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

MAR 16 2011

OFFICE OF
AIR AND RADIATION

MAR 2011

J R Stroble, Manager
National TRU Program
Carlsbad Field Office
U.S. Department of Energy
P.O. Box 3090
Carlsbad, NM 88221-3090

Dear Mr. Stroble:

This letter provides the results of the U.S. Environmental Protection Agency's (EPA) continued compliance inspection of the Central Characterization Project (CCP) waste characterization (WC) program for contact-handled (CH) and remote-handled (RH) transuranic (TRU) waste at the Idaho National Laboratory (INL) near Idaho Falls, ID. This inspection occurred on November 16-17, 2010. As a result of this continued compliance inspection, EPA confirmed that the INL-CCP continues to characterize CH and RH TRU waste consistent with the conditions and limitations from EPA's baseline approval granted in November 2005 (CH) and January 2007 (RH) (EPA Air Docket No. A-98-49; II-A4-59 and No. A-98-49; II-A4-72). The enclosed report (EPA Air Docket No. A-98-49; II-A4-142) gives the details of the evaluation.

In accordance with 40 CFR 194.8(b), during this on-site inspection, EPA sampled the following TRU waste characterization activities and processes:

- Acceptable knowledge (AK) for CH and RH waste streams
- Two nondestructive assay (NDA) systems operated by INL-CCP for characterizing CH TRU wastes: the Waste Assay Gamma Spectrometer (WAGS) and the Super High Efficiency Neutron Counter (SuperHENC)
- Real-time radiography (RTR) for CH retrievably stored TRU debris waste (S5000)
- Visual Examination (VE) for newly generated CH and RH TRU waste

During the inspection, EPA issued a concern in the area of RTR of CH waste. That concern is resolved based on the information submitted to EPA and through follow up discussions between EPA and DOE.

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EPA continues to approve the INL-CCP CH and RH TRU WC program in the configuration observed during this inspection consistent with the limitations described in the baseline inspection report and in follow on Tier 1 approval reports as cited. EPA confirmed that INL-CCP has appropriately implemented and informed EPA of Tier 2 changes since the baseline inspections cited above.

If you have any questions, please contact Rajani Joglekar (202 343-9462) or Ed Feltcorn (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-A4-142

WASTE CHARACTERIZATION INSPECTION CONTINUED COMPLIANCE REPORT

EPA INSPECTION OF THE CENTRAL CHARACTERIZATION PROJECT WASTE CHARACTERIZATION PROGRAM AT THE IDAHO NATIONAL LABORATORY

November 16-17, 2010

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

February 2011

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Attachment B.3	Replicate Testing Data for Drum BN10381564 - SuperHENC
Attachment C.1	Acceptable Knowledge References – Contact-Handled Waste
Attachment C.2	Acceptable Knowledge References – Remote-Handled Waste
Attachment C.3	Nondestructive Assay References – Contact-Handled Waste

ACRONYMS AND ABBREVIATIONS

AEC	Atomic Energy Commission
AK	Acceptable Knowledge
AKE	Acceptable Knowledge Expert
AKSR	Acceptable Knowledge Summary Report
Am	americium
AMWTP	Advanced Mixed Waste Treatment Project
ANL-E	Argonne National Laboratory-East
ARP	Accelerated Retrieval Project
ASTM	American Society for Testing and Materials
Ba	barium
BDR	batch data report
CBFO	Carlsbad Field Office
CCP	Central Characterization Project
Cf	californium
CH	contact-handled
CIS	characterization information summary
cps	counts per second
CRR	Characterization Reconciliation Report
Cs	cesium
CWI	CH2M-WG Idaho, LLC
DOE	U.S. Department of Energy
DPS	Drum Packaging Stations
DQO	data quality objective
DR	discrepancy resolution
DU	depleted uranium
EA	Expert Analyst
EPA	U. S. Environmental Protection Agency
FQAO	Facility Quality Assurance Officers
FR	Federal Register
FRAM	Fixed-energy Response Function Analysis with Multiple Efficiencies
FWHM	Full Width at Half Maximum

g/cm^3	grams per cubic centimeter
GEM	Glovebox Excavator Method
HENC	High Efficiency Neutron Counter
HERL	Heavy Elements Research Laboratory
HEU	highly enriched uranium
HFEF	Hot Fuel Examination Facility
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
IQT	Image Quality Test
ITR	Independent Technical Review
keV	kilo electron volt
LBNL	Lawrence Berkeley National Laboratory
LLD	Lower Limit of Detection
LO	Lead Operator
LOQI	List of Qualified Individuals
LLNL	Lawrence Livermore National Laboratory
LWA	Land Withdrawal Act
MCS	Mobile Characterization Services
MFP	Mixed Fission Products
MGA	multi-group analysis
mrem/hr	millirem per hour
nCi/g	nanocuries per gram
NCR	Nonconformance Report
NDA	Nondestructive Assay
NDE	Nondestructive Evaluation
NNSS	Nevada National Security Site
Np	neptunium
NRF	Naval Reactors Facility
NTS	Nevada Test Site
NU	natural uranium
NWPA	Nuclear Waste Policy Act of 1982
OJT	on the job training
OM	Operations Manager

ORIA	Office of Radiation and Indoor Air
PCB	polychlorinated biphenyl
PDP	Performance Demonstration Program
PM	Project Manager
PPE	personal protective equipment
PTS	Project Tracking System
Pu	plutonium
QAPD	Quality Assurance Program Document
QC	quality control
R&D	Research and Development
RDS	Radioassay Data Sheet
RFETS	Rocky Flats Environmental Technology Site
RFP	Rocky Flats Plant
RH	remote-handled
RTR	Real-Time Radiography
RWMC	Radioactive Waste Management Complex
SCG	Summary Category Group
SDA	Subsurface Disposal Area
SHENC	Super High Efficiency Neutron Counter
SPC	sludge pan container
SPM	Site Project Manager
SQS	Small Quantity Site
Sr	strontium
SHENC	Super High Efficiency Neutron Counter
SWB	standard waste box
SWEPP	Stored Waste Examination Pilot Plant
T1	Tier 1
T2	Tier 2
TMU	total measurement uncertainty
TRA	Test Reactor Area
TTR	Tonopah Test Range
TTR-HET	Tonopah Test Range- Heterogeneous
TRU	transuranic

U	uranium
VE	Visual Examination
VEE	Visual Examination Expert
VERB	Visual Examination and Repackaging Building
VET	Visual Examination Technique
VPM	Vendor Project Manager
WAGS	Waste Assay Gamma Spectrometer
WC	Waste Characterization
WCPIP	Waste Characterization Program Implementation Plan
WDS	Waste Data System
WG	weapons-grade
WIPP	Waste Isolation Pilot Plant
WMC	Waste Matrix Code
WMP	Waste Material Parameter
WSPF	Waste Stream Profile Form
WTS	Washington TRU Solutions

1.0 EXECUTIVE SUMMARY

In accordance with 40 CFR 194.24(h), the U.S. Environmental Protection Agency (EPA) conducted a continued compliance inspection of the Central Characterization Project (CCP) waste characterization program for contact-handled (CH) and remote-handled (RH) transuranic (TRU) wastes at the U.S. Department of Energy (DOE) Idaho National Laboratory (INL) in Idaho Falls, Idaho. This inspection occurred on November 16-17, 2010. In accordance with the provisions of 40 CFR 194.24(h), as issued in a July 16, 2004, *Federal Register* (FR) notice (69 FR 42571–42583), EPA conducted a continued compliance inspection of the site's program to characterize TRU wastes proposed for disposal at the Waste Isolation Pilot Plant (WIPP). As a result of this continued compliance inspection, EPA confirmed that the INL-CCP TRU waste characterization program continues to characterize CH and RH TRU waste consistent with the conditions and limitations that are discussed in the baseline inspection reports (see EPA Docket Nos. A-98-49; II-A4-59 and A-98-49; II-A4-72). During this inspection, EPA evaluated samples of the following waste characterization activities:

- Acceptable knowledge (AK) for CH and RH waste streams
- Two nondestructive assay (NDA) systems operated by INL-CCP for characterizing CH TRU wastes: the Waste Assay Gamma Spectrometer (WAGS) and the Super High Efficiency Neutron Counter (SuperHENC)
- Real-time radiography (RTR) for CH retrievably stored TRU debris waste (S5000)
- Visual Examination (VE) for newly generated CH and RH TRU waste

EPA maintains its approval of the INL-CCP CH and RH TRU waste characterization programs in the configuration observed during this inspection consistent with the limitations described in the baseline inspection reports cited above and other subsequent EPA Tier 1 (T1) approvals. The T1 and Tier 2 (T2) designations from the baseline inspection and other subsequent EPA T1 approvals remain applicable and no T1 or T2 tiering changes resulted from this continued compliance inspection.

This report serves as EPA's public notification of the results of the continued compliance inspection. This information will be provided through the EPA website and by sending emails to the WIPPNEWS list, in accordance with 40 CFR 194.8(b)(3).

2.0 PURPOSE OF CONTINUED COMPLIANCE INSPECTIONS

Under the changes to 40 CFR 194.8 promulgated in the July 16, 2004, FR 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 a 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 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. EPA is also 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).

3.0 PURPOSE OF THIS REPORT

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

- Describes the sample of the INL-CCP waste characterization systems evaluated during this inspection
- Identifies all areas where waste characterization systems have changed relative to what was approved during the baseline inspection and other subsequent EPA T1 evaluations, and assesses the impact, if any, of those changes
- Provides objective evidence to support the EPA continued approval basis for all waste characterization systems
- Describes any tests or demonstrations completed during the course of the inspection and their relevance to EPA's approval decision.

The DOE documents that EPA reviewed for this evaluation are cited in different sections throughout the report and are listed in Attachments C.1 through C.3. Any of these documents can be requested from the following address:

Carlsbad Field Office
Manager, National TRU Program
P.O. Box 3090
Carlsbad, NM 88221-3090

4.0 SCOPE OF THIS CONTINUED COMPLIANCE INSPECTION

The scope of this continued compliance inspection included the evaluation of selected elements of the waste characterization systems in use at INL-CCP to characterize CH and RH TRU wastes that were approved during the baseline inspection and subsequent T1 evaluations. The EPA inspection team evaluated aspects of these systems with respect to their ability to continue to perform the following functions:

- Identify and quantify the activities of the 10 WIPP-tracked radionuclides [americium-241 (^{241}Am), cesium-137 (^{137}Cs), plutonium-238 (^{238}Pu), ^{239}Pu, ^{240}Pu, ^{242}Pu, strontium-90 (^{90}Sr), uranium-233 (^{233}U), ^{234}U, and ^{238}U] using a combination of AK and NDA systems

- Assign waste material parameters (WMPs) correctly using RTR and VE for CH and RH retrievably stored and newly generated wastes, respectively

Specifically, these consisted of the following components:

- AK processes that support CH and RH wastes
- Two NDA systems, the WAGS and SuperHENC systems
- RTR for retrievably stored CH wastes
- VE for newly generated CH and RH wastes

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 batch data reports (BDRs), radioassay data sheets, 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 samples of objective evidence, EPA determined the technical adequacy of the waste characterization processes within the inspection's scope.

5.0 PERSONNEL

5.1 EPA Inspection Team

Table 1 identifies the members of the EPA waste characterization inspection team.

Table 1. EPA Inspection Team Members

Inspection Team Member	Position	Affiliation
Ed Feltcorn	Inspector-Team Leader	U.S. EPA ORIA[a]
Rajani Joglekar	Inspector	U.S. EPA ORIA
Lindsey Bender	Inspector	U.S. EPA ORIA
Cathy Economy	Observer	U.S. EPA ORIA
Patrick Kelly	NDA Inspector	SC&A, Inc.
Dorothy Gill	RTR Inspector	SC&A, Inc.
Connie Walker	AK Inspector	SC&A, Inc.
Kira Darlow	AK Inspector	SC&A, Inc.
Rose Gogliotti	NDA Observer	SC&A, Inc.

[a] Office of Radiation and Indoor Air

5.2 Personnel Contacted

EPA and its support personnel conducted interviews with INL-CCP waste characterization personnel in several disciplines. The personnel contacted represented a sample of the CH and RH TRU waste characterization staff, and they are listed in**Error! Reference source not found.**, with their affiliations and areas of expertise or function.

Table 2. Personnel Contacted During Inspection

Personnel	Affiliation	Area of Expertise/Function
Scott Smith	TechSpecs/INL-CCP	AKE
Lisa Frost	CWI	ICP
Tom Johnson	CWI	STR
Stephanie McElhaney	Pajarito	SHENC-EA
Courtland Fesmire	CBFO	Observer
Michael Walentine	WTS/CCP Project Office	PM
Thomas L. Clements, Jr.	CWI	ICP
Irene Quintana	WTS/CCP RH	PM
Ted Carlson	WTS/INL-CCP	VPM
Greg Smith	WTS/INL-CCP	VPM
Tyson Christenson	VJ Technologies	RTR
Rick Green	Pajarito	SHENC
Howard Budweg	CBFO	Observer
Jeffrey Poole	WTS/INL-CCP	VEE
Preston Abbott	MCS	NDA, EA
Bart Morales	MCS	NDA-EA
Bill Verlanic	WTS/INL-CCP	Site PM
Bryce Woodbury	MCS	NDA-EA
Mark Pearcy	WTS/CCP Project Office	Certification Manager
Corey Boland	MCS	NDA-LO
Sharon Cummins	Pajarito	NDA—SuperHENC, Operator
Shane Boudreau	Pajarito	NDA—SuperHENC, EA
James Rowsell	MCS	NDA—WAGS, Operator
John Braiser	MCS	NDA—WAGS, EA
Jerry Bowden	VJ Technologies	RTR Operator, ITR
Brett Gyorfy	Stoller	RTR Operator, ITR
Vince Medina	WTS/INL-CCP	SPM

6.0 TECHNICAL EVALUATION OF THE WASTE CHARACTERIZATION AREAS

Sections 6.1 through 6.4 of this report detail the four technical areas assessed during this inspection: acceptable knowledge (AK); nondestructive assay (NDA); and nondestructive examination (NDE), consisting of real-time radiography (RTR) and visual examination (VE).

6.1 Acceptable Knowledge

6.1.1 Contact-Handled Waste Streams

Background Information

EPA examined the AK process and associated information to determine whether INL-CCP remained in compliance with 40 CFR 194.8 requirements for CH waste streams. The continued compliance inspection scope included all of the Small Quantity Site (SQS) and three Accelerated Retrieval Project (ARP) waste streams. Specifically, EPA reviewed the following CH waste streams:

- ID-NTLBL-S3900
- ID-NTLBL-S5400
- ID-NTS-TTR-HET
- ID-SDA-DEBRIS
- ID-SDA-SLUDGE
- ID-SDA-SOIL

Small Quantity Site Waste Streams

EPA approved the INL-CCP CH baseline program in October 2005 for S3000, S4000, and S5000 waste. In 2008, INL-CCP began accepting waste from offsite SQS generators for characterization and subsequent shipment to WIPP. Several sites have shipped waste to INL for characterization as SQSs— Nevada National Security Site[1] (NNSS) was a main storage area for waste from several SQSs including Lawrence Livermore National Laboratory (LLNL), Lawrence Berkeley National Laboratory (LBNL), Lynchburg, Industrial Technology Research Institute, Rocky Flats Environmental Technology Site (RFETS),[2] the Tonopah Test Range (TTR) and related test facilities at or near NNSS. NNSS itself also generated waste [e.g., waste created during repackaging at the NNSS Visual Examination and Repackaging Building (VERB) facility]. INL-CCP accepts waste directly from Small Quantity Sites (SQS) including LLNL, LBNL, and General Electric Vallecitos. EPA examined the SQS characterization process with an emphasis on AK data assembly, use, and interpretation to assess whether these wastes have been appropriately characterized under INL-CCP's approved program.

Accelerated Retrieval Project Waste Streams

[1] The Nevada National Security Site was formerly named the Nevada Test Site.

[2] The Rocky Flats Environmental Technology Site was formerly known as the Rocky Flats Plant (RFP).

Over the years, INL received TRU waste from several onsite and offsite DOE locations [e.g., Argonne National Laboratory West, and Rocky Flats Plant (RFP)], as well as other generators (e.g., Colorado School of Mines, and the United States Geologic Survey). These wastes were placed in the subsurface disposal area (SDA). The SDA at INL consists of 58 trenches, 20 pits, 21 rows of soil vaults, Pad A, and the Acid Pit, where historic waste disposal activities occurred. Waste in certain areas of the SDA has been targeted for removal under the ARP, and the areas containing the targeted waste are collectively identified as the "retrieval area." The waste removal, drumming, and characterization for WIPP disposal are occurring in a phased manner [Phases I (ARP-I) through V (ARP-V)]. The retrieved ARP wastes are divided into three waste streams during VE: ID-SDA-DEBRIS, ID-SDA-SLUDGE, and ID-SDA-SOIL. EPA has approved these INL-CCP Summary Category Groups (SCGs) for WIPP disposal.

During this continued compliance inspection, EPA primarily evaluated Revision 9 of the AK Summary Report (AKSR), but also included specific sections of Revisions 7 and 8 of the AKSR to confirm that INL-CCP continues to comply with the EPA-approved AK processes when integrating additional ARP phases into the AK record.

EPA conducted a continued compliance inspection at INL-CCP during September 2008, and later in October-December 2008. EPA's report, dated March 2009, identified as a T1 change the following (see EPA Docket No. A-98-49): "Changes to the targeted waste(s) from what was presented in Revision 6 of the AK Summary CCP-AK-INL-001." CCP-AK-INL-001, Revision 7, approved by CBFO on October 27, 2008, revised the targeted waste to incorporate the previously non-targeted RFP 742-sludge. This approval occurred while EPA's continued compliance report was in preparation, and was implemented before EPA's T1 requirement was documented. EPA elected to postpone review of the inclusion of 742-sludge until the next continued compliance inspection. The analysis is presented in Item (1) below.

Waste Characterization Element Description

As part of the inspection, EPA reviewed the elements of the AK process listed below:

- Waste stream definition
- AK information pertaining to the radiological characteristics of TRU wastes
- Identification of wastes' physical form, including waste material parameters (WMPs) and prohibited items
- AK procedural adequacy and implementation, i.e., assembly compilation, interpretation, confirmation, and discrepancy resolution
- Adequacy of the AKSR
- Drum traceability and the ability to follow the AK waste characterization process
- Defense origin of TRU wastes
- Spent Nuclear Fuel (SNF) and High Level Waste (HLW) status relative to the Land Withdrawal Act (LWA)

- Waste Stream Profile Form (WSPF) preparation and completeness
- Preparation of nonconformance reports (NCRs)
- AK accuracy
- Implementation of load management
- NDA-AK communication.

Documents, Waste Containers, and Batch Data Reports Reviewed

As part of this continued compliance inspection attachments, source documents, required forms, and other data were provided to EPA and were examined, as appropriate. All CH AK documentation referenced is listed in Attachment C.1. Some of these documents were provided in advance of the inspection, however most were provided to EPA upon arrival at INL-CCP. The list of VE and NDA BDRs examined for this evaluation is presented in Table 3.

Table 3. Contact-Handled Batch Data Reports Examined

Waste Stream	Drum Number	NDE BDR Number	NDA BDR Number
ID-NTLBL-S3900	NT080018R	INRTRS090049	INNDAS090184
ID-NTLBL-S5400	NT041489A	INRTRS090058	INNDAS09218
ID-NTS-TTR-HET	TTR-21A	INRTR5090059	NNDAW090179
ID-SDA-DEBRIS	ARP06227	INARPVE000740	INNDAH080058, INNDAW090184
ID-SDA-SLUDGE	ARP15566	INARPVE001510	INNDAS090352
ID-SDA-SOIL	ARP20413	INARPVE001936	INNDAS100048

Technical Evaluation

EPA examined three SQS waste streams and three ARP waste streams. Adequacy of documentation and identification of the waste streams are addressed below. Throughout the review, the three ARP waste streams may be evaluated as one because they are differentiated only by their physical characteristics.

(1) The definition of waste stream was evaluated and found to be adequate.

Contact-Handled Wastes Streams from Small Quantity Sites:

As part of this inspection, EPA evaluated three SQS waste streams. These waste streams have been characterized and disposed at WIPP and INL-CCP informed EPA of the availability of WSPFs as T2 changes in the Q1 2010 Tier Report. EPA reviewed the information provided and included the three SQS waste streams listed below in this inspection.

ID-NTLBL-S5400 debris from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

The waste stream originated from research and development (R&D) and maintenance activities at LBNL. Source documents (References U001, U015, U029, U052, U072, U074, U084, and U103) suggest that drums from the waste stream had original closure dates from 1975–1980 and

were shipped to NNSS between May 1975 and December 1984. The waste stream originally consisted of 12 drums, seven of which were overpacked into 85-gallon drums and directly shipped to WIPP from NNSS. NNSS repacked the remaining five drums, resulting in one 55-gallon S5400 drum, one S5400 standard waste box (SWB), and one 55-gallon S3900 drum (discussed below as a separate waste stream) (References DR002, P025, U015, U072, U074, U084, and U103).

The AKSR and related source documents indicate that the waste stream was generated primarily as part of ongoing actinide chemistry research in the Heavy Elements Research Laboratory (HERL) in Building 70A and its predecessor in Building 70 (P098). Source documents (e.g., C101) suggest the waste in this waste stream originated from the Pitroom (Building 70). The AKSR states that the following divisions were operating during the time of waste generation:

- Chemistry Division, 1961 through 1963
- Nuclear Chemistry Division, 1964 through 1974 (P098)
- Materials and Molecular Research Division, 1975 through 1986 (Reference P098)

The AKSR implies that wastes generated between 1976 and 1996 from the Nuclear Science Division may be present based on the dates of activities. The AKSR also suggests that waste generated from 1977 and 1995 by the Earth Sciences Division to support the development of nuclear waste repositories, specifically WIPP and Yucca Mountain could also be present in the waste (Reference P098).

INL-CCP stated that any activities performed prior to 1975 may have contributed to this waste stream, as 1975 was the date of the first drum closure, not the date of first generation of this waste. No waste generated after 1980 would be in the waste stream. INL-CCP indicates that waste cannot be differentiated by generator location because wastes were comingled at a single collection point. Based on the process description and general information provided by INL-CCP, the waste stream is appropriately defined. Physical and radiological characteristics of the waste stream are described in Items (2) and (3) below.

ID-NTLBL-S3900 solid waste from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

Waste Stream ID-NTLBL-S3900 originated from R&D and maintenance activities performed at LBNL (References U001, U015, U029, U072, and U103). The waste stream is mixed homogeneous solids originally generated from 1977 to 1980, which are the closure dates of the original NTLBL drums containing solid waste. The waste stream consists primarily of absorbed and solidified aqueous liquids. The materials used to absorb/solidify liquids include Aquaset, diatomaceous earth, Portland cement, and vermiculite. This waste has the same process origin as ID-NTLBL-S5400, but was generated when the original four drums were repackaged and S3900 waste was segregated into a separate one-drum waste stream. Waste Stream ID-NTLBL-S3900 consists of a single drum and no additional containers of this waste stream will be generated in the future. Based on this information, the waste stream is adequately defined; see Items (2) and (3) below for additional information.

ID-NTS-TTR-HET debris from the Tonopah Test Range/Roller Coaster Project stored at Nevada National Security Site (AKSR CCP-AK-INL-014, Revision 0)

The Roller Coaster Project involved storage transportation tests conducted at the Double Tracks located at the Nellis Air Force Range and the Clean Slate 1, 2, and 3 sites located on the TTR. Conventional explosives were used to detonate nuclear materials and study their distribution. These two areas were contaminated with Pu and U and were remediated in 1994–2000, resulting in the collection of metal fragments and other debris such as personal protective equipment (PPE) (References C1002, C1003, P1017, P1013, and P1025). Two 30-gallon drums of TRU debris waste were generated and these were shipped to NNSS for storage at the TRU Pad Cover Building in December 1999. Approximately 3,550 grams of hot fragments were collected and are in the debris waste, with a measured ^{241}Am activity in excess of 100 nanocuries per gram (nCi/g) (References C1002, M1005, P1012, P1013, P1014, P1024, P1025, P1033, P1036, P1099, and P1107). The TTR-HET drums were repackaged into a single 55-gallon drum at the VERB in 2006 (References C1014 and P1016). Based on this information, while the wastes were obtained from two separate areas, the processes associated with their creation are similar and their commingling during repackaging makes it impossible to distinguish them by production areas. The waste stream is adequately defined, see Items (2) and (3) below for additional information.

In addition to the three SQS waste streams, ARP waste streams were evaluated, as described below.

Contact-Handled Waste Streams from the Accelerated Retrieval Project (AKSR CCP-AK-INL-001, Revision 9)

The targeted waste in all five ARP phases (ARP-I – ARP-V) consists of RFP First-Stage Sludge (741-Series), RFP Second-Stage Sludge (742-Series), RFP Organic Setups (743-Series), RFP Roaster Oxide, RFP Graphite, and RFP Filters. The pits contained within ARP-III, -IV, and -V received waste from RFP during the same time period as the previously approved waste (May 1964 – September 1968, compared to January 1963 – September 1968), indicating that the wastes have the same origin (References ID-P092, ID-U343, ID-U344, ID-U345, INTEC-P002, RF-U1306, RF-U1307, and RF-U1308). Waste Stream ID-SDA-DEBRIS is defined as a separate waste stream because it contains more than 50% debris. Waste Stream ID-SDA-SLUDGE is defined as a separate waste stream from the rest of the ARP waste because it contains more than 50% sludge. Waste Stream ID-SDA-SOIL is defined as a separate waste stream because it contains more than 50% interstitial soil from the retrieval area. Based on this information, the waste streams are adequately defined; see Items (2) and (3) below for additional information.

Evaluation of the Inclusion of Rocky Flats Plant Second-Stage Sludge (742-Series) as Targeted Waste from the Accelerated Retrieval Project

The 741- and 742-series sludges were generated in RFP Building 774, which treated aqueous solutions contaminated with highly enriched uranium (HEU), depleted uranium (DU) and Pu containing trace amounts of ^{241}Am, neptunium-237 (^{237}Np,) ^{233}U, and curium-244 (^{244}Cm). The treatment activities performed in Building 774 used a two-stage precipitation process. The first stage contained the bulk of the radioactive constituents and was designated as 741-series sludge.

The first-stage effluent was collected as feed for the second-stage precipitation process; sludge collected from second-stage precipitation was designated a 742-series sludge (second-stage sludge) (Reference P562). RFP 741-series inorganic sludges were included in the original targeted waste population, but the 742-series sludges were not because targeted wastes were limited to those expected to contain a significant portion of the constituents of concern, specifically volatile organic compounds, U, and TRU radionuclides, including Pu. INL-CCP later determined that the 741- and 742-series sludges are generally physically indistinguishable; therefore, INL-CCP decided to include the 742-series sludge in the targeted population because it was typically comingled with the excavated targeted waste (References P216, P239).

EPA examined references to determine the radiological differences between the two sludges. The data provided indicates that the 741-series sludge is expected to include the bulk of the actinides present in the waste stream, primarily ^{239}Pu, ^{241}Am, and ^{240}Pu by mass, while the 742-series sludge is expected to contain far less Pu and other actinides, and more U (References P256, U115). 741-series sludge also contains over 63% of the TRU activity, while 742-series sludge contains less than 0.2% of the TRU activity (Reference P103). The treatment process may preferentially concentrate more soluble radionuclides in the 742-series sludge than in the 741-series sludge.

INL-CCP included radiological data for all wastes in the overall radiological envelope expected for the SDA waste streams, including non-targeted materials, as discussed in Section 5.5 of the AKSR and presented in Table 5-4. INL-CCP also adjusted the AK-NDA memorandum (included in Attachment 7 of CCP-TP-005) between Revisions 6 and 9 of the AKSR to include new ARP phases; APR-III and -IV include more 742-series sludge by volume and the isotopic data presented in the AK-NDA memorandum should reflect this change. Changes to the estimated radionuclide mass and activity percents for the waste stream as a whole due to addition of ARP-III and -IV were relatively small. The eventual addition of ARP-V waste to the AK-NDA memorandum should not impact the estimated values greatly, due to the relatively low volumes of 741- and 742-series sludge expected in ARP-V. EPA also notes that 742-series sludge was generated from the same general process as the 741-series sludge, and agrees that while the radiological composition of the 742-series sludge is different, the overall composition fits the anticipated ARP radiological composition (AKSR Table 5-4), which was developed to include all targeted and non-targeted wastes. EPA agrees that the 742-series sludge was included in the waste stream because it was indistinguishable from 741-series sludge, and believes this may account for the large number of INL-CCP Nonconformance Reports (NCRs) issued due to drums exhibiting TRU activity <100 nCi/g. EPA concludes that the 742-series sludge fits the previously defined radiological envelope of the ARP wastes, and has been accounted for in recent AK-NDA memoranda with the inclusion of ARP-III and ARP-IV waste.

Modification of the targeted waste population remains a T1 change.

(2) Acceptable Knowledge information pertaining to the radiological characteristics of transuranic wastes was examined and found to be adequate.

Radiological characteristics of each waste stream were evaluated as described below.

Contact-Handled Waste Streams from Small Quantity Sites
ID- NTLBL-S5400 debris from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

Experiments and activities conducted at LBNL resulted in wastes containing a wide variety of radionuclides. LBNL was not a production facility, so constant isotopic ratios for Pu are not expected (References C101, P025, P094, U001, U003, U029, U061, U067, and U085). Radionuclides that may be present include the following:

- ^{241}Am, ^{243}Am
- Berkelium-249
- Californium-249, 252
- ^{242}Cm, ^{244}Cm
- ^{237}Np
- Protactinium-231
- ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{241}Pu, ^{242}Pu
- Radium-226
- Thorium-228
- Mixed fission products, assumed to include ^{137}Cs and ^{90}Sr

Based on NNSS NDA measurements of the two containers in the waste stream, the predominant radionuclides by weight percent are ^{237}Np at 56.61% and ^{241}Am at 18.54%. Greater than 95% of the total activity is ^{241}Am and ^{241}Pu. Previous assay data from NNSS show that ^{234}U and ^{238}U are not expected (References C142 and U103). This information does not coincide with INL-CCP NDA data, which indicates that ^{239}Pu and ^{241}Am are the predominant radionuclides by weight, and INL-CCP submitted a freeze file[3] change to the AKSR to address this discrepancy. The NDA memorandum for this waste stream states that several Pu *grades* were commonly used at LBNL; *grades* are defined by their percentage composition of ^{240}Pu and ^{241}Am (except for heat-grade Pu). The NDA memorandum provided default isotopic distributions for weapons-grade (WG), fuel-grade, reactor-grade, mixed-grade, and americium-enriched plutonium, enriched uranium and DU. The NDA memorandum states that if isotopic analysis results are not acceptable or available, default isotopics as defined in AK are used. In the case of drum No. NT041489A, which was examined as part of this continued compliance inspection, the NDA analyses used AK-based default isotopics as defined in the AK-NDA memorandum. See Item (11) below for additional information pertaining to AK accuracy and Item (14) below for additional information pertaining to AK-NDA communication. Based on data reviewed and INL-CCP assay information, the radiological composition of the waste stream is adequately defined.

ID-NTLBL-S3900 solid waste from Lawrence Berkeley National Laboratory and stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

[3] As a result of an inspection-related EPA issue, INL-CCP may have to revise a document. INL-CCP makes the change(s) and provides the revised document to EPA as a freeze file to serve as objective evidence for the inspection. INL-CCP's document control process then generates an official version of the revised document.

Waste Stream ID-NTLBL-S3900 consists of mixed homogeneous solids generated at LBNL as part of R&D and maintenance activities and is composed primarily of absorbed and solidified aqueous and organic liquid. Aquaset, diatomaceous earth, Portland cement, and vermiculite were used to absorb/solidify liquids. The radionuclide composition of the waste stream was based on NDA measurements performed at the NNSS indicating that the predominant radionuclides for this waste stream by weight are ^{239}Pu (90%) and ^{240}Pu (6.15%), and that over 95% of the total activity is ^{239}Pu, ^{240}Pu, and ^{241}Pu. The NDA memorandum indicates that default isotopics will be used in the event that measured values are unacceptable. In the case of the single drum in the waste stream, measured isotopics were acceptable. Based on data reviewed and INL-CCP assay information, the radiological composition of the waste stream is adequately defined.

ID-NTS-TTR-HET debris from the Tonopah Test Range/Roller Coaster Project stored at Nevada National Security Site (AKSR CCP-AK-INL-014, Revision 0)

Waste Stream ID-NTS-TTR-HET was generated from the remedial investigations and the cleanup of Double Tracks and Clean Slate sites. At these sites, high explosives were detonated near nuclear weapon assemblies to determine contamination dispersion. The assemblies were composed of ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{241}Pu, and DU, and debris associated with the waste contain these radionuclides and ^{241}Am, a decay product of ^{241}Pu (References C1002, P1012, P1013, P1014, P1017, P1018, P1023, P1032, P1033, P1096, P1107, and P1099). Container TTR-21A was radioassayed at NNSS in 2006 and was determined to be TRU, i.e., >100 nCi/g TRU alpha activity. Based on the results of this assay, the two predominant radionuclides expected by weight percent based on AK are ^{238}U and ^{239}Pu, while ^{241}Pu, ^{239}Pu, and ^{240}Pu comprise over 95% of the total activity. This information does not coincide with INL-CCP NDA data which indicates that ^{239}Pu and ^{240}Pu are the predominant radionuclides by weight, and INL-CCP submitted a freeze file change to the AKSR rectifying this discrepancy. The AK-NDA memorandum stated that if measured isotopic results were not available, default isotopics would be used. In the case of the single drum, TTR21A, measured isotopics were used. INL-CCP measurement data indicate that ^{239}Pu and ^{241}Am are the most prevalent isotopes by weight. See Item (11) below for additional information pertaining to AK Accuracy and Item (14) below for additional information pertaining to AK-NDA communication. Based on EPA's analysis, the radiological composition of the waste stream was adequately defined.

Contact-Handled Waste Streams from the Accelerated Retrieval Project (AKSR CCP-AK-INL-001, Revision 9)

While each ARP phase contains targeted RFP waste, the proportion and type of targeted and non-targeted wastes waste types in each area varies, as do the SQSs that contribute to each ARP. The waste retrieval and VE processes attempt to remove as much of the non-targeted waste as possible; however, some contamination is inevitable. Therefore, the expected radionuclides in ARP waste streams must be updated every time a new ARP phase is added. INL-CCP calculates the expected radionuclides based on AK data (Reference ID-U313), and continues to update these calculations every time additional ARP phases are added, historically adding one new ARP phase per AKSR revision, as evidenced by comparing Tables 5-2, 5-3, and 5-4 in AKSR, Revisions 7, 8, and 9. INL-CCP indicates that the most prevalent radionuclide by mass are ^{238}U (99.63%), with ^{235}U and ^{239}Pu as the second and third most prevalent by mass in almost equal

concentrations, while the most prevalent radionuclides by activity are ^{241}Pu (50.56%) and ^{241}Am (38.07%). During this continued compliance inspection, EPA noted that the AK-based expected radionuclides do not accurately correspond with those measured by NDA. This appears to be because INL-CCP is not adequately correcting for the in-growth of ^{241}Am from ^{241}Pu.[4] EPA recognizes that INL-CCP has not historically been required to update the radiological characterization information in the AKSR based on NDA information. Instead, the AK-NDA memorandum is expected to reflect accurate, NDA-based information and the AK Accuracy Reports are expected to catch inconsistencies between the AKSR and the NDA records. See Items (11) and (13) below for further discussion of this issue. Based on the above information, the AK information pertaining to the radiological characteristics of TRU wastes is adequate.

(3) Identification of physical form, including Waste Material Parameters and prohibited items, were assessed and found to be adequate.

Contact-Handled Waste Streams from Small Quantity Sites

ID- NTLBL-S5400 debris from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

Waste Stream ID-NTLBL-S5400 is composed of mixed, heterogeneous decontamination and decommissioning and process/maintenance related wastes generated at LBNL, appropriately classified as WMP S5400. Specific waste items include organic laboratory debris (cardboard, cloth tape, cotton swabs, Kimwipes, paper) and inorganic debris (aluminum, copper, glass, graphite, and other scrap metals). The AKSR states that the drum(s) may contain ^{241}Am sources with lead shielding, but sources were not found during repackaging. Small amounts of sorbent may be present. INL-CCP estimated the WMP based on NNSS RTR and VE of six containers shipped directly from NNSS to WIPP (Reference C134). INL-CCP determined that the waste stream is composed primarily of inorganic waste, such as metals (79.7%), with the remainder composed of organic material, such as cellulosics (20.3%). Comparison of these data with the RTR results for drum NT041489A indicates that this drum contains materials that generally correspond with those identified in legacy drums. Typical materials include scrap metal, hand tools, springs, metal cans, wire, metal funnels, hose clamps, open metal buckets, metal clamps, scrap lead, small glass containers, absorbent, light bulbs, labware, wood, plastic bags, scrap plastic, and plastic sheeting. Based on the above analysis, the physical composition of the waste stream was adequately described.

ID-NTLBL-S3900 solid waste from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

Waste Stream ID-NTLBL-S3900 is composed of homogenous solids generated through solidification of liquids associated with LBNL R&D and process/maintenance activities. It is composed primarily of absorbed or solidified aqueous liquids generated through mixing with Aquaset, diatomaceous earth, Portland cement, and vermiculite. Debris may also be present in the waste stream. It is appropriately assigned WMC S3900, Unknown/Other Homogenous Solids

[4] With a half-life of 14.35 years, ^{241}Pu decays to ^{241}Am at a rate of approximately 4.7% per year, i.e., ^{241}Am accumulates at a rate of approximately 4.7% per year.

(References C101, P094, U014, and U103). INL-CCP evaluated pre-screen RTR information performed at NNSS to estimate WMP percentages and content information compiled in supporting AKSR CCP-AK-NTS-003. Based on this analysis, INL-CCP estimated that the waste stream was composed primarily of inorganic (92.54%) and organic materials (7.46%).

Examination of Attachment 6 and associated memoranda, as well as the container RTR performed by INL-CCP, indicates that the drum contains a plastic bag, plastic containers, and sludge (percentages were not provided on the RTR form). This description generally conforms with AK. The physical composition of the waste stream was adequately described.

ID-NTS-TTR-HET debris from the Tonopah Test Range/Roller Coaster Project stored at Nevada National Security Site (AKSR CCP-AK-INL-014, Revision 0)

Waste Stream ID-NTS-TTR-HET is composed primarily of debris and other site remediation-related waste, as well as a small amount of soil containing metal fragments. Specific debris items include PPE and sampling equipment such as plastic gloves and bags, boot covers, disposable coveralls, wipes, foil, respirator cartridges, masking tape, and disposable sampling tools (References C1002, C1024, M1005, M1025, P1099, P1107, U1010, and U1011). INL-CCP indicated that VE forms were not prepared by NNSS when this waste stream was repackaged and consolidated, and the waste generation processes suggested that the waste may contain substantially more soil than presented in the AKSR. However, the AK references examined verify that the waste stream is composed primarily of debris (80%), with some soil and metal (20%). WMC S5400, Heterogeneous Debris, was assigned to the waste stream (References C1024, M1025, U1010, and U1011). WMP estimates were obtained based on the assumptions that:

- The soil component contains both soil and metal fragments of equal weight
- The weight percents are 50% metal fragments (iron based metal/alloys), 25% aluminum-based metals/alloys and 25% other metals.

Based on the descriptions of PPE and sampling equipment from AK source documents, the debris component is estimated to contain by weight 30% cellulosics, 30% plastic, 30% rubber, 5% iron-based metal/alloys, 3% other metals, and 2% aluminum-based metals/alloys (References P1099 and P1107). Examination of RTR data for drum No. TTR21A indicates that it is composed of scrap metal, scrap rubber, plastic bags, plastic sheeting, plastic tubing, large open plastic containers, and soil, which corresponds to the anticipated waste content determined by AK. Based on the above analysis, the physical composition of the waste stream was adequately described.

Contact-Handled Waste Streams from the Accelerated Retrieval Project (AKSR CCP-AK-INL-001, Revision 9)

The three ARP waste streams are debris (ID-SDA-DEBRIS), solid/sludge (ID-SDA-SLUDGE), and soil (ID-SDA-SOIL). An ARP waste drum may contain any of these three wastes and these materials are delineated into the three waste streams bases on the WMP associated with more than 50% of the drum's contents, as discussed under Item (1), above.

The AKSR describes the targeted debris waste as graphite and filters. Solid targeted wastes are:

- 741- and 742-series sludges – inorganic solid matrices derived from treatment of aqueous liquids that were solidified through the addition of Portland cement
- 743-series sludge – an organic solid matrix derived from the treatment of oils and organic solvents into a solid by mixing with a synthetic calcium silicate and organic solvents
- Roaster oxides – pure DU metal machine turnings converted to an oxide in a chemical roaster that INL-CCP classifies as a homogenous solid waste

Soils are not targeted waste, however, many of the targeted debris and sludge wastes are no longer (or were never) buried in drums or containers and quantities of the interstitial dirt are inadvertently removed from the retrieval area and packaged with the targeted wastes.

As described in Item (2) above, the volumes of targeted wastes are included in the different ARP phases in varying proportions to other targeted and non-targeted wastes. Therefore, INL-CCP periodically updates the estimated waste burial volumes and WMP percentages based on expected contents of the newly added ARP areas and the VE records of waste packaged from ARP-I and -II (References ID-U-329 and ID-U345). While the percentage of targeted waste in the entire retrieval area did not change with the addition of ARP-III, -IV, and -V, the proportions estimated in the various areas vary widely. The total volume of ARP-I and ARP-II is currently estimated at 225,087 ft^3 (85,046 ft^3 less than estimated in AKSR, Revision 6), of which 33% is targeted waste and 67% is non-targeted waste (10% more and 10% less, respectively, than estimated in AKSR, Revision 6). In total, ARP-III, -IV, and -V add a total of 361,159 ft^3, of which 17% is targeted waste and 83% is non-targeted waste. Addition of the newer ARP phases increased the total waste volume but did not increase the percentage of targeted waste.

Analysis of the information provided by INL-CCP indicates that the intended physical characteristics of the debris, solid, and soil wastes in the new ARP phases and ARP-I and -II should be comparable for targeted wastes. Data suggest that there are no major anomalous non-targeted materials. However, 100% VE is performed during waste packaging to verify the absence of prohibited items, identify anomalous items, catalogue WMPs, and assign the drum to the appropriate waste stream. The physical composition of the waste stream was adequately described.

(4) Acceptable Knowledge procedural adequacy and implementation were assessed and found to be adequate (assembly compilation, interpretation, confirmation, discrepancy resolution).

INL-CCP uses procedure CCP-TP-005 for AK data collection, analysis, interpretation, confirmation, and discrepancy resolution. INL-CCP has used Revision 18 of this procedure since 2008, but this procedure was recently updated and the current revision is 20. EPA expected revision 20 to include information formerly included in the WCPIP for RH waste (Revision 0D), which was removed and placed in procedure CCP-TP-005 during the most recent revision of the

WCPIP. However, Revision 20 does not include these requirements, which should only impact RH waste. EPA reviewed changes to CCP-TP-005, as presented in Revisions 19 and 20:

- Revision 19: This revision incorporated relatively minor changes identified during internal and external audits. Typical revisions include changes to source document titles and simplification of attachment references. A notable change is the addition of a requirement to return generator site documents to the generator site once INL-CCP no longer works at that site, rather than include those references in INL-CCP Records. This was apparently due to the number of site documents assembled as part of the AK program. EPA understands this simplification, but CBFO must ensure EPA has access to these documents regardless of the characterization entity that uses (or used) the documents. For example, it is possible that INL-CCP could lose their certification, at which point records typically included in INL-CCP's files would no longer be available at INL-CCP Records. EPA expects that all documents will be readily available to EPA regardless of storage location. Additionally, INL-CCP revised language to no longer require that the Attachment 3 summaries be "attached" to their associated source documents. This practice of separating Attachment 3 summaries from the full source document proved burdensome at other CCP sites because the Attachment 3 forms were assigned the exact same document number as the original source document. If the two files were mixed, it would be impossible to tell the original source document from the summary. If the Attachment 3 summaries are separated from the original source documents, EPA expects that these files will have unique identifiers such that the source documents and summaries can be differentiated.
- Revision 20: This document revision includes minor modifications, the most notable being a requirement to submit each AKSR revision to INL-CCP Document Services.

Revisions 19 and 20 of CCP-TP-005 did not significantly modify the AK process, and are acceptable noting the above items.

Contact-Handled Waste Streams from Small Quantity Sites (AKSRs CCP-AK-INL-010, Revision 0 and CCP-AK-INL-014, Revision 0)

EPA also reviewed the confirmation checklists for the three SQS waste streams to determine if any issues requiring a discrepancy resolution (DR) and reevaluation checklist arise during the confirmation process. Waste Stream LBNL S3900 did not require AK re-evaluation based on characterization data. However, both the TTR-HET and LBNL S5400 waste streams reevaluation checklists noted issues that mandated AK reevaluation.

- For LBNL S5400, ^{239}Pu and ^{241}Am are the most prevalent radionuclides by weight based on measurement data, not ^{237}Np and ^{241}Am as indicated by AK. An AK reevaluation was requested, and an Attachment 10 (reevaluation checklist) was finalized on November 9, 2010. This explained the discrepancy, and indicated that the AKSR will be updated to recognize this change. The AKSR is dated July 2009, so the next revision of this AKSR should include the modification based on the DR and AK re-evaluation.

- For TTR-HET, ^{239}Pu and ^{240}Pu are the most prevalent radionuclides by weight based on measurement data, not ^{238}U and ^{239}Pu as indicated by AK. An AK reevaluation was requested, and an Attachment 10 was completed January 7, 2010. This re-evaluation resulted in the generation of DR1005. The AKSR is dated June 18, 2009, so the next revision of this AKSR should include the modification based on the DR and AK re-evaluation.

Notification of revisions to any SQS AKSR remains a T2 change.

Contact-Handled Waste Streams from the Accelerated Retrieval Project (AKSR CCP-AK-INL-001, Revision 9)

EPA also reviewed random confirmation checklists for the three ARP waste streams to determine if any issues requiring issuance of DRs and/or reevaluation checklists arose during the confirmation process. Waste Stream ID-SDA-DEBRIS did not require AK reevaluation. However, both the ID-SDA-SLUDGE and ID-SDA-SOIL waste streams have reevaluation checklists noting issues associated with tentatively identified compounds that mandated AK reevaluation. The reevaluation checklist for the ID-SDA-SLUDGE waste stream was noted during a previous continued compliance inspection. The soil reevaluation checklist, completed one year later, lists additional compounds but describes the same solution. The AKSR was not revised as a result of either discrepancy. Notification of revisions to the AKSR remains a T2 change.

(5) The Acceptable Knowledge Summary Report was assessed and found to be adequate.

AK summaries for each of the waste streams were evaluated, as summarized below.

Contact-Handled Waste Streams from Small Quantity Sites

ID- NTLBL-S5400 debris from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

Waste Stream ID-NTLBL-S5400 consists of mixed heterogeneous debris generated at LBNL as part of R&D and maintenance activities. INL-CCP states that the waste stream is composed of organic and inorganic laboratory debris. See Item (3) above for additional detail. AK indicates that some drums may contain ^{241}Am sources with lead shielding, but VE did not identify these items. Small amounts of homogenous solids may be present, but the vast majority of this waste material type was removed during repackaging and placed in the S3900 waste stream. AK indicated that the two predominant radionuclides by mass are ^{237}Np and ^{241}Am, while over 95% of the total activity is ^{241}Am and ^{241}Pu. However, as indicated in Items (2) and (4) above, INL-CCP's NDA data showed that ^{240}Pu was a predominant radionuclide by mass, so the AKSR must be revised to address this discrepancy. Additionally, the AKSR did not adequately address the defense determination explanation; see Item (7) below for additional information. As detailed in Item (6) below, INL-CCP submitted a freeze file change describing drum traceability elements. EPA expects the AKSR to be revised to reflect all of these deficiencies and notification of availability of this revision remains a T2 change.

ID-NTLBL-S3900 solid waste from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

Waste Stream ID-NTLBL-S3900 is mixed homogenous waste generated during R&D and process/maintenance activities at LBNL. See Item (3) for additional detail. The waste was originally comingled with debris generated by the same activities, but was separated into a different waste stream during repackaging at NNSS. AK data suggest that the two predominant radionuclides by mass are ^{239}Pu and ^{240}Pu, and over 95% of the total activity is ^{239}Pu, ^{240}Pu, and ^{241}Pu, which was confirmed by NDA. However, as indicated in Item (7) below, the AKSR did not adequately address the defense origin of wastes. As detailed in Item (6) below, INL-CCP submitted a freeze file change describing drum traceability elements. The AKSR must be revised to better justify the defense determination and to address the traceability change and notification of availability of this revision remains a T2 change.

ID-NTS-TTR-HET debris from the Tonopah Test Range/Roller Coaster Project stored at Nevada National Security Site (AKSR CCP-AK-INL-014, Revision 0)

Waste Stream ID-NTS-TTR-HET is composed of waste generated through cleanup of two sites in Nevada at which U- and Pu-bearing materials were exploded using conventional explosives. The waste consists of heterogeneous debris waste with lesser amounts of soil containing metal fragments. See Item (2) above for additional detail. The AKSR states that the two predominant radionuclides by weight are ^{238}U and ^{239}Pu, while over 95% of the total activity is ^{239}Pu, ^{240}Pu, and ^{241}Pu. However, NDA measurements found the two predominant radionuclides by weight to be ^{239}Pu and ^{240}Pu. As indicated in Items (2) and (4) above, the AKSR should be revised to address this discrepancy. Notification of availability of a revised AKSR remains a T2 change.

Contact-Handled Waste Streams from the Accelerated Retrieval Project (AKSR CCP-AK-INL-001, Revision 9)

These ARP waste streams consist of targeted RFP debris and sludge wastes and may also contain interstitial soil. While the historic source of all the targeted waste is RFP, various small generators also contributed waste to the ARP. Every time a new ARP area is added, INL-CCP continues to adequately update the list of potential waste generators, the expected radionuclides, WMP estimates, and the list of AK source documents. For example, in AKSR, Revision 9, INL-CCP described three additional INL waste generators relative to ARP-V (Pit 9): CFA-665 – the Vehicle Maintenance Terminal and Automotive Repair Shop, the Modular Analytical Laboratory, and the Glovebox Excavator Method (GEM) Project. The Modular Analytical Laboratory will only contribute wastes (including unaltered sample material) generated during analysis of the ARP wastes (References ID-P402, ID-P403, ID-P404, ID-U376, and ID-U377). The GEM project tested the methods to be utilized throughout the ARP retrieval area by excavating a portion of Pit 9 (now ARP-V); the wastes removed by the GEM project will be repackaged and sorted into the three ARP waste streams (References ID-C114, ID-P377, ID-P380, ID-P399, ID-U355, and RF-P356). As described in Items (2) and (3) above, INL-CCP adequately revised the AKSR, Revision 9 to account for the expansion of the retrieval area to include ARP-V. Sufficient source documents were added to the AK record to support inclusion of ARP-V. The CCP-TP-005, Attachment 4, AK Summary Document Reference List has not yet

been updated to include references in the AKSR, Revision 9. EPA assumes that this document will be updated in the future.

(6) Drum traceability and the ability to follow the Acceptable Knowledge waste characterization process for containers were evaluated and found to be adequate.

Contact-Handled Waste Streams from Small Quantity Sites

Retrievably stored and newly generated containers were evaluated separately. Traceability of retrievably stored containers from LBNL to NNSS to INL was examined to verify that a drum's history could be tracked to the place of origin. To streamline the inspection, traceability was performed on the LBNL wastes only, although examined references indicate that a similar level of traceability is available in the AK record for the TTR-HET waste stream.

ID- NTLBL-S5400 debris from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0), and ID-NTLBL-S3900 solid waste from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

Traceability of drums from the two LBNL waste streams was evaluated by interviewing INL-CCP representative Scott Smith. Since the containers have a common origin they were evaluated in tandem and the results are presented together. The final drums of interest are Nos. NT041489A (S5400) and NT080018R (S3900) and were part of 12 that originated from the Building 70 Pitroom and were originally loaded between 1975 and 1980. These 12 drums were shipped to NNSS, beginning in 1975; seven were directly shipped to WIPP, while five drums were retained because they required repackaging. These five drums (Nos. NT280011, NT280007, NT280015, NT780025, and NT751050) were repackaged in 2008, resulting in one debris drum (No. NT041489A), one debris SWB, and one homogenous solids drum (No. NT080018R). It must be noted that the AKSR states four drums, not five, were retained and repackaged at NNSS. EPA noted the discrepancy in drum numbers while performing the traceability analysis and INL-CCP submitted a freeze file modification to Section 4.5.1 of the AKSR. EPA evaluated the freeze file modification and found it acceptable. Notification of availability of a revised AKSR that includes this revision remains a T2 change.

Traceability of LBNL Drum No. NT280011 was examined. This drum was generated at LBNL in 1980 and shipped to NNSS. It underwent RTR at NNSS in 2005 upon repackaging it to drum "A" in July 2005, and a second repackaging to drum "AA" in October 2005. The drum was then assayed in June 2006, and was repackaged again in 2009 placed in a SWB, and shipped to INL. References U103, U065, U016, U051 and U001 were among those examined to verify this progression. INL-CCP provided the information presented in Table 4 below that identifies original LBNL drum numbers:

Table 4. Original Lawrence Berkeley National Laboratory Drum Numbers

Waste Stream	Drum Number Shipped to INL	Feed Drum Number	Interim Drum Number	Interim Drum Number	Drum Number Shipped to NNSS
ID-NTLBL-S5400	NT080344R	NT280011AA	NT280011A		NT280011
		HC-05-065A	NT042090A	NT042090	NT280007
		NT980100			NT280015
		NT780025A			NT780025
	NT041489A	NT041489			NT751050
ID-NTLBL-S3900	NT080018R	NT780025A			NT780025
		NT280011A			NT280011

Additionally, INL-CCP provided a list of source documents and identified the pages in those source documents that addressed the LBNL waste traceability; source documents U014, U015, U051, U061, U065, U067, U084, and U085 were included in this listing. These data indicate that traceability could be achieved for the complex history associated with the two S5400 containers and single S3900 drum that originated at LBNL. Notification of availability of a revised AKSR that includes revisions related to drum repackaging remains a T2 change.

Contact-Handled Waste Streams from the Accelerated Retrieval Project (AKSR CCP-AK-INL-001, Revision 9)

The three ARP waste streams are composed entirely of newly generated waste; therefore, there is no direct link between waste generation at generator site and the drums being characterized by INL-CCP. However, through use of the Waste Inventory Location Database at INL and other historic waste documentation, INL-CCP is able to identify the specific wastes that were interred in the pits by ARP phase. EPA evaluated traceability for the last drum from each ARP waste stream that was emplaced in the WIPP facility as of the date of the continued compliance inspection. VE and NDA BDRs, relevant NCRs, project tracking system (PTS) screenshots, and WDS Container Data Reports were provided for each drum. Each drum was traceable from generation during VE through NDA to final emplacement in the WIPP facility, as summarized below in Table 5.

Table 5. Summary of Accelerated Retrieval Project Drum Traceability Analysis

Drum No.	SCG	VE BDR, date	NDA BDR, date – result	2nd NDA BDR, date – result	Emplacement Date
ARP06227	S5400	IN-ARP-VE-000740, 2/11/08	INNDAH080058, 2/20/08 – rejected, NCR-INL-0159080	INNDAW090184, 7/30/09 – reworked, then accepted, NCR-INL-052610	11/10/10
ARP15566	S3900	IN-ARP-VE-001510, 4/9/09	INNDAS090352, 11/23/09 – accepted	N/A	11/12/10
ARP20413	S4200	IN-ARP-VE-001936, 3/8/10	INNDAS100048, 3/17/10 – accepted	N/A	11/7/10

(7) Defense origin of transuranic wastes was examined and found to be adequate.

Contact-Handled Waste Streams from Small Quantity Sites

ID- NTLBL-S5400 debris from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0) and ID-NTLBL-S3900 solid waste from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

INL-CCP states that since 1931, LBNL has been involved with TRU research and development, including technologies important to the development of the first atomic bombs. From 1947 to 1975, the Atomic Energy Commission (AEC) was responsible for and funded programs in nuclear weapons research, development, production, and testing, as well as projects related to radioactive materials and TRU radionuclides. INL-CCP also states that budget documents generated from 1957 through 1986 identified numerous programs and projects that can be tied to defense activities.

INL-CCP states that based on guidance from the DOE, a TRU waste is eligible for disposal at WIPP if it has been generated in whole or part by one of the atomic energy defense activities listed in Section 10101(3) of the Nuclear Waste Policy Act of 1982 (NWPA). INL-CCP attempted to demonstrate that the TRU waste destined for disposal at WIPP is associated with defense activities by linking TRU waste items to researchers, LBNL divisions, and facilities that were associated with defense work that generated the wastes (Reference P098). INL-CCP concluded that there was a sufficient correlation of defense activities to those performed at LBNL to support a defense determination for waste generated at this facility. CBFO issued an approved defense determination for LBNL waste shipped to LLNL in April 2004, and INL-CCP stated that this was applicable to the LBNL waste shipped to NNSS since it was within the time frame of generation of the LBNL wastes assigned to Waste Streams ID-NTLBL-S5400 and ID-NTLBL-S3900 (Reference P098).

EPA reviewed source documents associated with the LBNL waste streams and noted that the defense determination was not supported by some of these references. Specifically, Reference C101, which is an interview with operators who performed experiments in the Building 70 Pitroom during the 1975–1980 time period, states that activities performed at this location were non-defense in origin. EPA questioned the INL-CCP AKE about these assertions, and received an adequate explanation. Since the wastes originated prior to 1975, DOE contends that this waste is likely to be contaminated with defense-related radionuclides. EPA also expects that when the AKSR and Reference C101 and other references that discuss the defense determination are revised, notification of availability of a revised AKSR and corresponding references is necessary and it remains as a T2 change.

ID-NTS-TTR-HET debris from the Tonopah Test Range/Roller Coaster Project stored at Nevada National Security Site (AKSR CCP-AK-INL-014, Revision 0)

Based on guidance from the DOE, a TRU waste is eligible for disposal at WIPP if it has been generated in whole or part by one of the atomic energy defense activities listed in Public Law

102-579, *The Waste Isolation Pilot Plant Land Withdrawal Act* (as amended), and Section 10101(3) of the NWPA. INL-CCP concluded that AK indicated the TRU waste generated from the Roller Coaster Project is contaminated from activities related to weapons, defense nuclear waste and materials by-products management, and defense research and development. EPA accepts DOE's conclusion.

Contact-Handled Waste Streams from the Accelerated Retrieval Project (AKSR CCP-AK-INL-001, Revision 9)

The AKSR, Revision 9 was assessed with respect to the defense origin of these wastes. Targeted waste in the additional ARP phases came from RFP and EPA previously established RFP's involvement with weapons-related activities, thus meeting the defense-related criterion. With regard to the non-targeted waste, EPA previously determined that the targeted and non-targeted wastes within the three waste streams were commingled due to a lack of container integrity within the pits. This situation is no different in ARP-III, -IV, or -V than it was in ARP-I and -II. Therefore, the defense arguments posed by INL-CCP continue to be acceptable to EPA and supported by available documentation.

(8) The absence of Spent Nuclear Fuel and High Level Waste Status in these waste streams was evaluated and found to be in compliance with the *Land Withdrawal Act*.

The AKSRs for all evaluated waste streams indicate the following: "The Public Law 102-579, [WIPP LWA] prohibits the disposal of spent nuclear fuel and high-level waste as defined by the [*Nuclear Waste Policy Act* (NWPA)]... at WIPP." According to the NWPA, spent nuclear fuel (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 Order 435.1, Radioactive Waste Management (Reference 16) 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." High-level waste (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."

The waste stream contents and descriptions were evaluated against these definitions to determine whether the waste streams contained SNF or HLW.

Contact-Handled Waste Streams from Small Quantity Sites

ID- NTLBL-S5400 debris from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

ID-NTLBL-S3900 solid waste from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

The NTLBL-S5400 and NTLBL-S3900 waste streams consist of debris and homogeneous waste "contaminated with radioactive material from R&D, maintenance, and repackaging operations." INL-CCP indicates that these operations did not include any separation or reprocessing of reactor fuel, and the wastes themselves do not contain irradiated fuel elements from a reactor; spent fuel pieces or particles also are not included in the waste. INL-CCP concludes, and EPA agrees, that the three containers in the subject waste streams do not include SNF and are not HLW (Reference P098).

ID-NTS-TTR-HET debris from the Tonopah Test Range/Roller Coaster Project stored at Nevada National Security Site (AKSR CCP-AK-INL-014, Revision 0)

Operation Roller Coaster and remediation of the Roller Coaster test sites and Roller Coaster RADSAFE Area involved the dispersion of nuclear material through detonation of conventional chemical explosives. References provided to EPA did not indicate that the Pu and U sources used were "spent nuclear fuel." The waste stream does not include HLW as defined by the NWPA (References P1008, P1016, and P1022).

Contact-Handled Waste Streams from the Accelerated Retrieval Project (AKSR CCP-AK-INL-001, Revision 9)

As evaluated in the last continued compliance inspection at INL, the AKSR, Revision 9 adequately explains that Waste Streams ID-SDA-DEBRIS, ID-SDA-SLUDGE, and ID-SDA-SOIL do not contain SNF or HLW. The AKSR states that SNF may have been buried in Pit 4, but not in the retrieval area, and that if SNF is found it will be segregated and not packaged. No NCRs have been generated since 2006 due to the presence of intact fuel rods. The AKSR also states that while HLW (acidic liquids) were produced in one of the small waste-contributing generators (CCP-601), it was sent to a different facility and not buried in the retrieval area. EPA continues to accept INL-CCP's position that ARP waste streams do not contain SNF or HLW.

(9) Waste Stream Profile Form preparation and completeness were evaluated and found to be adequate.

The WSPFs for each of the waste streams were examined for completeness. Note that none of the WSPFs examined had a change request form indicating that modifications were requested after initial approval.

Contact-Handled Waste Streams from Small Quantity Sites

ID-NTLBL-S5400 debris from Lawrence Berkeley National Laboratory and stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

Michael Walentine approved the WSPF on October 23, 2009; the Characterization Information Summary (CIS) was attached, including the AK Summation of Aspects. The approved WSPF was complete.

ID-NTLBL-S3900 solid waste from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

Michael Walentine approved the WSPF on October 23, 2009; the CIS was attached, including the AK Summation of Aspects. The approved WSPF was complete.

ID-NTS-TTR-HET debris from the Tonopah Test Range/Roller Coaster Project stored at Nevada National Security Site (AKSR CCP-AK-INL-014, Revision 0)

Michael Walentine approved the WSPF on November 18, 2009; the CIS was attached, including the AK Summation of Aspects. The approved WSPF was complete.

Contact-Handled Waste Streams from the Accelerated Retrieval Project (Acceptable Knowledge Summary Report CCP-AK-INL-001, Revision 9)

Barbara Broomfield approved the ID-SDA-DEBRIS WSPF on February 21, 2007; the CIS is attached, including the AK Summation of Aspects. The approved WSPF is complete.

Barbara Broomfield approved the ID-SDA-SLUDGE WSPF on February 25, 2007; the CIS is attached, including the AK Summation of Aspects. The approved WSPF is complete.

Barbara Broomfield initially approved the ID-SDA-SOIL WSPF on June 17, 2008; the CIS was attached, including the AK Summation of Aspects. However, the AK Summation of Aspects appeared to be missing the first two pages. Other than the missing pages, the approved WSPF was complete. In 2009, the WSPF was revised in response to New Mexico Environment Department comments. Michael Walentine approved the ID-SDA-SOIL WSPF, Revision 1, on October 7, 2009 by; the CIS is attached, including all pages of the AK Summation of Aspects. The approved revised WSPF is complete.

(10) Preparation of nonconformance reports was evaluated and found to be adequate.

Contact-Handled Waste Streams from Small Quantity Sites (AKSRs CCP-AK-INL-010, Revision 0 and CCP-AK-INL-014, Revision 0)

INL-CCP provided a spreadsheet that identified the NCRs issued at INL since 2006. Based on this spreadsheet and the BDRs provided for Waste Streams NTLBL-S5400, NTLBL-S3900, and TTR-HET, NCRs were not prepared for any drums examined within these waste streams.

Contact-Handled Waste Streams from the Accelerated Retrieval Project (AKSR CCP-AK-INL-001, Revision 9)

EPA has evaluated INL-CCP's ability to produce compliant NCRs several times. As a spot check, EPA reviewed the two NCRs associated with drum traceability data for S5400 drum No. ARP06227. INL-CCP generated NCR-INL-0159080 because this drum assayed at less than 100 nCi/g of TRU and was returned to INL. A year later, NCR-INL-052610 was generated during a

second NDA analysis of this drum because of an issue with the ^{238}Pu activity. This drum underwent review by the NDA expert analyst (EA), the Independent Technical Reviewer (ITR) and Site Project Manager (SPM), and finally was accepted for disposal at WIPP. These two NCRs indicate that INL-CCP continues to produce NCRs according to EPA-approved procedures.

(11) Acceptable Knowledge accuracy was assessed and found to be adequate.

Contact-Handled Waste Streams from Small Quantity Sites

ID- NTLBL-S5400 debris from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

EPA reviewed the AK accuracy report for Waste Stream NTLBL-S5400, and found that it contained typographical errors. EPA also found that the predominant radionuclides identified by AKSR and NDA did not correspond, but the AK accuracy report did not reflect this discrepancy. Instead, the AK accuracy report stated that NDA and AK data were in agreement, with 100% accuracy. INL-CCP representatives explained that at the time the AK accuracy report was prepared, a freeze-file change was in place that updated the AKSR by revising the predominant radionuclides to correspond to those identified through INL-CCP NDA.

The NDA results and AK information in place at the time of AK accuracy report preparation, including the AKSR, must be compared to determine radiological accuracy. The freeze file change was in place prior to the NDA-AK comparison. In the future, AK accuracy reports must state whether a pending freeze file or other documentation was reviewed in addition to the AKSR. If a freeze file change or other documentation was not in place at the time of the review to explain differences between NDA and the AKSR, then INL-CCP must evaluate NDA-AKSR discrepancies as radiological inaccuracies. INL-CCP provided a revised AK accuracy report, approved on January 7, 2010, that rectified the typographical errors, but this version did not state that the AK accuracy review included AKSR freeze-files. EPA also believes that INL-CCP should consider both radionuclide weight percent and activity percent when evaluating AK accuracy and will revisit this issue in the future. Providing AK accuracy reports for this waste stream remains a T2 change.

ID-NTLBL-S3900 solid waste from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

EPA reviewed the AK accuracy report for Waste Stream NTLBL-S3900 that states that ^{239}Pu and ^{240}Pu are the two most prevalent radionuclides, which was verified by NDA performed by INL-CCP. No Attachment 10s were prepared for this waste stream (AK-reevaluation). The AK accuracy report concluded that the accuracy for this waste stream was 100% because there was no reassignment of WMC and no addition of new hazardous waste numbers, and because the radionuclide composition determined by measurement is consistent with AK. This appears reasonable since the radionuclide content assigned by AK was verified by INL-CCP's NDA measurements. As stated previously, EPA believes that INL-CCP should consider both

radionuclide weight percent and activity percent when evaluating AK accuracy and will revisit this issue in the future.

ID-NTS-TTR-HET debris sourced from the Tonopah Test Range/Roller Coaster Project stored at Nevada National Security Site (AKSR CCP-AK-INL-014, Revision 0)

EPA reviewed the AK Accuracy Report for Waste Stream NTS-TTR-HET, and questioned how CCP-TP-005, Attachment 10 was addressed. INL-CCP representatives adequately explained the discrepancy. EPA also found that the AKSR and NDA-identified predominant radionuclides did not correspond, but the AK accuracy report did not reflect this discrepancy and instead stated that NDA and AK data were in agreement, with 100% accuracy. INL-CCP representatives explained that at the time the AK accuracy report was prepared, a freeze-file change was in place that updated the AKSR by revising the predominant radionuclides to correspond to those identified through CCP-INL NDA. However, the freeze file was prepared on January 10, 2011, and was not in place at the time the AK accuracy report was prepared and INL-CCP did not provide information to support their contention that AK reviewed at the time of AK Accuracy Report preparation supported NDA results.

The NDA results and AK information in place at the time of AK accuracy report preparation, including the AKSR, must be compared to assess accuracy. AK accuracy reports must state whether a pending freeze file or other documentation was reviewed in addition to the AKSR. If a freeze file change or other documentation was not in place at the time of the review to explain differences between NDA and the AKSR, then INL-CCP must evaluate NDA-AKSR discrepancies as radiological inaccuracies. As stated previously, EPA also believes that INL-CCP should consider both radionuclide weight percent and activity percent when evaluating AK accuracy and will revisit this issue in the future. INL-CCP must revise the AK accuracy report for Waste Stream ID-NTS-TTR-HET to accurately reflect the AK data in the record at the time of report preparation. Providing AK accuracy reports for this waste stream remains a T2 change.

Contact-Handled Waste Streams from the Accelerated Retrieval Project (AKSR CCP-AK-INL-001, Revision 9)

INL-CCP provided AK Accuracy Reports for ID-SDA-DEBRIS Lots 1-28, ID-SDA-SLUDGE Lots 1-185, and ID-SDA-SOIL Lots 1-37. None of the AK accuracy reports identified any issues with respect to WMPs or radionuclides and all three reports indicate that the most prevalent radionuclides by mass are ^{238}U and ^{239}Pu, consistent with AK. However, since actual weight percentages are not given, it is impossible to compare the predicted and actual values. All three reports state that no drums were rejected due to radionuclide-related concerns. As mentioned in Item (2) above and Item (13) below, the AK record does not include the in-growth of ^{241}Am from ^{241}Pu, but this discrepancy between expected and NDA-measured values is not reflected in the AK accuracy report. EPA determined that this is because the discrepancy is apparent when comparing radionuclide activity percentages, which the AK accuracy report does not evaluate. As stated previously, EPA believes that INL-CCP should consider both radionuclide weight percent and activity percent when evaluating AK Accuracy and will revisit this issue in the future.

EPA also notes one minor typographical error in the Soil AK accuracy report (one of the section headings references incorrectly ID-SDA-DEBRIS" instead of "ID-SDA-SOIL"), and assumes that this will be corrected before the next version is available. Providing AK accuracy reports for the ID-SDA-SOIL, ID-SDA-SLUDGE, and ID-SDA-DEBRIS waste streams remains a T2 change.

(12) Load management was examined and found to be not applicable.

Contact-Handled Waste Streams from Small Quantity Sites

ID- NTLBL-S5400 debris from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

ID-NTLBL-S3900 solid waste from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

ID-NTS-TTR-HET debris from the Tonopah Test Range/Roller Coaster Project stored at Nevada National Security Site (AKSR CCP-AK-INL-014, Revision 0)

The WSPFs for these three waste streams state that load management will not be employed for these waste streams. Implementation of load management remains a T1 change.

Contact-Handled Waste Streams from the Accelerated Retrieval Project (AKSR CCP-AK-INL-001, Revision 9)

INL-CCP has previously indicated, and EPA has previously observed, that load management is not being performed. During this continued compliance inspection, INL-CCP stated that load management had not been implemented. Implementation of load management continues to be a T1 change.

(13) NDA-AK communication was assessed and found to be adequate.

Contact-Handled Waste Streams from Small Quantity Sites

ID-NTLBL-S5400 debris from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

ID-NTLBL-S3900 solid waste from Lawrence Berkeley National Laboratory stored at Nevada National Security Site (AKSR CCP-AK-INL-010, Revision 0)

INL-CCP issued the same AK-NDA memorandum for the NTLBL-S3900 and NTLBL-S5400 waste streams on June 25, 2009. Jim Shoen prepared the memorandum which states, "The purpose of this memorandum is to satisfy the requirement of CCP-TP-005, INL-CCP Acceptable Knowledge Documentation, for evaluating the radionuclide characterization of LBNL TRU mixed waste streams ID-NTLBLS5400: Heterogeneous Debris and ID-NTLBL-S3900: Solidified Inorganics and Organics."

The AK-NDA memorandum stated that INL-CCP expected that the isotopic codes MGA or FRAM[5] provide reasonable estimates of the isotopic distribution. However, if acceptable isotopics are not provided during assay, the NDA EA compares the measured and AK-based values and derives technically appropriate isotopic values. If this process does not provide valid isotopic values, the drum is rejected. The report included default isotopic values for WG, default reactor-grade, mixed and ^{241}Am-enriched Pu, as well as for natural uranium (NU) and DU. None of this information was included in the AKSR, but is apparently available in references and literature. Examination of NDA data for both the S3900 and S5400 drums from LBNL indicates that default isotopics were used for the S5400 drum No. NT041489A, and measured values were used for S3900 drum No. NT080018R. Based on the above information, development and implementation of the AK-NDA memorandum were adequate.

ID-NTS-TTR-HET debris from the Tonopah Test Range/Roller Coaster Project stored at Nevada National Security Site (AKSR CCP-AK-INL-014, Revision 0)

John Kleckner prepared the AK-NDA memorandum that was issued August 14, 2009. The document states, "[in] most cases experience has shown that the isotopic codes MGA or FRAM will provide a reasonable estimate of the waste isotopic distribution." However, in those instances when the measurement does not yield a reasonable isotopic distribution, the NDA EA compares the measured and AK-based values and derives technically appropriate isotopic values. If this process does not provide isotopic values, the drum is rejected. The report provides default isotopic values for WG Pu and DU, Tables 3 and 4, respectively. The single drum in this waste stream did not require use of default isotopics. Based on the information reviewed, development and implementation of the AK-NDA memorandum were adequate.

Contact-Handled Waste Streams from the Accelerated Retrieval Project (AKSR CCP-AK-INL-001, Revision 9)

A single AK-NDA memorandum has been issued that applies to all three ARP waste streams and is included with Attachment 7 of CCP-TP-005, Revision 18, prepared for each stream. The most recent memorandum is dated June 7, 2010 and does not include reference to ARP-V, which was added in AKSR, Revision 9, dated September 8, 2010. It is assumed that the AK-NDA memorandum will eventually be updated to include ARP-V. The AK-NDA memorandum states that the soil, sludge, and debris waste streams are actually conglomerations of several waste streams mixed during retrieval, and it is not possible to predict a radiological distribution when the waste streams are expected to contain undetermined and varying amounts of the parent waste streams. Tables 1 and 2 in the AK-NDA memorandum present the mass and activity fractions by target waste type, with overall waste radiological distribution provided in Table 3. This memorandum states that if NDA does not yield valid isotopic results, default isotopics based on RFP WG Pu, HEU, and DU will be used, as detailed in Tables 4 – 6; ^{242}Pu will be determined by correlation techniques and ^{234}U will be scaled to ^{235}U and/or ^{238}U, as appropriate.

As in the AKSR, Revision 9, the predicted radionuclide distributions have not been corrected for decay or in-growth, and a footnote has been included to bring this to the reader's attention. EPA

[5] MGA is Multi Group Analysis. FRAM is Fixed-energy Response function Analysis with Multiple efficiencies.

raised this issue with INL-CCP, who responded that they did not want to correct all of the radionuclides for decay/in-growth and so were not correcting any of the radionuclides, and that it did not matter because the measurements of record are observed values from NDA. However, there are times when NDA data are not usable and the declared isotopics become part of the measurement of record. In such situations, ^{241}Am may be underreported. It is EPA's position that there is no need to correct all radionuclides in the AK-NDA memorandum. However, quantification of the 10 WIPP-tracked radionuclides and their uncertainty is required and this includes ^{241}Am. The calculation of ^{241}Am in-growth from its progenitor ^{241}Pu (half-life approximately 14.2 years) is relatively simple and can change significantly over the time frames relevant to characterization of TRU waste for WIPP. EPA expects that the AK-NDA memorandum contain the most accurate information practicable regarding the 10 WIPP-tracked radionuclides. Accordingly, if information regarding the in-growth of ^{241}Am is available for a specific group of wastes, waste containers or waste stream(s), it should be integrated in the AK-NDA memorandum, as appropriate. EPA expects information addressing the in-growth of ^{241}Am to be included in the AK record.

No further response is required at this time. Revision of the AK-NDA memoranda applicable to the ID-SDA-SOIL, ID-SDA-SLUDGE, and ID-SDA-DEBRIS waste streams, or preparation of new, separate memoranda, remains a T2 change.

Summary of Contact Handled Acceptable Knowledge Results

Acceptable Knowledge Findings or Concerns

The EPA Inspection Team did not identify any AK findings or concerns related to AK for CH wastes as a result of this continued compliance inspection.

Changes to Acceptable Knowledge Tiering

There are no changes to the T1 or T2 designations to INL-CCP's CH waste characterization programs as a result of this continued compliance inspection.

Acceptable Knowledge Conclusions

Based on the results of this evaluation and the data examined, EPA determines that INL-CCP demonstrated continued AK characterization compliance for CH waste streams.

6.1.2 Remote-Handled Waste Streams

This report includes only the new information EPA evaluated for the RH waste streams approved as T1 changes in 2009 -2010. The review did not include examination of AKSRs with respect to waste stream determination and other types of data, because EPA recently reviewed and approved this information as part of the T1 review process.

Background Information

EPA's INL-CCP continued compliance inspection scope included all RH streams approved since 2009. These waste streams included:

- ID-ANLE-S5000 [Argonne National Laboratory-East (ANLE[6]), additional drums]
- ID-HFEF-S5400-RH [Hot Fuel Examination Facility (HFEF), Lots 1a and 1b
- ID-MFC-S5400-RH (MFC)
- IN-ID-NRF-153 [Naval Reactors Facility (NRF)]
- ID-INTEC-RH [Idaho Nuclear Technology and Engineering Center (INTEC)]
- ID-RTC-S3000 [Test Reactor Area (TRA)]

T1 requests for the NRF and TRA waste streams were recently approved by EPA and the ANLE waste stream change involved only a few drums, so these waste streams were not included in EPA's continued compliance inspection. The continued compliance inspection focused on the MFC, HFEF, and INTEC RH waste streams.

Waste Characterization Element Description

Because many elements related to these waste streams were previously covered by EPA's T1 approvals, EPA's continued compliance inspection addressed the following:

- WSPF and Characterization Reconciliation Report (CRR) adequacy
- New NCRs and AK DRs
- AK accuracy
- AK data traceability related to characterization/confirmation activities
- Adequacy of T1 review result requirements, including revision of documents to address T1 review results

Documents, Waste Containers, and Batch Data Reports Reviewed

Several attachments, source documents, required forms, and other data were provided to EPA as part of the continued compliance inspection. The listing of RH AK source documents examined is presented in Attachment C.2. BDRs examined as part of the RH continued compliance inspection are presented below. All available BDRs for the HFEF waste stream were provided to EPA, but the three presented below include two of the most recent drums emplaced in the WIPP facility (October 1, 2010). Table 6 below lists the BDRs that were provided for the HFEF drums as well as the two INTEC and eight MFC waste drums.

Table 6. Remote-Handled Batch Data Reports Examined

Waste Stream	Drum Number	NDE BDR Number	DTC BDR Number
ID-INTEC-RH	IDIC000000460	RHINLVE090001	INLRHDTC09004
ID-INTEC-RH	IDIC000000427	RHINLVE090001	INLRHDTC10002

[6] ANLE is now called simply ANL but many existing record use the old name.

Table 6. Remote-Handled Batch Data Reports Examined

Waste Stream	Drum Number	NDE BDR Number	DTC BDR Number
ID-HFEF-S5400-RH	SN152A SN152B	INLRHRTR10009	INLRHDTC10012
ID-HFEF-S5400-RH	IDAWANL780204A	INLRHRTR09006	INLRHDTC09006
ID-MFC-S5400-RH	IDAWANL880065A DAWANL880065B IDAWANL880068A IDAWANL880068B IDAWANL880134A IDAWANL880134B	INLRHRTR09009	INLRHDTC09009
ID-MFC-S5400-RH	IDAWANL880064A IDAWANL880064B	RHINLVE090003	INLRHDTC09009

Technical Evaluation

(1) The Waste Stream Profile Form and related change requests, as well as new/updated Characterization Reconciliation Reports, were evaluated and found to be adequate.

Remote-Handled Waste Stream ID-INTEC-RH

The WSPF provided to EPA during this inspection was approved on September 15, 2010. The waste stream is described as debris that may include combustibles and noncombustibles, as well as solidified sludge of acid-dissolved fuel, absorbed with diatomaceous earth. The WSPF states that the waste stream consists of two 30-gallon lead-lined drums, Nos. IDIC000000460 and IDIC000000427. The WSPF includes the CRR for the waste stream. No change requests were provided for the waste stream, and the drums have been emplaced in the WIPP.

Remote-Handled Waste Stream ID-HFEF-S5400-RH

The WSPF provided to EPA during the inspection was approved on February 10, 2010. This WSPF said the waste stream was composed of organic and inorganic debris derived through the examination of irradiated fuel pins. The waste stream consists of 91 waste canisters, and the WDS indicates about 75 individual drums or containers have been emplaced in the WIPP since the waste was first shipped on March 11, 2010. No change requests were provided for the waste stream. The CRR attached to the WSPF addressed nine of the initial drums included in the shipment; no additional CRRs were provided to EPA.

Remote-Handled Waste Stream ID-MFC-S5400-RH

The WSPF provided to EPA during the inspection was approved on June 24, 2010. The waste stream is described as glassware, paper, poly, and miscellaneous hardware generated during analytical chemistry laboratory hot cell operations. The WSPF states that the waste stream consists of eight 55-gallon drums packaged into three RH canisters. The WSPF includes the CRR for the waste stream. No change requests were provided for the waste stream, and the drums have been emplaced in the WIPP.

Based on the information above, INL-CCP continues to adequately prepare WSPFs and related attachments.

(2) New Non Conformance Reports and AK discrepancy resolutions were reviewed and found to be adequate.

Remote-Handled Waste Stream ID-INTEC-RH

DR001, dated October 13, 2009, was provided to EPA as part of the original T1 review. DR002 was listed on the new AKSR reference list and although RCRA-related, was provided to EPA as part of this inspection. No new DRs relevant to EPA's characterization program were generated. EPA approved the T1 request for this waste stream in August 2010. NCR Nos. NCR-RHINL-0501-10, NCR-RHINL-D502-10, NCR-RHINL-0504-09, NCR-RHINL-0507-09, and NCR-RHINL-0512-09 were prepared prior to EPA's approval. EPA reviewed the NCR process as part of the T1 review and no new NCRs were issued for this waste stream after EPA approval.

Remote-Handled Waste Stream ID-HFEF-S5400-RH

DR003, dated August 27, 2009, was provided to EPA as part of the original T1 review. DR004 is a new DR generated post-EPA approval that addresses liquids in HFEF cans and was provided to EPA upon request. No other DRs were provided. EPA approved the T1 request for Lot 1a in February 2010 and Lot 1b in August 2010. INL-CCP provided four example NCRs pertaining to this waste stream that were issued after EPA's approval of Lot 1a:

- NCR-RHINL-0500-10, issued February 10, 2010, indicated that the surface dose rate for Drum No. IDAWANL870105A measured 70 millirem per hour (mrem/hr), not the required >200 mrem/hr. The disposition for this drum was to return it to the host site.
- NCR-RHINL-0507-10, issued May 25, 2010, dealt with addition of containers to the AK tracking spreadsheet. The information was added to the AK tracking spreadsheet, and no final disposition was identified.
- NCR-RHINL-0514-10, issued October 18, 2010, dealt with the identification of negative container weight on a waste conversion record. The final disposition was not identified, although the issue did not impact AK.
- NCR-RHINL-0515-10, issued November 2, 2010, stated that drum Nos. N154B, N153A and SN151A did not meet the decay heat limits specified in approved RH-TRUCON codes. The final disposition was not identified, although the issue did not impact AK.

Remote-Handled Waste Stream ID-MFC-S5400-RH

DR002, dated September 23, 2008, was provided to EPA as part of the original T1 review. DR003 is a new DR generated post-EPA approval that addresses the size of the waste-containing paint cans within the eight drums and was provided to EPA upon request. No other DRs relevant to the MFC waste stream have been generated. EPA approved the T1 request for this waste stream in June 2010. INL-CCP had not prepared any NCRs pertaining to this waste stream prior to EPA approval and had issued one NCR pertaining to this waste stream after EPA's approval.

NCR-RHINL-0509-10, issued July 20, 2010, indicated that the ITR did not properly review the Audio/Video for drum No. IDAWANL880065A. The disposition was to rework the RTR BDR and resubmit the document to records.

Based on the information presented above, EPA concludes that INL-CCP continues to prepare DRs and NCRs as required.

(3) Acceptable Knowledge accuracy was reviewed and found to be adequate.

Remote-Handled Waste Stream ID-INTEC-RH

The AK accuracy report was approved and finalized on November 5, 2010. While the subject of the report was the INL Waste Stream ID-INTEC-RH, Lot 1, the text addressed Waste Stream SR-BCLPD.004.002. INL-CCP agreed that the report was in error and indicated that a revision was in process. Notification of availability of a revised final INTEC AK accuracy report remains a T2 change.

Remote-Handled Waste Stream ID-HFEF-S5400-RH

A draft AK accuracy report, dated October 12, 2009, was provided to EPA that indicated Lots 1-9 exhibited 100% AK accuracy, because no waste was reassigned to a different SCG or waste stream, and the radiological parameters were accurate with respect to AK. Verification of accuracy was accomplished through achievement of AK-based data quality objectives (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. It is expected that the final report will include all lots characterized through 2010. Notification of availability of a final AK accuracy report for this waste stream remains a T2 change.

Remote-Handled Waste Stream ID-MFC-S5400-RH

EPA evaluated a draft AK accuracy report, dated April 15, 2010 and found it to be adequate during the T1 review. The AK accuracy report indicated that all eight drums exhibited 100% AK accuracy, because no waste was reassigned to a different SCG or waste stream, and the radiological parameters were accurate with respect to AK. A final AK accuracy report is not yet available. Notification of availability of the final MFC AK Accuracy report remains a T2 change.

(4) Acceptable Knowledge data traceability as it related to characterization/confirmation activities was reviewed and found to be adequate.

The same traceability information was provided for the INTEC, HFEF, and MFC waste streams, so all were evaluated together. Data were provided to evaluate tracking of information for all three wastes streams, from the NDA/NDE phase through shipment, to emplacement in the WIPP. INL-CCP provided the following documents for each waste stream:

- CCP-TP-005, Revision 18, Attachment 8, which is a drum list showing drum status as of the date of list generation (i.e., repackaging status). This attachment is not necessarily a complete list of all containers in the waste stream.
    - INTEC: November 12, 2009
    - HFEF: November 12, 2009
    - MFC: February 2, 2010
- The AK tracking spreadsheet was also provided, which is a drum list that is current as of the date of report generation (September 27, 2010). There is one AK tracking spreadsheet for each site, so the same document was provided in reference to each of the three evaluated here.
- Several BDRs were provided (DTC, RTR, and VE); a subset of these BDRs is included in the WSPF CRR.
- INL-CCP provided a WDS spreadsheet that includes shipment, emplacement and other data. Once the WSPF is approved and shipment begins, INL-CCP tracks and has access to WDS information.
- PTS screen shots show tracking data maintained by INL-CCP, including NCR identification and status.

These mechanisms show that drum data are recorded throughout the characterization and emplacement process.

To verify traceability of data, drum Nos. IDWWAL780204A and IDAWANL880068A were tracked through the various characterization data sheets, databases, and ultimate emplacement of the waste in WIPP to verify that the same information was transferred throughout the process. Data examined included BDRs and WDS and PTS information; data in these examples were found to be traceable. In summary, the information provided shows that INL-CCP has access to information about each container throughout the characterization, shipment, and emplacement processes, and this traceability is adequate.

(5) Compliance with tiering requirements, including revision of documents to address Tier 1 review results, was evaluated and found to be adequate.

EPA examined key documents identified in EPA's T1 and T2 requirements to determine whether the most recent revision of these documents is available, whether EPA was properly notified of the documents' availability, and to determine the status of document reviews and revisions. EPA examined the tiering elements and associated documents and activities as a status check to determine whether the ongoing characterization process incorporated these elements. The results of this examination are presented in Table 7 below.

Based on the information in Table 7 below, EPA determined that, for the most part, data are available to evaluate the T1 compliance issues; the HFEF waste stream's AKSR does not yet include the changes necessary to address issues identified during EPA's T1 evaluation. EPA was also provided updated information about the documents associated with each of the T2 elements.

EPA determined that the quarterly T2 notification reports continue to include revised or newly issued documents as required under 40 CFR 194.8.

Table 7. Summary of Compliance with Tiering Requirements

Tier	Tiering Requirements[1]	INTEC	HFEF	MFC
T1	Addition of containers to approved waste streams if new or different radionuclide-scaling factors or a different radiological characterization process are required	The INTEC waste stream is of finite size and has been emplaced in WIPP, so no addition of containers is anticipated.	INL-CCP indicated that new "lots" may be added to the waste stream in the future that require different scaling factors, but CCP-AK-INL-581, Revision 1 was updated to include the Lot 1b scaling factors, but no additional new scaling factors.	The MFC waste stream is of finite size and has been emplaced in WIPP, so no addition of containers is anticipated.
T1	Any new RH waste streams not approved to date	EPA was not informed of new RH waste streams as part of the inspection, and understands that these requests may be in forthcoming T1 change requests.		
T1	Substantive modification(s) that have the potential to affect the characterization process: CCP-AK-INL-500, CCP-AK-INL-501, or CCP-AK-INL-502	The INTEC waste stream is of finite size and has been emplaced in WIPP, so no substantive modifications are expected.	Substantive modifications may occur in the future; however, the most recent version of these documents was provided during this inspection and such modifications have not been made.	The MFC waste stream is of finite size and has been emplaced in WIPP, so no modifications affecting the characterization of this waste stream are expected. The 580 document has been modified to include an additional waste stream that may be the subject of a forthcoming T1 change request.
T1	Load management for any RH waste stream	EPA did not find that load management was being performed for these waste streams.		
T2	Notification to EPA when updates to AK Summary Reports (AKSRs), Radiological Characterization Reports, and Confirmation Test Plans (e.g., CCP-AK-INL-500, CCP-AK-INL-501, and CCP-AK-INL-502) are approved by CBFO	The most updated versions of these documents were provided to EPA during the inspection. CCP-AK-INL-550, Revision 1 was approved by CBFO on March 10, 2010, and EPA was notified of this change via the CBFO FY2010 2nd quarter T2 reporting. This revision includes the changes necessary to address concerns identified during EPA's T1 evaluation.	The most updated versions of these documents were provided to EPA during the inspection. EPA was notified of the availability of CCP-AK-INL-580, Revision 2, CCP-AK-INL-581, Revision 1, and CCP-AK-INL-582, Revision 1 via the CBFO FY2010 3rd quarter T2 reporting. Revision 2 of the AKSR does not include the Lot 1b freeze file changes generated as a result of EPA's Tiering review. EPA expects that Revision 3 will address these changes.	The most updated versions of these documents were provided to EPA during the inspection. CCP-AK-INL-540, Revision 2 was approved by CBFO on November 8, 2010. This revision includes the changes necessary to address concerns identified during EPA's T1 evaluation. EPA expects that official notification of this revision will be made via the CBFO FY2011 1st quarter T2 reporting.
T2	Notification to EPA when changes to AK documentation as a result of Waste Characterization Program Implementation Plan (WCPIP) revisions have been made [e.g., Characterization Reconciliation Reports (CRRs)]	The new WCPIP was only recently approved, so EPA determined that none of the expected changes to documentation (e.g., CCP-TP-005) would be available at this inspection.		

Table 7. Summary of Compliance with Tiering Requirements

Tier	Tiering Requirements[1]	INTEC	HFEF	MFC
T2	Notification to EPA when a Correlation or Surrogate Summary Form is completed for each of the RH containers in this waste stream identified as contact-handled (CH), based upon measured dose rates that present nondestructive assay (NDA) results for assayed containers	CSSFs were not provided to EPA during the inspection, so it is assumed that none are available.	CSSFs were not provided to EPA during the inspection, so it is assumed that none are available.	CSSFs were not provided to EPA during the inspection, so it is assumed that none are available.
T2	Notification to EPA once waste stream data package for debris waste stream and any modifications to the Waste Stream Profile Form (WSPF), including the CRR and AKSR, are completed	See Item (1), above. Notification of the availability of the final WSPF was provided to EPA via the CBFO FY2010 4th quarter T2 reporting.	See Item (1), above. Notification of the availability of the final WSPF was provided to EPA via the CBFO FY2010 2nd quarter T2 reporting.	See Item (1), above. Notification of the availability of the final WSPF was provided to EPA via the CBFO FY2010 4th quarter T2 reporting.
T2	Notification to EPA that the final dose-to-curie (DTC) determination is complete for RH containers 728 through 737, as identified in AK Reference P030	The requirement is not applicable to these waste streams. This information was not provided during the inspection, and EPA expects it would be included, as available, in T2 request quarterly responses.		
T2	AK accuracy reports (prepared annually, at a minimum)	See Item (3), above. The final AK accuracy report is dated November 5, 2010, and therefore EPA expects that notification of availability should occur via the CBFO FY2011 1st quarter T2 reporting.	See Item (3), above. EPA has not received notification of the availability of an AK accuracy report.	See Item (3), above. EPA has not received notification of the availability of a final AK accuracy report.
T2	Notification to EPA when additional containers are added to RH TRU debris or sludge waste streams that have been approved to date and the containers were characterized using the same radionuclide-scaling factors	The INTEC waste stream is of finite size and has been emplaced in WIPP, so no addition of containers is anticipated.	The HFEF waste stream, as approved by EPA, is expected to add containers as waste is generated. EPA expects that notification will be provided as outlined in the HFEF Lot 1b T1 approval report.	The MFC waste stream is of finite size and has been emplaced in WIPP, so no addition of containers is anticipated.
T2	Notification to EPA of availability of a revised AKSR and source documents supporting the addition of containers to the approved waste streams	The INTEC waste stream is of finite size and has been emplaced in WIPP, so no addition of containers is anticipated.	See Item (1) above. EPA requested copies of new source documents and received that information during the continued compliance inspection.	The MFC waste stream is of finite size and has been emplaced in WIPP, so no addition of containers is anticipated.

Table 7. Summary of Compliance with Tiering Requirements

Tier	Tiering Requirements[1]	INTEC	HFEF	MFC
T2	Notification to EPA when Attachment 4 of CCP-TP-005 is generated to reflect the updated AKSR Source Document Reference List	A revised Attachment 4 was provided. EPA did not receive notification of the availability of the revised Attachment 4; however, this T2 requirement was put in place after the most recent AKSR revision and it is assumed that Attachment 4 is only updated upon CBFO's approval of an AKSR revision.	A revised Attachment 4 was provided. EPA did not receive notification of the availability of the revised Attachment 4; however, this T2 requirement was put in place after the most recent AKSR revision and it is assumed that Attachment 4 is only updated upon CBFO's approval of an AKSR revision.	A revised Attachment 4 was provided. EPA did not receive notification of the availability of the revised Attachment 4; however, it is assumed that Attachment 4 is only updated upon CBFO's approval of an AKSR revision, notification of which is expected via the CBFO FY2011 1st quarter T2 reporting. Therefore, EPA expects that notification of availability of the revised Attachment 4 will also take place via the CBFO FY2011 1st quarter T2 reporting.

[1] These are the tiering requirements as published in the most recent INL-CCP T1 approval report (approval of TRA sludge waste, A-98-49, II-A4-137, November 1, 2010).

Summary of Remote Handled Acceptable Knowledge Results

Acceptable Knowledge Findings or Concerns

The EPA Inspection Team did not identify any AK findings or concerns as a result of the RH portion of the continued compliance inspection.

Changes to Acceptable Knowledge Tiering

There are no changes to the T1 or T2 designations for INL-CCP's RH waste characterization program as a result of this continued compliance inspection.

Acceptable Knowledge Conclusions

Based on the results of this evaluation and the data examined, EPA determines that INL-CCP demonstrated continued AK characterization compliance for RH waste streams.

6.1.3 Summary of Acceptable Knowledge Results

Acceptable Knowledge Findings or Concerns

The EPA Inspection Team did not identify any AK findings or concerns for INL-CCP's CH or RH waste characterization programs as a result of this continued compliance inspection.

Changes to Acceptable Knowledge Tiering

There are no changes to the T1 or T2 designations to INL-CCP's CH or RH waste characterization programs as a result of this continued compliance inspection.

Acceptable Knowledge Conclusions

Based on the results of this evaluation and the data examined, EPA determines that INL-CCP demonstrated continued waste characterization compliance for all evaluated CH and RH waste streams.

6.2 Nondestructive Assay

EPA had approved the SuperHENC and the WAGS NDA systems initially during the baseline inspection and two subsequent continued compliance inspections in 2008 and 2009. The systems' abilities to perform the required analyses had been demonstrated during the baseline and confirmed in the two continued compliance inspections. Accordingly, this inspection focused on the following:

- Confirming that the design and technical capabilities of both NDA systems' hardware and software had not changed since EPA's last inspection
- Adequacy of the current revisions of the INL-CCP NDA procedures and documents

- Operational and maintenance history of the NDA systems since the last EPA inspection
- Knowledge, understanding and training status of INL-CCP NDA personnel

The documents that EPA examined in assessing the WAGS and SuperHENC systems during this inspection are listed in Appendix C.3.

6.2.1 Technical Evaluation: Waste Assay Gamma Spectrometer

The following aspects of the WAGS were evaluated during this inspection:

(1) The Waste Assay Gamma Spectrometer Nondestructive Assay system is the same system that was approved previously.

The WAGS system is located at INL in the facility formerly called the SWEPP,[7] Building WMF-610. The EPA inspection team verified that there have been no substantive hardware or software changes to this system except for the detector replacement that is discussed under Item (3) below.

(2) The design and operational range of the Waste Assay Gamma Spectrometer were assessed and were found to be unchanged from the last inspection and were adequate for the wastes currently being assayed.

The WAGS assays retrievably stored (legacy) wastes and newly generated wastes from the ARP at INL. ARP wastes include sludge, debris and soils, most of which originated at RFP and are primarily WG Pu covered under AK Memorandum 19. Additional wastes are from the SQS program and include wastes from LLNL, which are not typically WG Pu wastes. These wastes contain fuel-grade, reactor-grade and mixed isotopics-grade Pu, as documented in AK Memorandum 18. Between January 2010 and November 16, 2010, the WAGS assayed 1,617 drums that were compiled in 191 BDRs. The EPA Inspectors observed the assay of drum No. 10348288, a legacy waste sludge that had a density of 0.0920 kilograms/liter and approximately 0.5 g ^{239}Pu upon assay. All daily performance measurements were observed, appropriately recorded and were in control. Specifically, background, daily performance check, Full Width at Half Maximum (FWHM), energy calibration (gain) and barium-133 (^{133}Ba) transmission source checks were evaluated, as evidenced in the WAGS daily operational logbook and BDRs. Warning and Control Limits [2 and 3 sigma (σ) limits] for all parameters had been established and documented, as appropriate, and background [~40 counts per second (cps), full spectrum], FWHM and gain were controlled by boundary limits. Decay correction of the ^{133}Ba transmission source was performed in the software. Typical assay times for debris drums were ~32 minutes and ~26 minutes for sludge drums. EPA Inspection personnel observed that WAGS personnel had available and were using the current revisions of the WAGS operating procedure. All operational aspects of the WAGS operation were acceptable.

[7] SWEPP is the Stored Waste Examination Pilot Plant.

(3) System calibration and calibration confirmation of the Waste Assay Gamma Spectrometer Nondestructive Assay system had been performed and documented as required.

The EPA inspection team verified that the system's original calibration was unchanged. One calibration verification had been performed since the last EPA inspection, when a gamma detector was replaced. This was documented in CCP-INL-WAGS-10-005; all aspects of the calibration verification were technically acceptable and appropriately documented.

(4) The total measurement uncertainty of assays performed on the Waste Assay Gamma Spectrometer Nondestructive Assay system had been determined and documented, as required.

CCP-INL-WAGS-002, *Total Measurement Uncertainty for the WAGS System* adequately documents all pertinent aspects of the system's total measurement uncertainty (TMU). The EPA inspection team verified that this document was unchanged from EPA's last inspection.

(5) The lower limit of detection, including the minimum detectable concentration of the Waste Assay Gamma Spectrometer, had been determined and documented, as required.

CCP-INL-WAGS-001, Revision 1, April 2008, adequately documents the technical basis for the system's lower limit of detection (LLD), including reporting thresholds for specific non-measured radionuclides ^{242}Pu and ^{90}Sr. The EPA inspection team verified that this document was unchanged from EPA's last inspection.

(6) The Waste Assay Gamma Spectrometer had successfully participated in Drum Cycle 17A and Box Cycle 9A of the CBFO-sponsored Performance Demonstration Program (PDP), as required.

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

All NDA personnel associated with the calibration, operation and data review and approval of the WAGS had current training in the applicable areas as evidenced by the List of Qualified Individuals (LOQI) provided during the inspection.

(8) EPA replicate testing of the Waste Assay Gamma Spectrometer unit was performed and evaluated, and was found to comply with the criteria for the Environmental Protection Agency Replicate Testing Protocol.

The purpose of the replicate testing performed as part of this inspection is to provide EPA with an independent means to verify that the WAGS can provide reproducible results for the determination of the quantity of 10 WIPP-tracked radionuclides (^{241}Am, ^{137}Cs, ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{90}Sr, ^{233}U, ^{234}U, and ^{238}U) and the TRU alpha concentration.[8] This is accomplished

[8] Revision 2 of the EPA Replicate Testing Protocol provides the details of the replicate testing assay protocol and data evaluation.

by the WAGS reassaying drums it previously measured to demonstrate the system's ability to do the following:

- Produce results consistent with the reported TMU by comparing the sample standard deviation for a number of replicate measurements taken over several hours or days to the reported TMU
- Provide reproducible results over longer periods of time, such as weeks or months, by comparing the results of the replicate measurement(s) to the original reported values.

As with all statistical evaluations, there are limitations inherent in this protocol. The usefulness of the results depends in large part on the degree to which the conditions encountered are consistent with the assumptions upon which the tests are predicated. EPA's experience to date indicates that containers chosen at random do not always provide information best suited for the application of these statistical protocols. For example:

- An NDA system may have been recalibrated in the time period between the original assay and the reassay performed during an inspection, and the new calibration may have different values for some of the calibration algorithm's terms.
- The containers chosen at random for replicate analysis may lack sufficient nuclear material content to provide useable data for some or all of the WIPP-tracked radionuclides.
- High precision for the five replicate assays may yield an average value that differs slightly from the original assay value, but produces results that the statistical analysis indicates are *Significant* or *Highly Significant*. However, these differences may be small variations that are more a function of the statistical protocols and do not indicate true measurement trends or problems, as discussed below.
- Since some radionuclides are quantified based on the measurement of another radionuclide, a *Significant* or *Highly Significant* indicator for one measured entity will be reflected in the other three, indicating a larger potential measurement trend or problem than actually exists. Examples include: values for ^{238}Pu and ^{240}Pu, which are derived by applying an isotopic ratio to a measured ^{239}Pu value; and ^{137}Cs and ^{90}Sr that are quantified based on a directly measured ^{241}Am value, an inferred ^{137}Cs value, and a scaling factor for ^{90}Sr, as discussed below.

It is important to keep these in mind when evaluating replicate data and to realize that *Significant* or *Highly Significant* results may not, in fact, be representative of true measurement issues, as discussed below for drum No. ARP22225.

As part of this inspection, EPA requested that INL-CCP reassay two drums that EPA randomly selected from a list of drums previously assayed on the WAGS. Drum Nos. ARP21969, and ARP22225 were reassayed five times and the results were compared to the original assay data. Two statistical tests, a chi-squared (χ^2) test and a *t* test, were performed. Data and results of the statistical analysis are included in Attachments B.1and B.2. For drum Nos. ARP21969 and ARP22225, the χ^2 test showed that the observed variances in the replicate measurements are less

than or equal to the reported uncertainties within the statistical limits of the test. For drum No. ARP21969, the *t* test showed no statistically significant differences between the original assay values and the average of the five replicate measurements.

The *t* test for drum No. ARP22225 showed a statistically *Highly Significant* difference between the original assay value and the average of the five replicate measurements for ^{238}Pu, ^{240}Pu and ^{242}Pu. The test also indentified a statistically *Significant* difference between the original assay value and the average of the five replicate measurements for ^{237}Np. This indicates that the variances in the replicate measurements for these items were greater than the reported uncertainties for all values relative to the limits of the test. The ^{242}Pu values that were found to be *Highly Significant*, was expected based on the manner in which this radionuclide is measured. There are several possible reasons for the *Highly Significant* differences for ^{238}Pu and ^{240}Pu replicate versus original—actual changes in the physical configuration of the drum's contents due to movement or settling; fluctuations in the measurement system's background; temporal factors such as radioactive growth or decay; or, actual changes in the measurement system, the aspect that this test is designed to query. Although the software identified these variances as *Highly Significant*, this does not necessarily indicate a measurement issue that warrants additional attention at this time. Further inspection of the five replicate measurements found a small standard deviation in value. The original measurement values were sufficiently similar to replicates that despite its classification as *Highly Significant* by the *t* test, there is no reason to question the instrument's performance.

6.2.2 Technical Evaluation: Super High Efficiency Neutron Counter

The following aspects of the SuperHENC were evaluated during this inspection:

(1) The Super High Efficiency Neutron Counter Nondestructive Assay system is the same system that was approved previously.

The SuperHENC system is located at INL in the facility formerly called the SWEPP, Building WMF-610, South Bay, and is officially designated as NDA SHENC-01. The EPA inspection team verified that there have been no substantive hardware or software changes to this system since the last EPA inspection.

(2) The design and operational range of the Super High Efficiency Neutron Counter were assessed and were found to be unchanged from the last inspection and were adequate for the wastes currently being assayed.

The SuperHENC assays a variety of configurations: 55-gallon drums of dry combustibles; SWBs containing debris; 100-gallon drums containing pucks[9]; one SWB containing two puck drums; and, one SWB containing four 55-gallon drums of sludge. Two interfering matrix baseline tests were performed and documented for the SuperHENC, one for a 55-gallon drum of dry combustibles and one for 2-pucks of light metals in an SWB. Approved waste streams include BN550 (from AMWTP), as documented in RPT-TRUW-07, the AK document for

[9] *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*.

supercompacted waste from RFETS and DOE's Mound Site, consisting of mixtures of 12% and 23% ^{240}Pu wastes. The EPA Inspectors observed that daily performance measurements were appropriately recorded and were in control. Specifically, neutron and gamma backgrounds, daily gamma source check, and californium-252 normalizations were performed, as evidenced in the SuperHENC daily operational logbook and BDR No. INNDA BO9016. Warning and Control Limits (2 and 3 σ limits) for all parameters had been established and documented, as appropriate. Background limits were established as an upper limit, i.e., three times the average gamma and neutron backgrounds observed during the system's initial calibration. All operational aspects of the SuperHENC were acceptable.

(3) System calibration and calibration confirmation of the Super High Efficiency Neutron Counter had been performed and documented as required.

The EPA inspection team verified that the system's original calibrations for all previously approved assay configurations were unchanged. No calibration verifications had been performed since the last EPA inspection.

(4) The total measurement uncertainty of assays performed on the Super High Efficiency Neutron Counter had been determined and documented, as required.

The EPA inspection team verified that the system's original determination of TMU for all previously approved assay configurations were unchanged since the last EPA inspection.

(5) The lower limit of detection, including the minimum detectable concentration of the Super High Efficiency Neutron Counter, had been determined and documented, as required.

The EPA inspection team verified that the system's original determination of LLDs for all previously approved assay configurations were unchanged since the last EPA inspection.

(6) The Super High Efficiency Neutron Counter had successfully participated in Drum Cycle 17A (combustibles and metals matrices) and Box Cycle 9A (combustibles and metals matrices) of the CBFO-sponsored PDP, as required. Additionally, INL-CCP submitted data for Box Cycle 10A on October 10, 2010, but had not received results at the time of the inspection.

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

All NDA personnel associated with the calibration, operation and data review and approval of the SuperHENC had current training in the applicable areas as evidenced by the LOQI provided during the inspection.

(8) EPA replicate testing of the Super High Efficiency Neutron Counter was performed and evaluated, and was found to comply with the criteria for the Environmental Protection Agency Replicate Testing Protocol.

The purpose of the replicate testing performed as part of this inspection is to provide EPA with an independent means to verify that the SuperHENC can provide reproducible results for the determination of the quantity of 10 WIPP-tracked radionuclides (^{241}Am, ^{137}Cs, ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{90}Sr, ^{233}U, ^{234}U, and ^{238}U) and the TRU alpha concentration.[10] This is accomplished by the SuperHENC reassaying drums it previously measured to demonstrate the system's ability to provide the following:

- Results consistent with the reported TMU by comparing the sample standard deviation for a number of replicate measurements taken over several hours or days to the reported TMU
- Reproducible results over longer periods of time, such as weeks or months, by comparing the results of the replicate measurement(s) to the original reported values

EPA requested that INL-CCP reassay one waste drum that EPA randomly selected from a list of drums previously assayed on the SuperHENC. EPA chose Drum No. BN10381564. The previously assayed drum was reassayed five times on the SuperHENC for this inspection. Two statistical tests, χ^2 test and a *t* test, were performed on the replicate analyses of the drum. Analytical data for each assay event and results of the statistical analysis are included in Attachments B.3

For both drums, the *t* test showed no statistically significant differences between the original measurement assay value and the average of the five replicate measurements for all measurement parameters. The χ^2 test for these drums showed that the observed variances in the replicate measurements were less than or equal to the reported uncertainties for all values within the statistical limits of the test. There are no outstanding issues with either statistical test for this drum.

6.2.3 Summary of Nondestructive Assay Results

Summary of Nondestructive Assay Findings and Concerns

The EPA inspection team did not identify any findings or concerns related to the WAGS or SuperHENC NDA systems during this continued compliance inspection.

Changes to Nondestructive Assay Tiering

There are no changes to the T1 or T2 designations for NDA as a result of this continued compliance inspection.

Nondestructive Assay Conclusion

Based on the results of this evaluation and the data examined, EPA determines that INL-CCP demonstrated continued NDA compliance for all evaluated systems.

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[10] Revision 2 of the EPA Replicate Testing Protocol provides the details of the replicate testing assay protocol and data evaluation.

6.3 Real-Time Radiography

EPA evaluated INL-CCP's continued compliance with EPA-approved RTR procedures for retrievably stored (legacy) CH waste and found compliance to be adequate.

Technical Evaluation

EPA interviewed operators/ITRs and reviewed BDRs and training records to verify ongoing RTR operations and training.

Operations were verified by review of BDR Nos. INRTR51000768, INRTR5100070, and INRTR5100076, generated in October and November of 2010 for CH drums. All BDRs contained an acceptable Measurement Control Report and a CCP Attachment 2, Radiography Data Sheet, had been completed for each drum. All attachments had been signed as required by procedure CCP-TP-053, Standard RTR Inspection Procedure. Required quality control (QC) samples, Independent Observation and Replicate Scan, had been successfully completed and included in each BDR. Correct generation, recording and processing of NCRs were investigated by reviewing the following NCRs:

- NCR-INL-0661-10, NCR-INL-0662-10 (BDR No. INRTR5100068)
- NCR-INL-0665-10, NCR-INL-0666-10 (BDR No. INRTR5100070)
- NCR-INL-0677-10, NCR-INL-0678-10, NCR-INL-0550-10 (BDR No. INRTR5100076)

BDR Nos. INRTR5100068 and INRTR5100070 had been reviewed at both data generation (ITR) and project level (SPM). At the time of the onsite inspection, INRTR5100076 had been reviewed at the ITR level only.

EPA reviewed the written and audio/visual record for drum No.10229559, which contained a large amount of liquid (17 pints). The operator responsible for this examination was interviewed to determine how the volume of this liquid, and that in other drums, was calculated. The information received from a second operator interviewed was different than that from the first, and EPA generated Concern INL-CCP-CH-RTR-10-01CR, Revision 1 to address this issue. The concern was discussed with INL-CCP RTR personnel and is summarized below.

EPA Inspection Issue Tracking Form, Concern No. INL-CCP-CH-RTR-10-01CR, Revision 1: There were two aspects to this concern, as follows:

- RTR operators that EPA interviewed did not describe a consistent method of volume calculation. For example, one operator always used a rectangular formula and another tried to use the closest standard shape formula. EPA is concerned that use of calculation formulae has the potential for inconsistent reporting of liquid volumes.
- RTR operators stated that they have not been provided any guidance for rounding and number of significant figures for reporting calculated liquid volumes.

Resolution: EPA has determined that this method of estimating liquid contents of containers was implemented solely to comply with recent hazardous waste permit requirements. Continued use of this method does not adversely affect compliance with EPA requirements to reasonably estimate the quantity of liquid emplaced in the WIPP repository.

Status of Concern: EPA considers this issue closed.

EPA inspectors interviewed RTR operators/ITRs and reviewed records to verify ongoing training and expertise. INL-CCP contracts with VJ Technologies to provide training, including calculation of volumes, to RTR operators for CH waste. Personnel performing RH RTR are employed by CH2M-WG Idaho, LLC (CWI) but INL-CCP provides oversight for the operations and examinations. CWI employees perform test drum examinations, which are scored by INL-CCP personnel and are subject to CCP training requirements. Operators were able to describe how data sheets are completed and how NCRs are initiated. Waste Stream AMWTP ID-RF-S3114 was being processed by INL-CCP at the time of the on-site inspection, which does contain free liquid. The free liquid is considered as PCB (polychlorinated biphenyl) liquid and these drums are returned to the Advanced Mixed Waste Treatment Project for reprocessing.

Test Drum records were reviewed and found to be complete. Operators are required to successfully examine a test drum every six months to remain qualified. INL-CCP has developed separate test drums for CH and RH wastes and for each summary category group.
EPA did not identify any concerns with regard to training of RTR operators.

Summary of Real-Time Radiography Findings and Concerns

The EPA inspection team did not identify any findings and did identify one concern related to RTR as performed by INL-CCP described above (see Attachment A for a copy of this concern) during this continued compliance inspection.

Changes to Real-Time Radiography Tiering

There are no changes to the T1 or T2 designations to RTR as a result of this continued compliance inspection.

Real-Time Radiography Conclusion

Based on the results of this evaluation and the data examined, EPA determines that INL-CCP demonstrated continued RTR compliance.

6.4 Visual Examination

EPA evaluated INL-CCP's continued compliance with EPA-approved VE procedures for newly generated CH and RH waste and found compliance to be adequate for both waste types.

Technical Evaluation

The EPA inspectors reviewed BDRs, interviewed personnel and observed packaging operations to verify that VE continues to be performed by INL-CCP in accordance with approved procedures.

INL-CCP performs CH VE at the Radioactive Waste Management Complex (RWMC) ARP and RH VE at INTEC. EPA determined that CH BDR Nos. IN-ARP-VE-002226 and IN-ARP-VE-002227 were generated in accordance with approved procedure CCP-TP-006, Visual Examination Technique for INL Newly Generated TRU Waste Retrieved from Pits. Data were recorded on the electronic data sheet Attachment 1 – CCP Waste Visual Examination Technique Data Form SCO# 798 Addendum 4, Windows XP 2002 MS Excel 2003. The data sheets were signed and dated by two operators and a Visual Examination Expert (VEE). No NCRs were generated for these two BDRs. VE operators and VEE interviewed were able to provide answers to all EPA's questions and were knowledgeable with regard to VE operations.

EPA determined that VE at CCP-INL continues to be performed by trained personnel and in accordance with approved procedures.

Summary of Visual Examination Findings and Concerns

The EPA inspection team did not identify any findings or concerns related to VE during this continued compliance inspection.

Changes to Visual Examination Tiering

There are no changes to the T1 or T2 designations to VE as a result of this continued compliance inspection.

Visual Examination Conclusion

Based on the results of this evaluation and the data examined, EPA determines that INL-CCP demonstrated continued VE compliance.

7.0 SUMMARY OF RESULTS AND CONCLUSIONS

7.1 Findings and Concerns

There were no findings identified during this continued compliance inspection. The EPA inspection team identified one concern related to RTR as performed by INL-CCP which is discussed above and is provided in Attachment A.

7.2 Tiering Changes

There are no changes to the T1 or T2 designations in any waste characterization area as a result of this inspection.

7.3 Conclusions

The EPA inspection team determined that the INL-CCP waste characterization program activities continue to be technically adequate. EPA is not proposing any changes to the INL-CCP waste characterization program in the configuration at this time. The scope of the compliance decision is based on EPA's inspection completed November 16–17, 2010.

ATTACHMENT A

Real-Time Radiography Concern No. INL-CCP-CH-RTR-10-01CR

Inspection No. EPA-INL-CCP-CH-11.10-24	**Issue Number:** INL-CCP-CH-RTR-10-01CR **Date:** November 16, 2010, Revision 1
Inspector: Dorothy E. Gill **Attachments?** ☐ YES ☒ NO	**Sample Size:** 1 **Population size (if known):** Unknown

Description of Issue:

A. Operators interviewed did not describe to EPA a consistent method of calculation of liquid volume. For example, one operator always used a rectangular formula and another attempted to use the closest standard shape formula. EPA is concerned that use of the calculation formulae has the potential for inconsistent reporting of liquid volumes.

B. Operators stated that they have not been provided any guidance for rounding and number of significant figures to use for reporting calculated liquid volumes.

B. Regulatory Reference: 40 CFR 194.24(c)

C. Site requirement(s): Not applicable

D. Discussed with: Mike Walentine, Bill Verlanic, Mark Pearcy

E. Additional Comments: EPA recognizes that the results of these calculations are estimates and a high degree of precision is not expected.

F. Site Response Information:

Site Response Required? ☒ YES ☐ NO
Site Response Due Date: December 7, 2010

ATTACHMENT B.1: REPLICATE TESTING DATA FOR DRUM ARP21969 – WAGS

Instrument: WAGS
Drum: ARP21969

Quantity of Interest	Original Measurement			Replicate #1			Replicate #2		
	Reported Value	Absolute Uncertainty	Relative Uncertainty	Reported Value	Absolute Uncertainty	Relative Uncertainty	Reported Value	Absolute Uncertainty	Relative Uncertainty
^{233}U Activity (Ci)		N/A			N/A			N/A	
^{234}U Activity (Ci)	2.39E-05	1.44E-05	6.03E-01	2.23E-05	1.35E-05	6.05E-01	1.93E-05	1.17E-05	6.06E-01
^{238}U Activity (Ci)	9.92E-06	3.52E-06	3.55E-01	7.21E-06	2.68E-06	3.72E-01	8.46E-06	3.08E-06	3.64E-01
^{238}Pu Activity (Ci)	2.54E-03	1.28E-03	5.04E-01	2.25E-03	1.15E-03	5.11E-01	5.14E-03	2.00E-03	3.89E-01
^{239}Pu Activity (Ci)	8.49E-02	2.89E-02	3.40E-01	8.01E-02	2.73E-02	3.41E-01	8.07E-02	2.75E-02	3.41E-01
^{240}Pu Activity (Ci)	1.71E-02	5.90E-03	3.45E-01	1.78E-02	6.24E-03	3.51E-01	1.83E-02	6.31E-03	3.45E-01
^{242}Pu Activity (Ci)	3.12E-06	1.12E-06	3.59E-01	2.31E-06	1.42E-06	6.15E-01	3.20E-06	1.15E-06	3.59E-01
^{241}Am Activity (Ci)	7.99E-02	2.73E-02	3.42E-01	7.33E-02	2.51E-02	3.42E-01	8.87E-02	3.04E-02	3.43E-01
^{90}Sr Activity (Ci)		N/A			N/A			N/A	
^{137}Cs Activity (Ci)		N/A			N/A			N/A	
TRU Alpha Conc. (nCi/g)	1.50E+03	3.27E+02	2.18E-01	1.41E+03	3.06E+02	2.17E-01	1.57E+03	3.38E+02	2.15E-01

Quantity of Interest	Replicate #3			Replicate #4			Replicate #5		
	Reported Value	Absolute Uncertainty	Relative Uncertainty	Reported Value	Absolute Uncertainty	Relative Uncertainty	Reported Value	Absolute Uncertainty	Relative Uncertainty
^{233}U Activity (Ci)		N/A			N/A			N/A	
^{234}U Activity (Ci)	2.10E-05	1.27E-05	6.05E-01	1.64E-05	9.92E-06	6.05E-01	2.15E-05	1.30E-05	6.05E-01
^{238}U Activity (Ci)	7.60E-06	2.84E-06	3.74E-01	8.53E-06	3.13E-06	3.67E-01	8.26E-06	2.98E-06	3.61E-01
^{238}Pu Activity (Ci)	4.70E-03	1.89E-03	4.02E-01	2.35E-03	1.21E-03	5.15E-01	2.30E-03	1.24E-03	5.39E-01
^{239}Pu Activity (Ci)	8.48E-02	2.89E-02	3.41E-01	8.24E-02	2.81E-02	3.41E-01	8.30E-02	2.83E-02	3.41E-01
^{240}Pu Activity (Ci)	1.91E-02	6.59E-03	3.45E-01	1.85E-02	6.37E-03	3.44E-01	1.80E-02	6.22E-03	3.46E-01
^{242}Pu Activity (Ci)	3.31E-06	1.19E-06	3.60E-01	3.17E-06	1.13E-06	3.57E-01	3.29E-06	1.18E-06	3.59E-01
^{241}Am Activity (Ci)	7.62E-02	2.61E-02	3.43E-01	8.17E-02	2.80E-02	3.43E-01	7.85E-02	2.70E-02	3.44E-01
^{90}Sr Activity (Ci)		N/A			N/A			N/A	
^{137}Cs Activity (Ci)		N/A			N/A			N/A	
TRU Alpha Conc. (nCi/g)	1.50E+03	3.21E+02	2.14E-01	1.50E+03	3.27E+02	2.18E-01	1.48E+03	3.22E+02	2.18E-01

ATTACHMENT B.1: REPLICATE TESTING RESULTS FOR DRUM ARP21969 – WAGS

Instrument: WAGS
Drum: ARP21969

Quantity of Interest	Original Measurement		Sample Mean	Sample Standard Deviation	Relative Standard Deviation	x^2	Pr(x <|c^2|)
	Reported Value	Absolute Uncertainty					
^{233}U Activity (Ci)	0.00E+00	N/A	N/A	N/A	N/A	N/A	N/A
^{234}U Activity (Ci)	2.39E-05	1.44E-05	2.01E-05	2.34E-06	1.17E-01	1.06E-01	9.99E-01
^{238}U Activity (Ci)	9.92E-06	3.52E-06	8.01E-06	5.80E-07	7.23E-02	1.08E-01	9.99E-01
^{238}Pu Activity (Ci)	2.54E-03	1.28E-03	3.35E-03	1.44E-03	4.31E-01	5.09E+00	2.78E-01
^{239}Pu Activity (Ci)	8.49E-02	2.89E-02	8.22E-02	1.88E-03	2.28E-02	1.69E-02	1.00E+00
^{240}Pu Activity (Ci)	1.71E-02	5.90E-03	1.83E-02	5.03E-04	2.74E-02	2.91E-02	1.00E+00
^{242}Pu Activity (Ci)	3.12E-06	1.12E-06	3.06E-06	4.21E-07	1.38E-01	5.66E-01	9.67E-01
^{241}Am Activity (Ci)	7.99E-02	2.73E-02	7.97E-02	5.91E-03	7.42E-02	1.87E-01	9.96E-01
^{90}Sr Activity (Ci)	0.00E+00	N/A	N/A	N/A	N/A	N/A	N/A
^{137}Cs Activity (Ci)	0.00E+00	N/A	N/A	N/A	N/A	N/A	N/A
TRU Alpha Conc. (nCi/g)	1.50E+03	3.27E+02	1.49E+03	5.72E+01	3.83E-02	1.22E-01	9.98E-01

Quantity of Interest	t	Pr(x <|t|)	x^2 Test	t Test
^{233}U Activity (Ci)	N/A	N/A	Not Applicable	Not Applicable
^{234}U Activity (Ci)	1.48E+00	2.13E-01	Not Significant	Not Significant
^{238}U Activity (Ci)	3.01E+00	3.97E-02	Not Significant	Significant
^{238}Pu Activity (Ci)	-5.11E-01	6.36E-01	Not Significant	Not Significant
^{239}Pu Activity (Ci)	1.31E+00	2.60E-01	Not Significant	Not Significant
^{240}Pu Activity (Ci)	-2.25E+00	8.76E-02	Not Significant	Not Significant
^{242}Pu Activity (Ci)	1.39E-01	8.96E-01	Not Significant	Not Significant
^{241}Am Activity (Ci)	3.40E-02	9.75E-01	Not Significant	Not Significant
^{90}Sr Activity (Ci)	N/A	N/A	Not Applicable	Not Applicable
^{137}Cs Activity (Ci)	N/A	N/A	Not Applicable	Not Applicable
TRU Alpha Conc. (nCi/g)	1.28E-01	9.05E-01	Not Significant	Not Significant

ATTACHMENT B.2: REPLICATE TESTING DATA FOR DRUM ARP22225 – WAGS

Instrument: WAGS
Drum: ARP22225

Quantity of Interest	Original Measurement			Replicate #1			Replicate #2		
	Reported Value	Absolute Uncertainty	Relative Uncertainty	Reported Value	Absolute Uncertainty	Relative Uncertainty	Reported Value	Absolute Uncertainty	Relative Uncertainty
^{233}U Activity (Ci)		N/A			N/A			N/A	
^{234}U Activity (Ci)	5.74E-05	3.51E-05	6.12E-01	5.38E-05	3.29E-05	6.12E-01	5.91E-05	3.62E-05	6.13E-01
^{238}U Activity (Ci)	6.27E-05	2.23E-05	3.56E-01	6.11E-05	2.17E-05	3.55E-01	6.04E-05	2.15E-05	3.56E-01
^{238}Pu Activity (Ci)	4.06E-03	2.17E-03	5.35E-01	1.89E-03	9.82E-04	5.20E-01	1.76E-03	9.13E-04	5.19E-01
^{239}Pu Activity (Ci)	6.46E-02	2.29E-02	3.55E-01	6.72E-02	2.38E-02	3.54E-01	6.25E-02	2.21E-02	3.54E-01
^{240}Pu Activity (Ci)	1.80E-02	6.52E-03	3.62E-01	1.49E-02	5.43E-03	3.64E-01	1.39E-02	5.05E-03	3.63E-01
^{242}Pu Activity (Ci)	6.12E-06	2.27E-06	3.71E-01	1.94E-06	1.21E-06	6.24E-01	1.80E-06	1.21E-06	6.72E-01
^{241}Am Activity (Ci)	1.66E-01	5.89E-02	3.55E-01	1.60E-01	5.67E-02	3.54E-01	1.57E-01	5.56E-02	3.54E-01
^{90}Sr Activity (Ci)		N/A			N/A			N/A	
^{137}Cs Activity (Ci)		N/A			N/A			N/A	
TRU Alpha Conc. (nCi/g)	1.62E+03	4.08E+02	2.52E-01	1.56E+03	3.96E+02	2.54E-01	1.51E+03	3.85E+02	2.55E-01

Quantity of Interest	Replicate #3			Replicate #4			Replicate #5		
	Reported Value	Absolute Uncertainty	Relative Uncertainty	Reported Value	Absolute Uncertainty	Relative Uncertainty	Reported Value	Absolute Uncertainty	Relative Uncertainty
^{233}U Activity (Ci)		N/A			N/A			N/A	
^{234}U Activity (Ci)	5.51E-05	3.37E-05	6.12E-01	5.46E-05	3.34E-05	6.12E-01	5.15E-05	3.15E-05	6.12E-01
^{238}U Activity (Ci)	6.37E-05	2.26E-05	3.55E-01	6.63E-05	2.35E-05	3.54E-01	6.40E-05	2.27E-05	3.55E-01
^{238}Pu Activity (Ci)	1.75E-03	9.12E-04	5.21E-01	1.77E-03	9.21E-04	5.20E-01	1.85E-03	9.61E-04	5.20E-01
^{239}Pu Activity (Ci)	6.23E-02	2.21E-02	3.55E-01	6.30E-02	2.23E-02	3.54E-01	6.58E-02	2.33E-02	3.54E-01
^{240}Pu Activity (Ci)	1.38E-02	5.05E-03	3.66E-01	1.40E-02	5.09E-03	3.64E-01	1.46E-02	5.31E-03	3.64E-01
^{242}Pu Activity (Ci)	1.80E-06	1.12E-06	6.22E-01	1.82E-06	1.13E-06	6.21E-01	1.90E-06	1.18E-06	6.21E-01
^{241}Am Activity (Ci)	1.68E-01	5.94E-02	3.54E-01	1.64E-01	5.84E-02	3.56E-01	1.80E-01	6.38E-02	3.54E-01
^{90}Sr Activity (Ci)		N/A			N/A			N/A	
^{137}Cs Activity (Ci)		N/A			N/A			N/A	
TRU Alpha Conc. (nCi/g)	1.57E+03	4.08E+02	2.60E-01	1.56E+03	4.02E+02	2.58E-01	1.68E+03	4.36E+02	2.60E-01

ATTACHMENT B.2: REPLICATE TESTING RESULTS FOR DRUM ARP22225 – WAGS

Instrument: WAGS
Drum: ARP22225

Quantity of Interest	Original Measurement		Sample Mean	Sample Standard Deviation	Relative Standard Deviation	x^2	Pr(x <|c^2|)
	Reported Value	Absolute Uncertainty					
^{233}U Activity (Ci)	0.00E+00	N/A	N/A	N/A	N/A	N/A	N/A
^{234}U Activity (Ci)	5.74E-05	3.51E-05	5.48E-05	2.76E-06	5.04E-02	2.48E-02	1.00E+00
^{238}U Activity (Ci)	6.27E-05	2.23E-05	6.31E-05	2.38E-06	3.78E-02	4.56E-02	1.00E+00
^{238}Pu Activity (Ci)	4.06E-03	2.17E-03	1.80E-03	6.23E-05	3.45E-02	3.30E-03	1.00E+00
^{239}Pu Activity (Ci)	6.46E-02	2.29E-02	6.42E-02	2.21E-03	3.44E-02	3.72E-02	1.00E+00
^{240}Pu Activity (Ci)	1.80E-02	6.52E-03	1.42E-02	4.83E-04	3.39E-02	2.19E-02	1.00E+00
^{242}Pu Activity (Ci)	6.12E-06	2.27E-06	1.85E-06	6.42E-08	3.47E-02	3.20E-03	1.00E+00
^{241}Am Activity (Ci)	1.66E-01	5.89E-02	1.66E-01	8.96E-03	5.40E-02	9.25E-02	9.99E-01
^{90}Sr Activity (Ci)	0.00E+00	N/A	N/A	N/A	N/A	N/A	N/A
^{137}Cs Activity (Ci)	0.00E+00	N/A	N/A	N/A	N/A	N/A	N/A
TRU Alpha Conc. (nCi/g)	1.62E+03	4.08E+02	1.58E+03	6.27E+01	3.98E-02	9.44E-02	9.99E-01

Quantity of Interest	t	Pr(x <|t|)	x^2 Test	t Test
^{233}U Activity (Ci)	N/A	N/A	Not Applicable	Not Applicable
^{234}U Activity (Ci)	8.53E-01	4.42E-01	Not Significant	Not Significant
^{238}U Activity (Ci)	-1.53E-01	8.86E-01	Not Significant	Not Significant
^{238}Pu Activity (Ci)	3.31E+01	4.99E-06	Not Significant	Highly Significant
^{239}Pu Activity (Ci)	1.82E-01	8.64E-01	Not Significant	Not Significant
^{240}Pu Activity (Ci)	7.11E+00	2.07E-03	Not Significant	Highly Significant
^{242}Pu Activity (Ci)	6.07E+01	4.41E-07	Not Significant	Highly Significant
^{241}Am Activity (Ci)	2.04E-02	9.85E-01	Not Significant	Not Significant
^{90}Sr Activity (Ci)	N/A	N/A	Not Applicable	Not Applicable
^{137}Cs Activity (Ci)	N/A	N/A	Not Applicable	Not Applicable
TRU Alpha Conc. (nCi/g)	6.41E-01	5.57E-01	Not Significant	Not Significant

ATTACHMENT B.3: REPLICATE TESTING DATA FOR DRUM BN10381564 – SUPERHENC

Instrument: SuperHENC
Drum: BN10381564

Quantity of Interest	Original Measurement			Replicate #1			Replicate #2		
	Reported Value	Absolute Uncertainty	Relative Uncertainty	Reported Value	Absolute Uncertainty	Relative Uncertainty	Reported Value	Absolute Uncertainty	Relative Uncertainty
^{233}U Activity (Ci)		N/A			N/A			N/A	
^{234}U Activity (Ci)		N/A			N/A			N/A	
^{238}U Activity (Ci)		N/A			N/A			N/A	
^{238}Pu Activity (Ci)	1.40E-02	5.64E-03	4.02E-01	1.37E-02	5.50E-03	4.01E-01	1.55E-02	6.24E-03	4.01E-01
^{239}Pu Activity (Ci)	4.58E-01	4.61E-02	1.01E-01	4.46E-01	4.43E-02	9.92E-02	5.06E-01	5.08E-02	1.00E-01
^{240}Pu Activity (Ci)	1.02E-01	5.88E-03	5.78E-02	9.93E-02	5.45E-03	5.49E-02	1.13E-01	6.41E-03	5.70E-02
^{242}Pu Activity (Ci)	1.32E-05	6.80E-06	5.15E-01	1.29E-05	6.63E-06	5.15E-01	1.46E-05	7.53E-06	5.15E-01
^{241}Am Activity (Ci)	9.39E-02	2.19E-02	2.34E-01	9.02E-02	2.56E-02	2.84E-01	1.02E-01	2.91E-02	2.85E-01
^{90}Sr Activity (Ci)		N/A			N/A			N/A	
^{137}Cs Activity (Ci)		N/A			N/A			N/A	
TRU Alpha Conc. (nCi/g)	1.82E+03	1.93E+02	1.06E-01	1.77E+03	1.90E+02	1.07E-01	2.01E+03	2.17E+02	1.08E-01

Quantity of Interest	Replicate #3			Replicate #4			Replicate #5		
	Reported Value	Absolute Uncertainty	Relative Uncertainty	Reported Value	Absolute Uncertainty	Relative Uncertainty	Reported Value	Absolute Uncertainty	Relative Uncertainty
^{233}U Activity (Ci)		N/A			N/A			N/A	
^{234}U Activity (Ci)		N/A			N/A			N/A	
^{238}U Activity (Ci)		N/A			N/A			N/A	
^{238}Pu Activity (Ci)	1.49E-02	6.00E-03	4.02E-01	1.47E-02	5.94E-03	4.04E-01	1.42E-02	5.68E-03	4.01E-01
^{239}Pu Activity (Ci)	4.86E-01	5.04E-02	1.04E-01	4.79E-01	5.28E-02	1.10E-01	4.62E-01	4.54E-02	9.85E-02
^{240}Pu Activity (Ci)	1.08E-01	6.76E-03	6.26E-02	1.06E-01	7.78E-03	7.31E-02	1.03E-01	5.49E-03	5.35E-02
^{242}Pu Activity (Ci)	1.40E-05	7.23E-06	5.16E-01	1.38E-05	7.15E-06	5.17E-01	1.33E-05	6.86E-06	5.15E-01
^{241}Am Activity (Ci)	9.82E-02	2.81E-02	2.86E-01	9.68E-02	2.79E-02	2.88E-01	9.33E-02	2.65E-02	2.84E-01
^{90}Sr Activity (Ci)		N/A			N/A			N/A	
^{137}Cs Activity (Ci)		N/A			N/A			N/A	
TRU Alpha Conc. (nCi/g)	1.93E+03	2.15E+02	1.11E-01	1.90E+03	2.23E+02	1.17E-01	1.84E+03	1.95E+02	1.06E-01

ATTACHMENT B.3: REPLICATE TESTING RESULTS FOR DRUM BN10381564 – SUPERHENC

Instrument: SuperHENC
Drum: BN10381564

Quantity of Interest	Original Measurement		Sample Mean	Sample Standard Deviation	Relative Standard Deviation	x^2	$Pr(x < \|c^2\|)$
	Reported Value	Absolute Uncertainty					
^{233}U Activity (Ci)	0.00E+00	N/A	N/A	N/A	N/A	N/A	N/A
^{234}U Activity (Ci)	0.00E+00	N/A	N/A	N/A	N/A	N/A	N/A
^{238}U Activity (Ci)	0.00E+00	N/A	N/A	N/A	N/A	N/A	N/A
^{238}Pu Activity (Ci)	1.40E-02	5.64E-03	1.46E-02	7.06E-04	4.83E-02	6.27E-02	1.00E+00
^{239}Pu Activity (Ci)	4.58E-01	4.61E-02	4.76E-01	2.30E-02	4.83E-02	9.94E-01	9.11E-01
^{240}Pu Activity (Ci)	1.02E-01	5.88E-03	1.06E-01	5.11E-03	4.83E-02	3.03E+00	5.53E-01
^{242}Pu Activity (Ci)	1.32E-05	6.80E-06	1.37E-05	6.63E-07	4.83E-02	3.81E-02	1.00E+00
^{241}Am Activity (Ci)	9.39E-02	2.19E-02	9.62E-02	4.65E-03	4.83E-02	1.79E-01	9.96E-01
^{90}Sr Activity (Ci)	0.00E+00	N/A	N/A	N/A	N/A	N/A	N/A
^{137}Cs Activity (Ci)	0.00E+00	N/A	N/A	N/A	N/A	N/A	N/A
TRU Alpha Conc. (nCi/g)	1.82E+03	1.93E+02	1.89E+03	9.15E+01	4.83E-02	8.94E-01	9.25E-01

Quantity of Interest	t	$Pr(x < \|t\|)$	x^2 Test	t Test
^{233}U Activity (Ci)	N/A	N/A	Not Applicable	Not Applicable
^{234}U Activity (Ci)	N/A	N/A	Not Applicable	Not Applicable
^{238}U Activity (Ci)	N/A	N/A	Not Applicable	Not Applicable
^{238}Pu Activity (Ci)	-7.27E-01	5.08E-01	Not Significant	Not Significant
^{239}Pu Activity (Ci)	-7.27E-01	5.08E-01	Not Significant	Not Significant
^{240}Pu Activity (Ci)	-7.27E-01	5.07E-01	Not Significant	Not Significant
^{242}Pu Activity (Ci)	-7.27E-01	5.08E-01	Not Significant	Not Significant
^{241}Am Activity (Ci)	-4.47E-01	6.78E-01	Not Significant	Not Significant
^{90}Sr Activity (Ci)	N/A	N/A	Not Applicable	Not Applicable
^{137}Cs Activity (Ci)	N/A	N/A	Not Applicable	Not Applicable
TRU Alpha Conc. (nCi/g)	-6.88E-01	5.30E-01	Not Significant	Not Significant

ATTACHMENT C.1

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CCP-TP-005 Attachment 1, Documentation Checklist, Waste Stream: ID-SDA-SLUDGE, June 3, 2010

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ATTACHMENT C.2

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CCP-TP-005, Attachment 8, Drum List Waste Stream ID-MFC-S5400-RH, February 2, 2010

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NCR-RHINL-0509-10, The ITR did not properly review the Audio/Video for container IDAWANL880065A. The RTR operator called out the wrong date and the ITR did not resolve this with the RTR operator, July 20, 2010

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ATTACHMENT C.3

Nondestructive Assay References

Audit Information summarizing numbers of containers and specific configurations assayed each year 2007 through 2010, prepared for inspection by Stephanie McElhaney

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