the regulatory requirements. This inspection was performed for

¹ The AMWTP is located on DOE's Idaho National Laboratory (INL) outside of Idaho Falls, Idaho.

² Hanford is sending approximately 800 55-gallon drums of debris waste belonging to four waste streams that were characterized by Hanford prior to termination of the non-CCP Hanford waste characterization program in 2008.

the purpose of determining AMWTP waste characterization program compliance with 40 CFR 194.24.

3.0 PURPOSE OF THIS REPORT

This report documents the basis for EPA's decision to maintain the approval of the AMWTP waste characterization program for CH TRU wastes. Specifically, this report does the following:

- Describes the sample of the AMWTP waste characterization systems evaluated during this inspection
- Identifies all areas where waste characterization systems have changed relative to the baseline approval configuration and assesses the impact, if any, of those changes
- Provides objective evidence to support the EPA continued approval basis for all waste characterization systems
- Provides objective evidence of outstanding findings or concerns, as applicable
- Describes any tests or demonstrations completed during the course of the inspection and their relevance to EPA's approval decision

Sections of this report reference the documents that the EPA inspection team reviewed in support of the technical determination. To see or obtain copies of any items identified, write to the following address:

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

EPA's continued approval of the AMWTP waste characterization program will be conveyed to DOE separately by letter. More information is also on EPA's website at <http://www.epa.gov/radiation/WIPP/index.html> in accordance with 40 CFR 194.8(b)(3).

4.0 SCOPE OF THE CONTINUED COMPLIANCE INSPECTION

The scope of EPA's unannounced continued compliance Inspection No. EPA-AMWTP-CH-UA-10.10.24 was the evaluation of selected elements of the waste characterization systems in use at AMWTP to characterize TRU wastes that had been approved during the baseline inspection. Specifically, the EPA inspection team focused on the following:

- AK: AMWTP components implemented to characterize Hanford TRU BN510.1 waste, including AK Summary Reports (AKSRs); Waste Stream Profile Forms (WSPFs) for both the BN510.1 waste stream and the BN510 waste stream, the latter of which has been emplaced in the WIPP since October 1, 2009; Batch Data Reports (BDRs) for NDA, VE and RTR; traceability of containers through the entire characterization process; and

tracking of EPA-selected Hanford containers from receipt at AMWTP through certification and/or emplacement in the WIPP

- NDA: Direct observation of the two Z-211-102 and Z-211-103 Integrated Waste Assay System (IWAS) NDA units in Building WMF-634 and evaluation of the two in-plant Z-390-100 and Z-390-101 IWAS NDA units in Building 639 by evaluation of NDA BDRs provided in October 2010
- VE/RTR training through interviews of personnel, review of training records, and examination of training materials; audio/video tapes recording physical contents of selected repackaged containers included in the provided VE/RTR BDRs.

5.0 PERFORMANCE OF CONTINUED COMPLIANCE INSPECTION

Background

In preparation for a scheduled inspection, the EPA technical inspectors typically obtain and review the latest revisions of key procedures and reports in the preparation of inspection checklists. For an unannounced inspection, EPA technical inspectors prepare using what they know to be the latest revisions of these documents. However, these documents may have been revised or superseded without EPA's knowledge. This requires that the EPA inspection team modify or adjust the inspection's scope on short notice while onsite. For this inspection, the revisions of the relevant documents for AK, NDA, RTR, and VE that the EPA inspection team used to prepare were sufficient to obtain a general understanding of the processes, although many AK documents had been updated without provision to EPA, and other AK documents required changes subsequent to the inspection. AMWTP also provided revisions of some documents during the inspection.

Logistics

The logistics of an unannounced inspection are different from a scheduled inspection. Because site personnel do not know an inspection will be occurring on a given day, certain aspects of the site's waste characterization program or key personnel may not be available for evaluation. For this inspection, key personnel in the areas of AK, NDA, RTR, and VE were available.

EPA's unannounced Inspection No. AMWTP-CH-UA-10.10.24 took place November 17–18, 2010. EPA reviewed additional documents that were provided after the inspection to complete its evaluation of several of the technical areas within the inspection's scope. The inspection involved the following steps:

- (1) Reviewing the waste characterization processes that were approved under EPA's baseline inspection;
- (2) Obtaining and reviewing site procedures, reports, and other technical information related to waste characterization activities at AMWTP in advance of the inspection; and
- (3) Examining draft checklists specific to each technical area before the inspection.

As part of this unannounced inspection, EPA inspectors did the following:

- (1) Interacted with Carlsbad Field Office (CBFO) and AMWTP personnel to arrange inspection logistics;
- (2) Verified onsite the technical adequacy or qualifications of waste characterization personnel, procedures, processes, and equipment by means of interviews, observation, and demonstrations, and recorded the results, as appropriate;
- (3) Recorded all concerns on EPA Inspection Issue Tracking Forms, as appropriate, and provided completed forms to CBFO and site personnel as they were generated;
- (4) Communicated all pertinent information to CBFO and AMWTP personnel onsite, as appropriate;
- (5) Pursued resolution of all identified issues before completion of the inspection by discussions with CBFO and AMWTP personnel;
- (6) Conducted entrance, exit, and daily briefings for CBFO and AMWTP management personnel, as appropriate; and
- (7) Reviewed additional information provided by AMWTP after the inspection, and achieved resolution of outstanding issues with AMWTP and CBFO.

The evaluation consisted of interviewing personnel, observing equipment operations that follow site procedures, and inspecting records related to each of the waste characterization processes within the inspection's scope. An important aspect of this evaluation was the objective evidence documenting the effectiveness of the waste characterization processes. Objective evidence typically takes the form of BDRs, radioassay data sheets, AKSRs and related documents, AK accuracy reports, and RTR tapes. During this inspection, EPA selected samples of each of these items, based on the number and variety of items each waste characterization process produced, consistent with standard inspection techniques. Based on the evaluation of the waste characterization processes in conjunction with the sample of objective evidence, EPA determined the technical adequacy of the waste characterization processes within the inspection's scope. The EPA inspection team consisted of the personnel shown in Table 1.

Table 1. Continued Compliance Inspection Participants

Name	Affiliation, Area of Expertise
Rajani Joglekar	EPA Headquarters, Lead Inspector
Ed Feltcorn	EPA Headquarters, Inspector
Lindsey Bender	EPA Headquarters, Inspector
Kathy Economy	EPA Headquarters, Observer
Connie Walker	SC&A, AK Technical Evaluator
Patrick Kelly	SC&A, NDA Technical Evaluator
Dorothy Gill	SC&A, RTR & VE Technical Evaluator
Kira Darlow	SC&A, AK Observer
Rose Gogliotti	SC&A, NDA Technical Evaluator-In-Training

The EPA inspection team interviewed and obtained information and/or inspection support from a number of AMWTP, CBFO, and DOE personnel listed in Table 2.

Table 2. Personnel Contacted During Inspection

Personnel	Affiliation	Area of Expertise/Function
Courtland Fesmire	DOE-CBFO	Observer
Lisa Frost	CWI	
Eric Schweinsberg	AMWTP	SPM
James Seamens	AMWTP	NDA, EA, AKE
Tom Johnson	CWI-CH TRU STR	
Gina Tedford	BNWI-AMWTP	SPM, AKE
Barbara Broomfield	WTS-CCP	
Bill Vercanic	WTS-CCP	
Steve Carpenter	AMWTP	SPM, AKE
Randy Morris	AMWTP	AKE
Rachelle Hubler	AMWTP	AKE

6.0 TECHNICAL WASTE CHARACTERIZATION AREAS

Sections 6.1 through 6.4 of this report detail the four technical areas assessed during this inspection—Acceptable Knowledge (AK), Non-Destructive Assay (NDA), Real-Time Radiography (RTR), and Visual Examination (VE).

6.1 Acceptable Knowledge and Load Management

Background

EPA examined the AK process and associated information to determine whether AMWTP remained in compliance with 40 CFR 194.8 requirements for CH newly generated soil, debris, and solid waste present in the Subsurface Disposal Area. AMWTP is also approved for retrievably-stored debris and solid waste originating from AMWTP, but these categories were not evaluated during EPA's unannounced continued compliance inspection.

The BN510 waste stream was a newly generated S5000 waste stream composed of waste that originated from Mound (MD), Rocky Flats Environmental Technology Site (RFETS), Battelle Columbus (BC), and Bettis Atomic Power Laboratory (Bettis). The waste stream is managed in the AMWTP facility. EPA's baseline approval of the AMWTP stated that addition of any waste streams to BN510 outside of those already included in the waste stream (i.e., Mound, RFETS, Battelle Columbus, and Bettis) is a T1 change requiring EPA's approval prior to implementation. This requirement is documented in EPA's baseline approval (Docket No: A-98-49, II-A4-66, September 2006) and in Table 7 of this report.

CBFO requested the addition of four Hanford waste streams to BN510 in March 2010 on behalf of AMWTP. At that time, Hanford's original certified program was no longer in place and DOE

contracted the Central Characterization Project (CCP) to characterize and ship Hanford wastes to AMWTP for characterization and ultimate emplacement in WIPP. Prior to termination of their program, Hanford shipped several thousand drums from three of the four proposed waste streams to WIPP under Hanford's original WIPP waste characterization program. CBFO approved the remaining waste stream (RLMPFPCD), but Hanford did not ship it to WIPP because an approved WSPF was not issued, although the AKSR had been approved. Below is a description of these four waste streams discussed in the Hanford AKSR (RPT-TRUW-82, Revision 2A).

- **Waste Stream RLM231ZD.001: Hanford 231 Z Building Waste.** This waste stream is composed of 66 containers of CH debris [S5400 Waste Matrix Code (WMC)] packaged in 55-gallon drums that were emplaced in 85-gallon overpacks. Waste Stream RLM231ZD.001 was generated by the 231-Z metallurgical research and plutonium fabrication, decontamination and decommissioning (D&D), technology development, and facility cleanout activities.
- **Waste Stream RLM325D.001: Hanford 325 Building Radiochemical Processing Laboratory Waste.** This waste stream is composed of CH debris (S5400 WMC) in 55-gallon drums that were placed in 85-gallon overpacks. Waste Stream RLM325D.001 consists of debris waste generated at the 325 Building Radiochemical Processing Laboratory and includes 220 containers with generation dates from September 28, 1972, through February 12, 1990.
- **Waste Stream MPFPD: Mixed Plutonium Finishing Plant Debris.** This waste stream consists of mixed TRU debris waste (S5490 WMC) generated between 1970 and the present in support of plutonium metal production operations and glove box activities (e.g., maintenance, clean out, decontamination, decommissioning, stabilization) associated with the Plutonium Finishing Plant (PFP) Complex.
- **Waste Stream RLMPFPCD: The Richland Mixed PFP Comprehensive Debris Waste Stream.** The RLMPFPCD waste stream is a mixed, heterogeneous debris waste stream (S5400 WMC) generated from 1970 through the present in support of PFP's plutonium production and stabilization activities. It is composed of a variety of inorganic, organic and other debris including both process and D&D waste. All of the facilities included in the MPFPD waste stream are included in Waste Stream RLMPFPCD, which includes the Building 242-Z-Waste Treatment Facility, 291-Z-Ventilation/Exhaust Air Stack Building, and PFP Ancillary Facilities.

EPA reviewed information pertaining to the Hanford waste streams proposed for shipment, and approved shipment of the waste streams to AMWTP in June 2010 (see EPA Air Docket No. A-98-49, II-A4-127). Hanford-CCP began shipping drums to AMWTP during September 2010. EPA's June 2010 approval stated that AMWTP must provide specific documentation for EPA's review to verify that the Hanford debris was adequately characterized by AMWTP for inclusion in the BN510 waste stream. During the unannounced continued compliance inspection, EPA evaluated this required documentation, including:

- Revised AK documentation for the BN510.1 waste stream showing how Hanford AK and other documentation have been incorporated
- The revised WSPF for AMWTP's BN510.1 waste stream to include Hanford waste
- BDRs from VE for physical contents and NDA for radiological contents of the BN510.1 waste stream debris
- Evidence tracing Hanford debris waste in AMWTP's waste tracking system.

As required by the WIPP Resource Conservation and Recovery Act (RCRA) permit, AMWTP integrated the Hanford waste streams, retired the BN510 waste stream, and created Waste Stream BN510.1. This waste stream includes all previous waste streams that feed into BN510, as well as the new waste streams from the Hanford site.

Technical Evaluation

EPA's previous AMWTP T1 approval (EPA Docket No. A-98-49, II-A4-127) addressed whether sufficient data were available to demonstrate that the waste being shipped from Hanford fits the acceptable envelope for the BN510.1 waste stream. The scope of this unannounced, continued compliance inspection included evaluating whether AMWTP has sufficiently implemented the characterization process with respect to these new waste streams, including incorporation, interpretation, and integration of AK and RTR/VE/NDA characterization.

In September 2010, Hanford-CCP (on behalf of DOE) initiated shipment of several hundred previously characterized and certified drums from Waste Streams RLM325D.001, RLM231ZD.001 MPFPD, and RLMPFPCD to AMWTP. These wastes will be repackaged, characterized, supercompacted, and shipped to WIPP as part of the BN510.1 waste stream. EPA examined the technical elements listed in this section for each of the waste streams to determine whether the information was adequately integrated into the waste stream and related documentation, i.e., the AMWTP "envelope." These technical elements include those presented in EPA's June 2010 approval letter. Additionally, the new BN510.1 waste stream was evaluated to determine whether it was adequately defined, including radiological and physical composition. Key limitations, as specified in the *Land Withdrawal Act* (LWA), were also evaluated.

- (1) Acceptable knowledge documentation associated with the BN510.1 waste stream was evaluated to determine the adequacy of the Advanced Mixed Waste Treatment Project's Hanford waste stream document review and integration and was found to be adequate.

EPA examined references as part of this inspection, including the following:

- RPT-TRUW-03, Drum Assay Technical Review Report, Advanced Mixed Waste Treatment Project, Revision 7, December 7, 2006
- RPT-TRUW-06, AMWTP Baseline AK for Newly-Generated Waste, Advanced Mixed Waste Treatment Project, Revision 12, August 16, 2010

- RPT-TRUW-07, Determination of Radioisotopic Content in TRU Waste Based on Acceptable Knowledge, Advanced Mixed Waste Treatment Project, Revision 16, August 12, 2010
- RPT-TRUW-12, AMWTP Waste Stream Designations, Advanced Mixed Waste Treatment Project, Revision 15, November 3, 2010
- RPT-TRUW-30, Acceptable Knowledge Summary for Supercompacted Debris Waste (BN510), Advanced Mixed Waste Treatment Project, Revision 6, September 11, 2008
- RPT-TRUW-82, Acceptable Knowledge Document for Hanford Debris Waste Shipped to AMWTP, Advanced Mixed Waste Treatment Project, Revision 1, June 21, 2010
- RPT-TRUW-82, Acceptable Knowledge Document for Hanford Debris Waste Shipped to AMWTP, Advanced Mixed Waste Treatment Project, Revision 2A, date to be determined (TBD)
- RPT-TRUW-83, Acceptable Knowledge Summary for Supercompacted Debris Waste (BN510.1), Advanced Mixed Waste Treatment Project, Revision 0, September 10, 2010
- RPT-TRUW-83, Acceptable Knowledge Summary for Supercompacted Debris Waste (BN510.1), Advanced Mixed Waste Treatment Project, Revision 1A, date TBD
- P853A, Revision 1, CCP-PK-RL-101, Revision 2, Central Characterization Project Process Knowledge Summary Report For Hanford Plutonium Finishing Plant Contact-Handled Transuranic Debris Waste, 85-Gallon Overpacked Drums, Waste Stream: MPFPDD, Larry Porter, Central Characterization Project (CCP), June 4, 2010
- P854A, Revision 1, CCP-PK-RL-102, Revision 2, Central Characterization Project Process Knowledge Summary Report For The Hanford 325 Building Radiochemical Processing Laboratory Contact-Handled Transuranic Debris Waste, 85-Gallon Overpacked Drums, Waste Stream: RLM325D.001, Larry Porter, Central Characterization Project (CCP), June 4, 2010
- P855A, Revision 1, CCP-PK-RL-103, Revision 2, Central Characterization Project Process Knowledge Summary Report For Hanford 231-Z Building Contact-Handled Transuranic Debris Waste, 85-Gallon Overpacked Drums, Waste Stream: RLM231ZD.001, Larry Porter, Central Characterization Project (CCP), June 4, 2010
- HNF-36515 Hanford Mixed PFP Comprehensive Debris (RLMPFPCD), Revision 0, revised document will have new title, date and "P" reference number
- HNF-6489, Revision 1, Hanford Mixed PFP Debris Waste Stream (MPFPD), revised document will have new title, date and "P" reference number.

To understand the interrelationships of these documents, one must understand the history of the Hanford waste streams accepted at the AMWTP and the characterization program approval process. EPA evaluated the information and concluded as follows.

AMWTP used Hanford-CCP process knowledge (PK) reports for debris Waste Streams MPFPDD, RLM231ZS.001 and RLM325D.001 to compile a new Hanford AKSR (RPT-TRUW-82, Revision 1). Information from RPT-TRUW-82, Revision 1 was then used to

generate a new, broader AKSR (RPT-TRUW-83, Revision 0) for the Hanford BN510.1 waste stream. Hanford-CCP's MPFPDD waste stream is similar to Waste Streams RLMFPFCD and MPFPD from the original Hanford program. EPA concluded that AMWTP's use of Hanford-CCP's PK documents for the three waste streams was inappropriate, since at the time of the unannounced inspection, EPA had not approved Hanford-CCP's baseline program. EPA also concluded that AMWTP had not integrated AK information generated by Hanford, who had characterized these drums for WIPP disposal prior to termination of the Hanford program. During a conference call with EPA, AMWTP, Hanford-CCP, and CBFO on December 6, 2010, EPA informed the participants that AMWTP should have used AK documents for the subject waste streams that were prepared under the old Hanford program and asked that AMWTP revise relevant documents.

AMWTP acknowledged EPA's decision and agreed that the Hanford and BN510.1 AKSRs required revision. AMWTP then submitted Revision 2A of RPT-TRUW-82 that modified the document to include the Hanford-approved AKSRs, rather than the Hanford-CCP PK reports. EPA found that the AMWTP RPT-TRUW reports were adequately modified to include information about the four Hanford waste streams, and the modifications were based on data presented in the Hanford-approved AKSRs. EPA finds the revision to be acceptable.

The AKSR for the Hanford waste streams (RPT-TRUW-82, Revision 2A) was created simply by combining the Hanford-approved AKSRs for the four waste streams (RLM231ZA.001, RLM325D.001, MPFPD, and RLMFPFCD) and adding a title page to the merged document. AMWTP representatives indicated that this information was accepted "as is," with little review of associated references or the AKSRs. The AKSRs for the Hanford waste stream were generated under EPA-approved programs. In the future, EPA expects any AKSR to be based on AK generated through an EPA-approved program and that source documents used to generate AKSRs are available in the AMWTP record. AMWTP representatives provided a cross-reference that showed that the source documents were in the AMWTP record.

- (2) The revised waste stream profile form for the Advanced Mixed Waste Treatment Project BN510.1 waste stream was reviewed and found to be adequate.

The WSPF for BN510 was retired and a new WSPF was generated for the BN510.1 waste stream. The WSPF for the new waste stream is dated September 10, 2010, and AMWTP representatives indicated that this profile had not been modified since its latest approval. Contents of the WSPF were compared to the requirements in AMWTP Form 1900, Revision 1, and the WSPF was found to be complete with respect to required contents.

- (3) Data tracking and data traceability of Hanford waste in the Advanced Mixed Waste Treatment Project system, including traceability of batch data reports, was examined and found to be adequate.

AMWTP uses the AMWTP Waste Tracking System (WTS) to track information pertaining to incoming drums from offsite sources, including the Hanford drums. Figure 1 presents the data flow and characterization process associated with Hanford drums. As shown in this chart, drums from Hanford arrive and are assigned an AMWTP drum number; drums then undergo screening

NDA and RTR (i.e., “fast scan”) to evaluate their acceptability according to the INL waste acceptance criteria. If a drum is acceptable, it is combined with others into a six-drum overpack (SDOP). The SDOP is then shredded, and the shredded SDOP is loaded into 55-gallon drums called “silvers.” VE is performed on a “silver” at the time of drum loading and is followed by NDA, after which it is supercompacted or “pucked.”³ The pucks are placed in a 100-gallon drum which may be sent to the INL-CCP Super High Efficiency Neutron Counter (SHENC) for additional assay if data suggest the drum’s TRU alpha activity may be less than 100 nanocuries per gram (nCi/g). Table 3 presents examples of drums sent from Hanford as they went through the AMWTP process described above (the table progresses from left to right). The table does not include all of the “silvers” generated from the specified SDOP, but includes examples to demonstrate traceability of the process. Table 3 and Figure 1 indicate that data are traceable from the original Hanford drums through the final 100-gallon product drum. Per agreements with the State of Idaho, any drum from Hanford must undergo characterization within six months of receipt at AMWTP, and must be removed from Idaho within six months of characterization. The first Hanford drums arrived at AMWTP in September 2010.

- (4) The integration of Hanford waste into the BN510.1 waste stream with respect to waste stream definition was evaluated and found to be adequate.

The BN510.1 newly generated debris waste stream is produced from supercompaction of 55-gallon containers of debris waste. The supercompacted debris consists of material with similar chemical matrices, physical form, and hazardous constituents and is a single waste stream.

The original AMWTP BN510 feedstock debris was generated during plutonium pit production; depleted uranium component fabrication; enriched uranium processing; support operations including: recovery, treatment, maintenance, laboratory analysis, and machining of non-nuclear weapon components; research and development; special order work; fabrication of plutonium-238 (²³⁸Pu) heat sources and manufacture of radioisotopic thermoelectric generators; D&D activities; and materials development. Waste streams generated at Hanford, as described above in the AK Background section and in RPT-TRUW-83, Revision 1A, fit the general feedstock descriptions expected at the AMWTP facility. It should be noted that all feedstock debris is commingled during unpackaging/shredding, sorting, and supercompaction, with the resulting WMC being S5490, “Unknown or Other Heterogeneous Debris.” See Item (1) for requirements pertaining to integration of data into documents, and Items (5) and (6) for information about the radiological and physical composition of the waste stream and Hanford feedstock.

³ *Pucks* are 55-gallon drums of TRU waste that have been compacted into smaller disks by crushing; the *pucks* are then over-packed in 100-gallon drums, which are referred to as *pucked drums*.

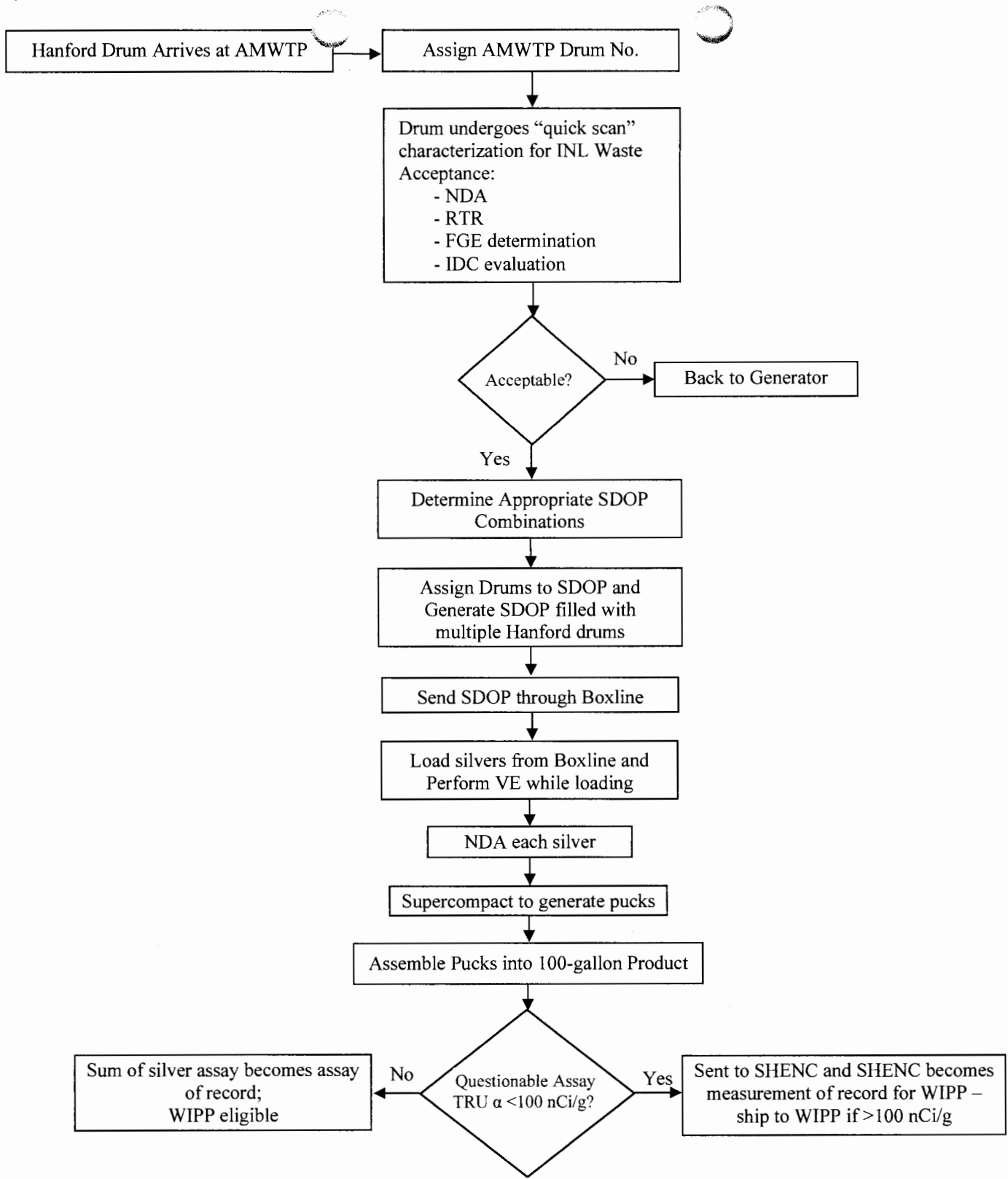


Figure 1. Hanford Drum Process Flow through the Advanced Mixed Waste Treatment Project

Table 3. Example Traceability of Hanford Drums through the Advanced Mixed Waste Treatment Project

Hanford Drum Number/Waste Stream	Fast Scan NDA BDR	Fast Scan RTR BDR	AMWTP Drum Number	SDOP	Silver number - No association with original AMWTP or Hanford Drum Number*	VE BDR (generated during loading of silver)	NDA BDR (generated by NDA of silver prior to pucking)	Product drum number (100-gallon containing pucks)	SHENC of 100 gallon? Y/N and BDR number
0026719/MPFPDD	ASY10-01501	RTR10-00152	10373072	10378197	10379920	VEB10-00914	ASY10-01912	BN10379712	Yes, INNDAD10085
0030006/RLM325D	ASY10-01503	RTR10-00140	10369476	10378197	10379915	VEB10-00914	ASY10-01912	BN10379714	No
0030209/RLM325D	ASY10-01474	RTR10-00140	10369559	10378197	10379905	VEB10-00914	ASY10-01912	BN10379716	No
0037465/RLM231ZD	ASY10-01474	RTR10-00140	10369566	10378197	10379919	VEB10-00914	ASY10-01911	BN10379718	No
0044257/MPFPDD	ASY10-01502	RTR10-00141	10373041	10378197	10379917	VEB10-00914	ASY10-01911	BN10379719	No
0044837/MPFPDD	ASY10-01501	RTR10-00142	10373073	10378197	10379950	VEB10-00915	ASY10-01916	BN10379878	No

* A total of 13 “silvers” were generated from shredding of SDOP10378197; only six are shown in this table.

- (5) Acceptable knowledge information pertaining to the radiological characteristics of transuranic wastes was examined with respect to the BN510.1 envelope and found to be adequate.

The radionuclides of concern for BN510 were: ^{238}Pu , ^{239}Pu , ^{240}Pu , ^{242}Pu , uranium-233 (^{233}U), ^{234}U , ^{238}U , and americium-241 (^{241}Am). AMWTP indicated that they did not expect the feedstock waste to contain measurable quantities of the remaining WIPP-tracked radionuclides, cesium-137 and strontium-90. Additional radionuclides which may be present in feedstock debris, as indicated the BN510 AKSR, were ^{241}Pu , thorium-228 (^{228}Th), ^{231}Th , ^{232}Th , ^{234}Th , ^{235}U , ^{236}U , curium-244, and neptunium-237. The two most prevalent radionuclides by activity expected in the majority of BN510 AMWTP supercompacted debris product drums are ^{239}Pu and ^{240}Pu , while the most prevalent radionuclides by activity will likely always include ^{239}Pu and a different second TRU or U radionuclide due to waste commingling. Addition of the Hanford waste streams in BN510.1 did not significantly modify the general discussion in the AKSR pertaining to the radionuclides of concern or the expected radionuclides. Table 4 presents the two most prevalent radionuclides by feedstock as identified in the AKSR (RPT-TRUW-83, Revision 1A) for the BN510 waste stream. A combination of any two of the common radionuclides identified may be detected as the most prevalent in waste containers that have multiple generators and a mixture of weapons-grade (WG) and heat source (HS) Pu, enriched uranium (EU), and depleted uranium (DU).

Table 4. Predominant Transuranic Radionuclides Expected in Debris Wastes by Generator Site

Generator Site	Principal Pu Type	Predominant TRU Radionuclides
RF	WG	^{239}Pu , ^{240}Pu
RF	WG/DU/EU	^{239}Pu (^{235}U or ^{238}U) ^a
MD	WG	^{239}Pu , ^{240}Pu
MD	HS	^{238}Pu , ^{239}Pu
BC	WG	^{239}Pu , ^{240}Pu
RL	Combination WG/Fuel-grade Pu	^{239}Pu (^{241}Pu or ^{241}Am)
BN	RFETS waste	^{239}Pu , ^{240}Pu
BN	Combination WG/HS	^{238}Pu , ^{239}Pu
BN	Combination WG/HS & U	^{239}Pu (^{240}Pu , ^{238}Pu , ^{241}Am , ^{235}U or ^{238}U) ^a

^a When waste contains DU or EU, and WG Pu, the prevalent radionuclides will include U.

EPA examined the information above against data presented in RPT-TRUW-82, Revision 2A, to determine whether the Hanford waste streams were adequately represented in the BN510.1 AKSR. This review indicated that ^{240}Pu , ^{241}Pu , ^{241}Am , and ^{238}U are expected, and ^{238}U may be a predominant radionuclide based on mass.

EPA also interviewed Mr. Randy Morris, AMWTP Acceptable Knowledge Expert (AKE), to understand how AK data from each of the AKSRs were reviewed and integrated into the BN510.1 waste stream. He stated that historic AK container data, previously approved Hanford AKSRs and representative source documents were reviewed to ensure that the radiological compositions of accepted containers were well understood. Mr. Morris also stated that the predominant radionuclide AK information from each AKSR was evaluated and incorporated in

the BN510.1 AKSR “as is.” EPA’s comparison of the BN510.1 report and individual AKSRs showed that Mr. Morris’ approach was followed and is acceptable. EPA also interviewed Mr. Jim Seamens to better understand the use of AK by NDA Expert Analysts (EAs). Mr. Seamens stated that default isotopics are used when the NDA isotopic determinations are inconclusive, as necessary. Mr. Seamens stated that he reviewed NDA data provided by Hanford and data obtained through site screening to determine whether drums from the four waste streams are acceptable and were “assayable” by the AMWTP system. All but six drums were found to be acceptable. In instances where default isotopics were used, Mr. Seamens indicated these were developed on a case-by-case basis, using available AK information. EPA found that AMWTP had adequately considered the radiological composition of the Hanford waste streams and adequately integrated that information into the BN510.1 AKSR.

- (6) Identification of physical form including waste material parameters and prohibited items was assessed with respect to the BN510.1 envelope and found to be adequate.

The BN510 waste stream was composed of supercompacted debris waste that included combustibles (e.g., rags, gloves, wipes); personal protective equipment (PPE); plastic and rubber items; filters; leaded gloves, aprons, bricks and sheeting; metal with and without lead or cadmium; glass; wood; inorganic debris; Plexiglas®; Benelex®; pieces of equipment; small amounts of process residue and graphite; asphalt, concrete, dirt and sand; and noncombustible solids packaged in 55-gallon drums, supercompacted, and packaged into 100-gallon product drums. AMWTP estimated the waste material parameter (WMP) weight percentages for BN510 using WMP data from 100% of the completed RTR and VE of supercompacted debris waste drums as obtained from the AMWTP WTS database as of October 11, 2006. The AKSR states that this represents 19% of the AMWTP-estimated number of drums for this waste stream and 100% of characterized waste stream containers.

AMWTP updated this understanding of physical composition in the BN510.1 report by examining information from the WIPP Data System/WIPP Waste Information System RTR and VE data for 22,399 Hanford containers shipped to WIPP between 2005 and 2009. The estimated WMPs are representative of the BN510.1 waste stream and are summarized in Table 5.

Table 5. BN510.1 Waste Material Parameters for Supercompacted Debris Waste

Waste Material Parameters	Estimated WMP Weight Percent
Iron-based Metals/Alloys	52
Aluminum-based Metals/Alloys	<1
Other Metals	<1
Other Inorganic Materials	3
Cellulosics	22
Rubber	1
Plastics (waste materials)	22
Organic Material	<1
Soils/Gravel	<1
Inorganic Matrix	<1

The AKSR for BN510.1 was not updated to specifically include the anticipated physical composition of the Hanford waste. Instead, the waste stream was modified to reflect data acquired through ongoing VE of the BN510 waste stream in 2009. Therefore, the physical composition of each of the four Hanford waste streams was examined to determine whether the composition would “fit” the general BN510.1 envelope. RPT-TRUW-82, Revision 2A provides WMP distributions by weight percent for each of the four waste streams, as listed in Table 6.

Table 6. Waste Material Parameter Estimated Percentages for Hanford Waste Streams

WMPs	WMP Weight/Unit Waste (Anticipated Weight Percent Range)			
	RLMPFPCD	MPFPD	RLM325ZD.001	RLM231ZD.001
Iron-based Metals/Alloys	40 (0-83)	48 (0-100)	40.91 (0 - 96.58)	74 (1-98)
Aluminum-based Metals/Alloys	<1 (0-100)	<1 (0-83)	0.08 (0 - 6.54)	<1 (0-1)
Other Metals	1 (0-70)	5 (0-87)	1.83 (0 - 56.73)	<1 (0-10)
Other Inorganic Materials	11 (0-85)	8 (0-100)	26.21 (0 - 90.67)	3 (0-38)
Cellulosics	15 (0-73)	12 (0-92)	9.13 (0 - 87.58)	10 (0-86)
Rubber	8 (0-49)	9 (0-91)	3.76 (0 - 59.64)	2 (0-19)
Plastics (waste materials)	25 (0-67)	18 (0-100)	18.10 (2.74 - 98.16)	11 (2-58)
Organic Material	<1 (0-49)	<1	Not reported	Not reported
Soils/Gravel	<1 (0-49)	<1	Not reported	Not reported
Inorganic Matrix	<1(0-49)	<1	Not reported	Not reported

The Hanford MPFPD AKSR did not provide estimated percentages; those presented were included in reference P853A.

These data suggest that the anticipated weight percent range for each waste stream encompasses the previously identified WMP percentages. Regardless of individual WMP percentage, the overall organic and inorganic percentages of the Hanford waste streams compare favorably with the anticipated WMPs.

Liquid is a prohibited item that is related to EPA compliance. Feedstock debris containers that are identified as containing prohibited items during RTR or VE are treated or rejected, as appropriate.

- (7) Defense status of the new waste streams incorporated into BN510.1 was evaluated and found to be adequate.

DOE-WIPP-3122 (the WIPP waste acceptance criteria or WAC) requires generator sites to use AK to determine if a WIPP-bound TRU waste stream meets the definition of defense waste. Based on DOE guidance, a TRU waste is eligible for disposal at WIPP if it has been generated in whole or in part by one of the atomic energy defense activities listed in Section 10101(3) of the *Nuclear Waste Policy Act of 1982* (NWSA). All feedstock to the BN510.1 waste stream (Rocky Flats, Mound, Battelle Columbus, Hanford, and AMWTP) were generated from defense-related processes or activities. With respect to Hanford, the waste was generated during nuclear materials production, nuclear waste and materials byproducts management, and defense research and development activities conducted at Hanford facilities. Hanford analytical labs or facilities may have carried out non-defense activities concurrently with defense-related activities, but segregation of waste into defense and non-defense subsets is not possible. The defense determination discussions specific to the RLMPFPCD, MPFPD, RLM325ZD.001, and

RLM231SD.001 AKSRs included in RPT-TRUW-82, Revision 2A state that all four waste streams were derived by defense-related activities in whole or in part and meet the definition of defense waste. EPA has examined the arguments presented in RPT-TRUW-82, Revision 2A and agrees that the waste streams include defense-related waste material.

- (8) The identification of BN510.1 feed waste streams as transuranic and not high-level waste or spent nuclear fuel was examined and found to be adequate.

The Public Law 102-579, LWA, bans the disposal at WIPP of spent nuclear fuel (SNF) and high-level waste (HLW) as defined by the NWPA. HLW is defined by the NWPA as “the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations, and other highly radioactive material that the Commission, consistent with existing law, determines by rule requires permanent isolation.” According to the NWPA, SNF is “fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing.” DOE Manual 435.1, *Radioactive Waste Management*, expands on this definition to clarify that “test specimens of fissionable material irradiated for research and development only, and not production of power or plutonium, may be classified as waste, and managed in accordance with the requirements of this Order when it is technically infeasible, cost prohibitive, or would increase worker exposure to separate the remaining test specimens from other contaminated material.”

EPA examined RPT-TRUW-82, Revision 2A and RPT-TRUW-83, Revision 1A and determined that the BN510.1 feed stock waste streams are not SNF or HLW. With regard to Waste Streams MPFPD and RLMPPCD (RPT-TRUW-82, Revision 2A), PFP did not process SNF nor was the facility involved with the separation or reprocessing of constituent elements from reactor fuel, so their resulting wastes do not contain irradiated fuel elements withdrawn from a reactor, only un-irradiated materials from testing. Therefore, these PFP wastes are not SNF or HLW. Waste Stream RLM325D.001 contains laboratory wastes and other debris items and does not contain SNF, and the debris items it does contain are incidental to reprocessing, as described in DOE M 435.1-1. This determination was submitted to and approved by the DOE Richland Operations Office in December 2006. Therefore, the waste is not SNF, HLW, and is not a waste historically managed as HLW. With regard to Waste Stream RLM231ZD.001, the 231-Z Building converted Pu nitrate to metal, performed casting and machining operations for weapons components, and recovered Pu from waste and scrap generated at Hanford and offsite facilities. The 231-Z Building did not reprocess SNF, was not involved with the separation or reprocessing of constituent elements from reactor fuel and did not manage or generate HLW.

- (9) The radiological controls associated with BN510.1 feed waste streams designed to ensure that the waste is transuranic were evaluated and found to be adequate.

TRU alpha contamination is composed of radionuclides with atomic numbers greater than 92 and half-lives greater than 20 years. Drums destined for emplacement in WIPP must contain more than 100 nCi/g TRU alpha activity. As presented in Figure 1 and Table 3, Hanford feedstock undergoes screening assay prior to emplacement in SDOPs. “Silvers” generated by packaging of

shredded SDOPs also undergo NDA before pucking, and 100-gallon drums may undergo further assay using the SHENC if previous assays are of question. Each Hanford drum is assayed prior to shipment to AMWTP, and the INL WAC requires that these drums be TRU. The radiological composition of the waste streams and BN510.1 feed waste streams is well understood.

RPT-TRUW-07, Appendix G presents the anticipated percentages of wastes that may be less than or equal to 100 nCi/g. As shown in this appendix, no wastes from Hanford are expected to be less than 100 nCi/g. As part of the transfer of waste from Hanford to AMWTP for management as BN510.1, AMWTP is supposed to receive only drums whose TRU alpha concentration is greater than 100 nCi/g. Therefore, AMWTP will not receive any non-TRU debris waste from Hanford for management as BN510.1 waste.

- (10) Load Management of the BN510.1 waste stream was evaluated with respect to the new Hanford feed waste streams and found to be adequate.

Load management is approved for the BN510.1 waste stream, and sufficient information was available to evaluate whether the Hanford waste would require this option. For waste streams that are TRU in the aggregate, AMWTP may employ load management. Specifically, individual containers in a TRU waste stream vary in their TRU alpha activity concentration, i.e., some containing more than 100 nCi/g and some containing less than 100 nCi/g. A final payload container, typically a ten-drum overpack, can be loaded such that on the whole the payload's TRU alpha activity exceeds 100 nCi/g, but the TRU alpha activity of the individual containers within the payload may be less than 100 nCi/g. As mentioned above, no waste drums from Hanford will have TRU alpha activity less than 100 nCi/g. This means that while load management is allowed in the AMWTP program, load management is not expected for these Hanford wastes.

Acceptable Knowledge Findings and Concerns

EPA did not identify any findings or concerns associated with AK during this inspection. However, EPA raised an issue concerning inappropriate use of Hanford-CCP prepared AK information specific to the Hanford waste integrated as BN510.1 waste by AMWTP. AMWTP revised two documents (RPT-TRUW-82, Revision 2A, and RPT-TRUW-83, Revision 1A) to address EPA issue. The revisions are acceptable.

Acceptable Knowledge Summary

EPA's unannounced inspection verified that AMWTP has sufficiently implemented the characterization process with respect to these new waste streams. EPA determined that integration of Hanford waste into the BN510.1 waste stream was appropriately documented and the BN510.1 waste streams were adequately defined, including the radiological and physical composition of the waste streams.

Changes to AK Tiering

There are no changes to the AK T1 and T2 assignments made during the baseline inspection as a result of this inspection.

6.2 Nondestructive Assay

Because this unannounced inspection focused on the continued compliance of a site that had an existing baseline approval, the emphasis was on the continued operations of a subset of the approved equipment. Accordingly, an evaluation of the design and basic operating principles of the Z-211-102 and -103 and Z-390-100 and -101 IWAS is not addressed in this report, but is addressed in detail in EPA's baseline inspection report (see EPA Docket No. A-98-49; II-A4-66). This report focuses on selected operational aspects of the IWAS Z-211-102 and -103 NDA systems and the preparation of NDA BDRs for the BN510.1 wastes. Specifically, this inspection focused on the following:

- Confirming that the design and technical capabilities of the NDA systems' hardware and software had not changed since EPA's last inspection
- Adequacy of the current revisions of pertinent AMWTP NDA procedures and documents
- Operational and maintenance history of the NDA systems in the last year
- Knowledge, understanding and training status of AMWTP NDA personnel

EPA examined references as part of this inspection, including the following:

- RPT-TRUW-03, Drum Assay Technical Review Report, Advanced Mixed Waste Treatment Project, Revision 7, December 7, 2006
- RPT-TRUW-30, Acceptable Knowledge Summary for Supercompacted Debris Waste (BN510), Advanced Mixed Waste Treatment Project, Revision 6, September 11, 2008
- INST-FO1-01, In-Plant Drum Assay Operations, Revision 19, November 23, 2009
- INST-TRUW-8.1.1, Drum Assay Post-Maintenance Calibration and Verification, Revision 11, January 5, 2010
- INST-O1-14, Drum Assay Operations, Revision 25, November 18, 2009
- RPT-TRUW-07, Determination of Radioisotopic Content in TRU Waste Based on Acceptable Knowledge, Advanced Mixed Waste Treatment Project, Revision 16, August 12, 2010
- MP-TRUW-8.8, Level 1 Data Validation, Revision 29, May 27, 2010
- AMWTP Work Order No. 327399, K Normalization Failure for the Z-390-101 IWAS NDA Unit, March 20, 2010
- Nonconformance Report No. 55734, Assay 100 (Z-390-100) 3 Sigma Failure, September 26, 2010
- AMWTP Work Order No. 327399, K Normalization Failure for the Z-390-100 IWAS NDA Unit, October 20, 2010

- Employees by Qualifications/Certifications, November 18, 2010: TCNDAETR – Non-Destructive Assay ETR; QCASYITR– Non-Destructive Assay Independent Technical Reviewer (ITR); and FQPOT9BO – Drum Assay
- CBFO Memorandum: Approval Status Notification – Primary NDA PDP Drum Cycle 16A, June 25, 2009
- NDA BDRs from the Z-390-100 and 101 IWAS Systems Nos. ASY-10-01885, ASY-10-01892, ASY-10-01893, ASY-10-01896, ASY-10-01897, ASY-10-01905, ASY-10-01906, ASY-10-001907 and ASY-10-001910.

Technical Evaluation

The following aspects of the Z-211-102 and -103 IWAS were evaluated during this inspection:

- (1) The Z-211-102 and Z-211-103 Integrated Waste Assay System nondestructive assay systems are the same systems that were approved previously.

The Z-211-102 and -103 IWAS systems are located at AMWTP in Building WMF-634. By direct observation of the systems and their documentation, the EPA inspection team verified that the systems have not been moved and that there have been no substantive hardware or software changes to these systems since EPA's baseline approval (see EPA Docket No. A-98-49; IIA4-66).

- (2) The design and operational range of the Z-211-102, Z-211-103, Z-390-100 and Z-390-101 Integrated Waste Assay System nondestructive assay systems were assessed and were found to be unchanged from EPA's baseline approval and remain adequate for the wastes currently being assayed.

The Z-211-102, Z-211-103, Z-390-100 and Z-390-101 IWAS NDA systems function using the same technical approach as was observed during EPA's baseline inspection. The active mode for neutron assays has been turned off and must be intentionally initiated by the operator for the neutron generator to fire. This leaves the passive mode neutron with californium-252 Add-A-Source matrix correction and the high-resolution gamma system with two broad energy germanium detectors. This is the same hardware configuration as was observed during the baseline inspection.

- (3) Performance/maintenance of the Z-211-102, Z-211-103, Z-390-100 and Z-390-101 Integrated Waste Assay System nondestructive assay systems and documentation thereof were evaluated and found to be adequate.

Two performance-related issues were identified with the assay of the DCAL 1999 standard: one 3-Sigma failure on the $^{240}\text{Pu}_{\text{EFF}}^4$ on January 31, 2010, for the Z-390-100 IWAS unit, and another on October 18, 2010, for the Z-390-101 IWAS unit. Both events were addressed via the

⁴ $^{240}\text{Pu}_{\text{EFF}}$ is defined as the mass of ^{240}Pu that would produce the same coincidence response upon assay as that obtained from all the even-numbered isotopes of Pu in an actual sample. Typically, the $^{240}\text{Pu}_{\text{EFF}}$ is 2-20% larger than the actual ^{240}Pu content.

AMWTP nonconformance process in a technically correct manner and were appropriately documented. Additionally, there were two K Normalization failures: one in March 2010 on the Z-390-101 IWAS NDA unit, and another in October 2010 on the Z-390-100 IWAS NDA unit. Both events were addressed via the AMWTP nonconformance process in a technically correct manner and were appropriately documented. There were no performance/maintenance issues relative to the Z-211-102, Z-211-103, Z-390-100 and Z-390-101 IWAS NDA units as a result of this inspection.

(4) All four Advanced Mixed Waste Treatment Project Integrated Waste Assay System nondestructive assay units, i.e., Z-211-102, Z-211-103, Z-390-100 and Z-390-101, had successfully participated in Drum Cycle 16A of the Carlsbad Field Office-sponsored Performance Demonstration Program, as required.

(5) Personnel training was assessed and found to be adequate.

All AMWTP NDA EAs, ITRs, and NDA operators associated with the calibration, operation and data review and approval of the Z-211-102, Z-211-103, Z-390-100 and Z-390-101 IWAS NDA systems had current training. AMWTP provided the following three training forms: Employees by Qualifications/Certifications, QCNDAETR – Non-Destructive Assay Expert; QCASITR – Nondestructive Assay ITR; and FQPOT9B0 – Drum Assay. All forms were dated November 18, 2010.

(6) Nondestructive assay batch data reports were evaluated and found to be adequate.

AMWTP had provided nine NDA BDRs to EPA in early October 2010. These had been requested as part of the two-step approval of the T1 change adding new Hanford waste streams to BN510 and were provided upon completion of supercompaction and assay of the Hanford waste using the in-plant Z-390-100 and Z-390-101 IWAS NDA units located in Building 639 at AMWTP. EPA's review of paper copies of these BDRs in advance of this inspection had generated a series of specific questions regarding preparation of the BDRs, and addressing these was the main focus of this inspection. AMWTP's position is that the official NDA BDR is the electronic version; therefore, several aspects of the NDA BDRs are not adequately represented in the paper copy and are available only in the electronic version. Mr. Jim Seamens, NDA EA, provided information during the inspection, and upon viewing the electronic NDA BDRs, EPA determined that they were adequate.

Nondestructive Assay Findings and Concerns

EPA did not identify any findings or concerns associated with NDA during this inspection.

Nondestructive Assay Summary

The Z-211-102, Z-211-103, Z-390-100 and Z-390-101 IWAS NDA units at AMWTP continue to be in compliance with EPA's baseline approval.

Changes to Nondestructive Assay Tiering

There are no changes to the NDA T1 and T2 assignments made during the baseline inspection as a result of this inspection.

6.3 Real-Time Radiography

Real-Time Radiography for Retrievably Stored (Legacy) Waste

EPA limited its review of RTR to ITR and Site Project Manager (SPM) review, nonconformance report (NCR) processing, and liquid volume determination. AMWTP personnel informed EPA that RTR operators do not calculate the volume of liquid in waste drums. They estimate the volume and use the table in procedure INST-OI-12 to convert the estimate to consistent units of measure. NCR No. 54679 was initiated for drum No. 10375763 because of the presence of liquid. This NCR was properly processed and closed. For BDR RTR10-00150, EPA determined that ITR- and SPM-level reviews were performed and documented.

Real-Time Radiography Findings and Concerns

EPA did not identify any findings or concerns associated with RTR procedures and processes during this inspection.

Real-Time Radiography Summary

EPA determined that RTR data continue to be generated in accordance with an approved procedure by qualified personnel.

Changes to Real-Time Radiography Tiering

There are no changes to the RTR T1 and T2 assignments made during the baseline inspection as a result of this inspection.

6.4 Visual Examination

Visual Examination for Newly Generated Waste

In March 2010, CBFO requested a T1 change for the AMWTP BN510.1 waste stream on behalf of AMWTP and provided eight VE BDRs for EPA's review. During the onsite visit, EPA inspectors interviewed a VE operator and a VE expert to verify that these BDRs had been generated in accordance with procedure INST-OI-17, Facility Visual Examination Operations. BN510.1 waste is generated when BN-508 waste is subject to VE and supercompaction. The final configuration of the BN510.1 waste is compacted waste in 100-gallon containers. EPA reviewed BDR Nos. VEB10-00898, VEB10-00899, VEB10-00903, VEB10-00904, VEB10-00905, VEB10-00906, VEB10-00909 and VEB10-00910. Site VE personnel answered EPA's questions with regard to WMP weight assignment, balance information, calculation of liquid volumes, and ITR. No NCRs were associated with the BDRs under review. VE personnel provided a general description of the waste stream that was consistent with RPT-TRUW-83, Revision 1A, Acceptable Knowledge Summary for Supercompacted Debris Waste (BN510.1). EPA verified continuing qualification of one VE operator.

Visual Examination Findings and Concerns

EPA did not identify any findings or concerns associated with VE procedures and processes during this inspection.

Visual Examination Summary

EPA determined that VE data continue to be generated in accordance with an approved procedure by qualified personnel.

Changes to Visual Examination Tiering

There are no changes to the VE T1 and T2 assignments made during the baseline inspection as a result of this inspection.

7.0 SUMMARY OF RESULTS AND CONCLUSIONS

Findings and Concerns

EPA did not identify any findings or concerns associated with AK, NDA, RTR, or VE during this inspection.

Approval

Based on EPA's inspection completed November 17–18, 2010, the EPA inspection team determined that the AMWTP waste characterization program activities continue to function in accordance with the baseline approval.

Tiering Changes

There are no changes to the AK, NDA, RTR, or VE T1 and T2 assignments made during the baseline inspection as a result of this inspection.

**Table 7. Tiering of Transuranic Waste Characterization Processes Implemented by the
Advanced Mixed Waste Treatment Project
(Based on March 28–30, 2006, Baseline Inspection, Revised February 2011)**

Process Elements	AMWTP T1 Changes	AMWTP T2 Changes ^a
AK including Load Management	Any new waste category Changes to WDS algorithms specific to load management	Notification to EPA upon the following: <ul style="list-style-type: none"> - Changes in load management status of approved waste stream(s) - Availability of WSPFs, including updates or additions to waste stream(s) within an approved waste category - Changes^b to site procedures requiring approvals by CBFO and other changes as discussed in Section 8.1 of the baseline report
NDA	New equipment or physical modifications to approved equipment ^c Changes to approved calibration range for approved equipment	Notification to EPA upon completion of changes to software for approved equipment, operating range(s), and site procedures that require CBFO approval and other changes as discussed in Section 8.2 of the baseline report
RTR	There are no T1 changes at this time	Notification to EPA upon the following: <ul style="list-style-type: none"> - Implementation of new equipment - Modification^c to approved equipment - Changes to site procedures requiring CBFO approvals and other changes as discussed in Section 8.3 of the baseline report
VE	Performance of VE by a different vendor	Notification to EPA upon the following: <ul style="list-style-type: none"> - Addition of new waste category - Addition of new procedure or site equipment identifier - Changes to site procedures requiring CBFO approvals and other changes as discussed in Section 8.4 of the baseline report
WWIS/WDS	There are no T1 changes at this time	Notification to EPA upon changes to site procedures requiring CBFO approvals and other changes as discussed in Section 8.5 of the baseline report

^a Upon receiving EPA approval, AMWTP will report all T2 changes to EPA at the end of each fiscal year quarter. Note: EPA may request specific T2 change items before the end of a fiscal quarter.

^b “Substantive changes” means changes with the potential to impact the site’s waste characterization activities or documentation thereof, excluding changes that are solely related to ES&H, nuclear safety, RCRA or are editorial in nature.

^c Modifications to approved equipment include all changes with the potential to affect NDA and/or RTR data relative to waste isolation and exclude minor changes, such as the addition of safety-related equipment.