DOCKET NO: A-98-49; II-A4-59

WASTE CHARACTERIZATION INSPECTION REPORT

EPA BASELINE INSPECTION NO. EPA-INL-CCP-05.05-8 OF THE ADVANCED MIXED WASTE TREATMENT PROGRAM (AMWTP) AND THE IDAHO CLOSURE PROJECT (ICP) WASTE CHARACTERIZED BY THE CENTRAL CHARACTERIZATION PROJECT (CCP) AT THE IDAHO NATIONAL LABORATORY (INL)

May 3–5, 2005

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

November 2005

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ATTACHMENTS

1.0 EXECUTIVE SUMMARY

In accordance with 40 CFR 194.8(b), from May 3–5, 2005, the U.S. Environmental Protection Agency (EPA or the Agency) conducted Baseline Inspection No. EPA-INL-CCP-05.05-8 of the Central Characterization Project (CCP), located at the Idaho National Laboratory (INL). INL-CCP is characterizing waste supplied by both the Advanced Mixed Waste Treatment Plant (AMWTP) and the Idaho Closure Project (ICP). EPA conducted a baseline inspection of the site's program to characterize wastes proposed for disposal in the Waste Isolation Pilot Plant (WIPP). Based on the results of the baseline inspection and upon the consideration of public comments, EPA is approving the INL-CCP waste characterization program based on a demonstration of the site's capabilities, with conditions and limitations, in accordance with 40 CFR 194.8(b).

EPA must verify compliance with 40 CFR 194.24 before waste may be disposed of at the WIPP, as specified in Condition 3 of the Agency's certification of the WIPP's compliance with disposal regulations for transuranic (TRU) radioactive waste (63 FR 27354 and 27405, May 18, 1998). EPA had not previously evaluated or approved waste characterization (WC) systems at INL-CCP, although EPA had previously inspected and approved CCP at several other Department of Energy (DOE or Department) TRU waste generator sites. EPA Baseline Inspection No. EPA-INL-CCP-05.05-8 was performed in accordance with the provisions of 40 CFR 194.8(b) as issued in a July 16, 2004, *Federal Register* notice (Vol. 69, No.136, pages 42571-42583). The purpose of the INL-CCP WC inspection was to evaluate the adequacy of the site's WC programs for TRU waste disposed at WIPP. The activities examined during the inspection included:

- Acceptable Knowledge (AK) and Load Management for the AMWTP's contact-handled (CH) retrievably-stored TRU debris waste (S5000) and solid waste (S3000)
- Visual Examination Technique (VET) for CH newly-generated debris waste (S5000), solid waste (S3000), and soils/gravel (S4000) from ICP Pit 4
- Visual Examination as Quality Control (QC) Check of Real Time Radiography (VE) for the AMWTP's CH retrievably-stored TRU debris waste (S5000) and solid waste (S3000)
- Real-Time Radiography (RTR) for the AMWTP's CH retrievably-stored TRU debris waste (S5000) and solid waste (S3000)
- Nondestructive Assay (NDA) and the WIPP Waste Information System (WWIS) for CH retrievably-stored and newly-generated TRU debris waste (S5000), solid waste (S3000), and soils/gravel (S4000), whether it is from the AMWTP or ICP Pit 4

Four NDA systems were evaluated for characterizing solid (S3000), soil/gravel (S4000), and debris (S5000) wastes. These were: high-efficiency neutron counter (HENC), tomographic gamma scanner (TGS), waste assay gamma spectrometer (WAGS), and Stored Waste Examination Pilot Plant (SWEPP) gamma-ray spectrometer (SGRS). The AMWTP debris waste examined is a mixture of TRU debris wastes from different DOE sites that have been in storage at INL, the majority of which originated from DOE's Rocky Flats Environmental Technology Site (RFETS) in Golden, Colorado.

EPA's inspection team did not have any findings and identified two concerns, both of which required a response from DOE. Information regarding both concerns was provided by the site and Carlsbad Field Office (CBFO) personnel prior to the inspection closeout using EPA Inspection Issue Tracking Forms (see Attachments C.1 and C.2). EPA evaluated the responses for completeness and adequacy and concluded that each had been resolved satisfactorily. EPA considers both concerns to be resolved, and there are no open concerns resulting from this inspection.

EPA's inspection team determined that INL-CCP's WC program activities were technically adequate. EPA approves the INL-CCP WC program in the configuration observed during this inspection and described in this report and in the checklists in Attachment A. This approval includes the following:

(1) The AK and Load Management process for CH retrievably-stored TRU debris and solid waste supplied by AMWTP

(2) The TGS, SGRS, and WAGS NDA systems for assaying solid, soil/gravel, and debris waste

(3) VE as a quality control (QC) check of the RTR process for retrievably-stored solid and debris waste

(4) The VET process for newly-generated debris, solid, and soil/gravel waste

(5) The NDE (RTR) process for retrievably-stored solid and debris waste

(6) The WWIS process for tracking of waste contents of debris, solid, and soil/gravel waste

Any changes to the waste characterization activities from the date of the baseline inspection must be reported to, and, if applicable, approved by EPA, according to the table on page 3.

EPA will notify the public of the results of our evaluations of proposed Tier 1 (T1) and Tier 2 (T2) changes through the EPA website and by sending emails to the WIPPNEWS list (see Section 2.0, below, for a discussion of tiering). All T1 changes must be submitted for approval before their implementation and will be evaluated by EPA. Upon approval, EPA will post the results of the evaluations through the EPA website and the WIPPNEWS list as described above. EPA will periodically post a summary of T2 changes on the website. EPA expects the first report of INL-CCP's T2 changes in February 2006.

Tiering of TRU Waste Characterization Processes Implemented by CCP at INL (Based on May 3-5, 2005 Baseline Inspection)

WC Process Elements	INL-CCP WC Process Specific T1 Changes	INL-CCP WC Process Specific T2 Changes*	INL-CCP General T2 Changes*
AK including Load Management	Any new summary category group for TRU waste Changes to WWIS algorithms specific to load management requiring revisions to the load management provisions of DOE's CH Waste Acceptance Criteria (WAC)	Waste Stream Profile Forms including updates or additions to waste stream(s) within an approved waste category (See Section 7.2) Changes in load management status of approved waste stream(s) Changes to the WWIS algorithms corresponding to the changes to the load management provisions of the CH WAC	Changes to site procedures requiring CBFO approvals
NDA	New equipment or physical modifications to approved equipment affecting actual radioassay results (e.g. DQO compliance, TMU) Changes to approved calibration range for approved equipment (see Section 7.3)	Changes to software for approved equipment (see Section 7.3 Changes to operating range(s) upon CBFO approval	Same as above
RTR	N/A	New equipment or changes to approved equipment	Same as above
VE and VET	Addition of a new vendor or other entity to conduct VE or VET processes	N/A	Same as above
WWIS	N/A	N/A	Same as above

* Upon receiving EPA approval, every three (3) months INL-CCP will report to EPA all T2 changes

This approval allows INL-CCP to dispose of CH TRU debris and solid waste from AMWTP at WIPP. As discussed in the inspection report, EPA has identified the following limitations and conditions that apply to the INL-CCP waste characterization program:

- Retrievably-stored debris and solid waste at AMWTP characterized by CCP using the approved processes cannot be sent for super compaction and must be disposed of at WIPP as direct load or load managed in accordance with the Appendix E of the WIPP Waste Acceptance Criteria.

- In order for waste characterized by AMWTP and INL CCP to be disposed of in the same payload container (i.e., ten drum overpack, standard waste box), DOE must be able to track the individual containers in the payload container or DOE must provide new AK documentation that applies to the entire payload container

and thereby resolves any difference between the AK documentation for AMWTP and INL CCP.

- This approval does not apply to newly-generated, CH TRU, debris, solid, and soil/gravel waste from ICP Pit 4. EPA must review the AK documentation for Pit 4 waste as a Tier 1 change prior to disposing of these wastes at WIPP.

- Replicate testing data for the HENC was not available at the time of EPA's inspection. Therefore, INL-CCP is not currently authorized to dispose of waste that has been characterized using the HENC.

EPA is aware that DOE intends to request the following additions to the INL-CCP approved waste characterization activities: 1) ICP Pit 4 AK documentation, 2) HENC replicate testing data, and 3) use of AMWTP's VE as a QC check of RTR at INL-CCP. According to the tiering established in this letter, these changes are Tier 1 and require EPA approval prior to implementation. Upon receipt of DOE's request for changes, EPA will conduct an evaluation and notify DOE, in writing, of decisions regarding these activities.

2.0 PURPOSE OF INSPECTIONS

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

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

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

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

In other words, the purpose of the baseline inspection is to assess whether DOE sites that characterize TRU waste prior to disposal at the WIPP are capable of characterizing and tracking the waste in such a manner that EPA is confident that the waste will not exceed the approved limits. By approving the WC systems and processes at INL-CCP, EPA is acknowledging that the capabilities of systems and processes EPA inspected and that are discussed in this report to accomplish two tasks: (1) the identification and measurement of waste components (such as plutonium) that must be tracked for compliance;[3] and (2) the confirmation that the waste in any given container has been properly identified as belonging to the group of approved waste streams.

Following the EPA's approval of WC processes evaluated during the baseline inspection, EPA is authorized to evaluate and approve, if necessary, changes to the site's approved WC program by conducting additional inspections under the authority of 40 CFR 194.24(h). Under 40 CFR 194.24 EPA has the authority to conduct continued compliance inspections to verify that the site continues to use only the approved WC processes to characterize the waste and remains in compliance with all the regulatory requirements. Based on the adequacies of the WC processes demonstrated during the baseline inspection, including all conditions and limitations, EPA will specify which subsequent WC program changes or modifications must undergo further EPA inspection or approval under 40 CFR 194.24. This will be accomplished by assigning a tier level to each aspect of the characterization program. Tier 1 (T1) activities have more stringent reporting requirements and require that DOE notify EPA, and that EPA provide approval prior to implementation. Tier 2 (T2) activities are reported to EPA by DOE based on the frequency established in the inspection report. DOE may choose to operate at risk while EPA considers the proposed Tier 2 changes. The rule under which this baseline inspection was conducted can be found in the *Federal Register* (Vol. 69, No.136, pages 42571–42583 of July 16, 2004).

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

[3] The potential contents of a waste stream or group of waste streams determine which processes can adequately characterize the waste. For example, if AK information suggests that the waste form is heterogeneous, the site should select an NDA technique that suits such waste in order for adequate measurements to be obtained. Radiography and VE help both to confirm and quantify waste components, such as cellulosics, rubbers, plastics, and metals. Once the nature of the waste has been confirmed, the assay techniques then quantify selected radionuclides in the waste. In some cases, a TRU waste generator site may be able to characterize a wide range of heterogeneous waste streams or only a few. A site's stated limits on the applicability of proposed WC processes govern EPA's inspection scope.

3.0 PURPOSE OF THIS REPORT

This inspection report documents the basis for EPA's approval decision and explains the results of Baseline Inspection No. EPA-INL-CCP-05.05-8 in terms of findings or concerns. The report provides objective evidence of outstanding findings (nonconformances) in the form of documentation, as applicable, describes the characterization systems approved, and identifies all system limitations. The report also describes any tests or demonstrations completed during the course of the inspection and their relevance to EPA's approval decision. The completed checklists attached to this report reference the documents that EPA's inspection team members reviewed in support of the technical determination. To see or obtain copies of any items identified in the attached checklists, write to the following address:

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

EPA will issue an approval letter to DOE along with this inspection report, announce the approval decision, and post the approval letter and the inspection report on our website at www.epa.gov/radiation/WIPP, in accordance with 40 CFR 194.8(b)(3).

4.0 SCOPE OF INSPECTION

The scope of Baseline Inspection No. EPA-INL-CCP-05.05-8 included the technical adequacy of the WC systems in use at INL-CCP to characterize TRU wastes. These systems were evaluated with respect to their ability to achieve the following:

- Identify and quantify the activities of the 10 WIPP-tracked radionuclides (^{241}Am, ^{137}Cs, ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{90}Sr, ^{233}U, ^{234}U, and ^{238}U) using a combination of AK and NDA systems
- Assign waste material parameters (WMPs) correctly using RTR and VE for CH retrievably-stored solid and debris waste and VET for newly-generated debris, solid, and soil/gravel waste
- Perform effective waste information (data) transfer using the WWIS

Specifically, these systems consisted of the following components:

- The AK and Load Management processes that support retrievably-stored S3000 solid and S5000 debris wastes
- Four NDA systems (HENC, SGRS, WAGS, and TGS systems, as described in this report) for the analysis of CH retrievably-stored or newly-generated S3000 solid, S4000 soil/gravel, and S5000 debris wastes
- VE as a QC Check for RTR for retrievably-stored S5000 debris and S3000 solid wastes

- VET for newly-generated S5000 debris, S3000 solid, and S4000 soil/gravel wastes from ICP Pit 4
- RTR for retrievably-stored S5000 debris and S3000 solid wastes
- The WWIS for the purpose of data transfer for waste containers destined for WIPP emplacement

During an inspection, EPA does not approve characterization data; that function is the sole responsibility of the site, namely INL-CCP. EPA evaluates the waste characterization processes implemented by the site to characterize AMWTP-supplied CH retrievably-stored debris and solid waste and newly-generated debris, solids, and soil from the Idaho Closure Project (ICP) Pit 4. The evaluation consists of personnel interviews, observing equipment operations that comport with the site procedures, and inspecting records related to each of the WC processes within the inspection's scope. An important aspect of this evaluation is the objective evidence that documents effectiveness of the WC processes. Objective evidence typically takes the form of batch data reports (BDRs), radioassay datasheets, AK accuracy reports, VE and RTR tapes, and WWIS printouts for specific TRU containers. During this inspection, EPA selected samples of each of these items based on the number and variety of items each WC process produced, consistent with standard auditing techniques. For example, the sample of NDA BDRs that were evaluated to verify compliance was chosen such that it included a contribution from all four operating systems, all waste matrices and that spanned each system's operating range. Based on the evaluation of the WC processes in conjunction with the sample of objective evidence, EPA determined the technical adequacy of the WC processes within the inspection's scope for approval.

5.0 INSPECTION-RELATED DEFINITIONS

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

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

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

6.0 INSPECTION TEAM

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

Inspection Team Member	Position	Affiliation
Mr. Ed Feltcorn	Inspection Team Leader	U.S. EPA
Ms. Rajani Joglekar	Inspector	U.S. EPA
Ms. Connie Walker	Inspector	S. Cohen & Associates
Ms. Dorothy Gill	Inspector	S. Cohen & Associates
Mr. Jim Channell	Inspector	S. Cohen & Associates
Mr. Patrick Kelly	Inspector	S. Cohen & Associates

A CBFO-QA team also performed CBFO Audit A-05-12, a separate and independent audit of the same ICP/CCP processes that EPA evaluated for regulatory compliance. Mr. Jimmy Wilburn, an employee of the CBFO technical assistance contractor (CTAC), served as the CBFO-QA Audit Team Leader and as DOE's primary point of contact with EPA's inspection team. Other QA auditors and technical specialists from the CTAC supported the CBFO-QA audit team.

7.0 PERFORMANCE OF THE INSPECTION

Site Background and History

INL is located in southeastern Idaho, about 80 miles from Idaho Falls, Idaho. The site encompasses approximately 890 square miles. The U.S. government established INL in 1949 as the National Reactor Testing Station. Its original mission was the design, construction, and testing of prototype nuclear reactors. Over the years, emphasis has shifted from reactor development to multi-program research, hazardous and radioactive waste management and cleanup, and the development of environmental technologies. In January 1997, the laboratory, then known as the Idaho National Engineering Laboratory (INEL), changed its name to the Idaho National Engineering and Environmental Laboratory (INEEL) to highlight its role in developing waste cleanup and other environmental technologies. In February 2005, the site's name was changed to the Idaho National Laboratory (INL) to better reflect its role in the development of nuclear-related technologies.

INL has approximately 65,000 m^3 of TRU waste in inventory. Of this, approximately 8,000 m^3 of waste (6,000 m^3 from the RFETS) is currently in storage at the Subsurface Disposal Area of the Radioactive Waste Management Complex (RWMC). In accordance with state agreements, INL was required to ship 3,100 m^3 of TRU waste to the WIPP by the end of 2002, a commitment that was met. Approximately 6,000 55-gallon drums of CH retrievably-stored homogenous solids generated at the RFETS were shipped to INL. British Nuclear Fuel Limited (BNFL) took over TRU WC responsibilities from Bechtel, which had shipped the required 3,100 m^3 to the WIPP under a separate activity. INL-CCP recently began operations at this site to expedite the characterization and shipment of TRU wastes. EPA and their support personnel conducted this inspection on-site at INL by conducting interviews with site personnel, and examining equipment, practices and procedures used to characterize TRU wastes as described in this report.

7.1 Personnel Interviewed During the Inspection

In the course of the inspection, information was obtained from several sources, including interviews with INL-CCP personnel in several disciplines. Personnel contacted were only a sample of the CH TRU waste characterization staff and they are listed in the table below along with their affiliation and technical area.

Personnel Contacted During the Inspection

Personnel	Organization or Affiliation	Area of Expertise
Jeff Harrison	CCP	AK Technical Specialist*
Kevin Peters	CCP	AK Technical Specialist*
Dave Haar	CCP Program Manager	CCP Management
Lisa Frost	CWI	AK
Thad Hasselstrom	MCS/CCP	RTR – Operator/ITR/TS/FQAO
Ed Gulbransen	MCS/CCP	NDA*
Bruce Gillespie	MCS/CCP	NDA – SGRS and WAGS SME*
James Behana	MCS/CCP	NDA – HENC SME*
Tom Donahue	MCS/CCP	NDA – TGS SME*
D. Walraven	ANTECH/TGS	NDA – TGS EA*
Larry Lamb	MCS/CCP	RTR – Operator/ITR/TS/FQAO
Kenneth Dale Simpson	MCS/CCP	RTR – Operator/ITR/TS/FQAO
J.R. Stroble	CCP	WWIS – WCO
Sinisa Djordjevic	CCP	WWIS – SQAO
Brian Lundell	ANL-West	VE – WC Operator
Jim Magnan	ANL-West	VE – VEE*
Terry Tripp	ANL-West	VE – WC Operator
Julie Colborn	ANL-West	VE – WC Operator
Paul Gomez	WTS/CCP	SPM
Christine Gomez	WTS/CCP	SPQAO
Abraham Romo	WTS/CCP	VE – SME*
L.J. Walker	WTS/CCP	VE – SME*
Kevin Streeper	INL	ARP Facility Manager

In this table EPA has identified key areas of expertise in which we are most interested with an asterisk. These positions were chosen for two reasons: each position represents a WC function with direct bearing on the quality of data used to insure waste isolation; and, because the individual occupying each position is allowed to function outside of the strict control of specific procedures on the basis of some combination of education, experience and training, all of which are routinely documented in site training records and would be available onsite for routine inspection by EPA.

For example, one of the responsibilities of an NDA Expert Analyst (EA) is to make an evaluation of whether data that are outside of an instrument's procedurally specified (i.e., normal) operational range are in fact useable values for certifying a waste container based on his/her technical judgment. This is the essence of the NDA EA's function, to evaluate potentially anomalous measurements based on some combination of technical knowledge, experience and training without the use of specific acceptance criteria or a detailed written procedure.

During the baseline inspection INL-CCP provided a list of TRU WC personnel from which EPA selected a few individuals to be interviewed. The EPA inspectors reviewed the qualifications and training records of these individuals to assess their WC capabilities. Based on this evaluation EPA determined that INL-CCP WC personnel responsible for characterizing TRU waste and certifying it as TRU waste are well qualified and have received adequate training to perform their assigned function. EPA may review the training and qualifications of the key WC personnel at any time. EPA may conduct periodic records reviews and interviews of WC personnel to ensure the quality of this aspect of the waste characterization process.

7.2 Acceptable Knowledge and Load Management

EPA examined the AK process and Load Management and associated information to determine whether INL-CCP demonstrated compliance with 40 CFR 194.8 requirements for CH retrievably-stored TRU debris (S5000) and solid (S3000) waste at the AMWTP. The example waste streams that were examined include retrievably-stored graphite as debris waste and RFETS Building 374 wastewater treatment sludges as solid waste, both of which were generated at the RFETS and shipped to INL for storage. EPA only evaluated AK applicable to retrievably-stored debris and solid wastes.

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

- Overall procedural technical sufficiency and scope, and ability to follow the AK WC process for containers and waste streams
- Waste-generating procedures, processes, and documentation
- Characterization of required WMPs and radionuclides
- AK information assembly and compilation
- AK confirmation and associated discrepancy resolution
- Sufficiency of AK characterization results
- Assembly of required information and use of supplemental information
- AK summary preparation
- Reassignment of waste stream due to AK and discrepancy analysis
- AK accuracy
- Load Management programmatic and procedural controls

The checklist included as Attachment A.1 identifies the objective evidence reviewed by the EPA inspector.

As part of the WIPP waste characterization program, AK is used to determine several aspects of TRU wastes at INL-CCP, including, but not limited to, the following:

- Defense waste status
- Material parameters
- Waste stream
- Radionuclide information
- Waste matrix codes (WMCs)

During the inspection, the following documents were provided by CCP at the request of the EPA inspector and CBFO auditor.

- CCP-TP-005, Attachment 13, CCP Acceptable Knowledge Confirmation Checklist, for ID-RF-3121-374, Draft, acquired during week of May 6, 2005
- CCP Characterization Information Summary including Acceptable Knowledge Confirmation Checklist, ID-RF-S5126, Rocky Flats Transuranic Graphite Debris, May 3, 2005
- CCP-AK-INL-002, Central Characterization Project Acceptable Knowledge Summary Report for the Idaho National Laboratory Rocky Flats Transuranic Graphite Debris Waste Stream ID-RF-S5125, Revisions 0 (March 18, 2005) and 1 (May 5, 2005)
- CCP-AK-INL-003, Central Characterization Project Acceptable Knowledge Summary Report for Rocky Flats Building 374 Sludge Stored at the Idaho National Laboratory, Waste Stream ID-RF-S3121-374, Revisions 0 (March 23, 2005) and 1 (May 5, 2005)
- CCP-TP-005, CCP Acceptable Knowledge Documentation, Revision 15, effective date March 31, 2005
- CCP-TP-005, Revision 15, Attachment 1, Acceptable Knowledge Documentation Checklist, ID-RF-S5126, Graphite Debris from Rocky Flats Building 374, acquired week of May 6, 2005
- CCP-TP-005, Revision 15, Attachment 4, Acceptable Knowledge Source Document Reference List for ID-RF-S3121-374, Wastewater Treatment Sludge from Rocky Flats Building 374, acquired week of May 6, 2005
- CCP-TP-005, Revision 14, Attachment 5, Hazardous Constituents, CCP-AK-INL-002, Revision 0, Graphite Molds, acquired week of May 6, 2005
- CCP-TP-005, Revision 14, Attachment 6, Waste Form, Waste Material Parameters, Prohibited Items, and Packaging, CCP-AK-INL-002, Revision 0, Graphite Molds, acquired week of May 6, 2005

- CCP-TP-005, Revision 14, Attachment 7, NDA-AK Memorandum for ID-RF-5126, Graphite Molds, dated April 20, 2005
- CCP-TP-005, Revision 14, Attachment 8, Waste Containers, for ID-RF-S3121-374, Wastewater Treatment Sludge from Rocky Flats Building 374, acquired week of May 6, 2005
- CCP-TP-005, Revision 15, Attachment 1, Acceptable Knowledge Documentation Checklist, ID-RF-S3121-374, Wastewater Treatment Sludge from Rocky Flats Building 374, acquired week of May 6, 2005
- CCP-TP-005, Revision 15, Attachment 4, Acceptable Knowledge Source Document Reference List for ID-RF-S3121-374, Wastewater Treatment Sludge from Rocky Flats Building 374, acquired week of May 6, 2005
- CCP-TP-005, Revision 14, Attachment 5, Hazardous Constituents, CCP-AK-INL-003, Revision 0, Wastewater Treatment Sludge from Rocky Flats Building 374, acquired week of May 6, 2005
- CCP-TP-005, Revision 14, Attachment 6, Waste Form, Waste Material Parameters, Prohibited Items, and Packaging, CCP-AK-INL-003, Revision 0, Wastewater Treatment Sludge from Rocky Flats Building 374, acquired week of May 6, 2005
- CCP-TP-005, Attachment 7, AK-NDA Memorandum, for ID-RF-S3121-374, RFETS Wastewater Treatment Sludge from Building 374, dated April 20, 2005
- CCP-TP-005, Revision 14, Attachment 8, Waste Containers, for ID-RF-S3121-374, Wastewater Treatment Sludge from Rocky Flats Building 374, acquired week of May 6, 2005
- CCP-TP-005, Revision 13, Attachment 10, Acceptable Knowledge Re-Evaluation Checklist for LLNL, LL-T002-S5400, dated November 18, 2003, CCP-TP-005, Revision 15, Attachment 4, Acceptable Knowledge Source Document Reference List, Waste Stream ID0RF-S5126, Graphite Debris from Rocky Flats, acquired week of May 6, 2005
- C063, External letter from J.D. Wells to Ann Ficklin, Rockwell, RE: Content Code Reconciliation, dated November 8, 1995
- C102, Letter from F.R. Dowsett, CDH, RE: characterization of insulation, flu-flo filter, and metal wastes, dated August 11, 1993
- C122, Memorandum to A.M Faucette, Safe Sites, from Y.B. Mazza and D.S. Remington, Safe Sites, RE: TCLP extraction analysis for Building 374 sludge, dated September 12, 1995
- C159, Interview Record for R. Hoffman by D. Herrick and J. Lamb, RE: Special Order Work, tracers, lithium and U-233 (RFETS), dated September 4, 1991
- Central Characterization Project Surveillance Report Approval and Concurrence, Verification of Acceptable Knowledge, S. Muse, Site Project Quality Assurance Office (SPQAO), Savannah River Site, dated April 6, 2004

- D001, AK Source Document Discrepancy Resolution: Historical Assignment of EPA Hazardous Waste Numbers to Graphite Waste, from K. Peters, dated May 5, 2005[4]
- Field Interview Work Sheet, Building 771, dated April 6, 1992
- Interoffice Correspondence, from I. Quintana to CCP Records Custodian, RE: Savannah River Site Summary Category Group Specific Miscertification Rate, dated January 21, 2005
- Interoffice Correspondence, from I. Quintana to CCP Records Custodian, RE: Waste Material Parameter Weight Comparison Report for Savannah River Site September 2003 through December 2004 (Relative Percent Difference Comparison Report for Radiography and Visual Examination), dated June 14, 2004
- Interoffice Correspondence, from I. Quintana to P.C. Gomez and B. Broomfield, RE: Acceptable Knowledge Accuracy Report: Idaho National Laboratory Waste Stream Number ID-RF-S5126, Lot 1, dated May 3, 2005
- Interoffice Correspondence, from A.J. Fisher to D.H. Haar, RE: Current Central Characterization Project Surveillance/Assessment Schedules, dated April 5, 2005
- NCR-INL-0216-05, Sealed Container > 4 Liters Is a Prohibited Item, dated April 5, 2005
- NCR-0213-05, Prohibited Item Greater Than 1" Liquid in Container, dated April 4, 2005
- P004, Rocky Flats Plant Waste Management Site Plan, dated December 1987
- P015, TRU Waste Sampling Program Volume 1: Waste Characterization (EEG WM 6503), dated 1985
- P028, Characteristics of Transuranic Waste at Department of Energy Sites, RFP-3367, dated May 1983
- P020, Characteristics of Transuranic Waste at Department of Energy Sites, RF-3357, dated May 1983
- P033, Summary of Transuranic Waste Characterization Programs and the INEL (1979-Present), INEL-95/0387, dated 1995
- P049, Annual Land Disposal Restriction Program Report, Rocky Flats Plant, dated 1994
- P052, Attachment 3, Acceptable Knowledge Source Document ID-RF-53121-374, ID-RF-S5126, dated April 12, 2005
- P059, Graphite Process Operations in Building 707, FO-0015, Revision 0, dated March 28, 1991
- P169, Plutonium Isotopic Ratios at Rocky Flats, dated November 16, 1990
- P147, Material Safety Data Sheet for KODAK HRP Developer, dated 1984

[4] This document was provided by CCP as the only example of how AK-AK discrepancies are documented and managed. No example was provided documenting AK-AK discrepancies for radiological information. In the absence of this document CCP would have failed to provide proper objective evidence for resolving AK-AK discrepancies specific to radiological contents.

- P174, Building 374 Evaporator Feed Streams, dated April 21, 1982
- P205, Nonmixed Waste Determination for IDC 300 Waste (Graphite Molds), INEEL/EXT-98-01137, dated February 1989[5]
- P212, Attachment 3, Acceptable Knowledge Source Document for ID-RFS5126, dated April 12, 2005
- P218, Attachment 3, Acceptable Knowledge Source Document Summary for ID-RF-53121-374
- P221, INEEL Acceptable Knowledge Waste Stream Summary Sheet—Graphite, EDF-1175, dated July 19, 1999
- P227, Plutonium Mass Fractions Derived from SGRS Data, EDF-1609, dated December 2000
- P238, INEEL Acceptable Knowledge Waste Stream Summary Sheet—Building 374 Sludge, Bechtel BWXT Idaho, LLC, EDF-2657, Revision 1, dated May 8, 2002
- P502, Packaging and Handling Plutonium Wastes and Residues, CO-1073-A, dated August 8, 1977
- P507, Acceptable Knowledge Document for INEEL Stored Transuranic Waste—Rocky Flats Plant Waste, INEL-06/0280, Revision 3, dated March 28, 2003
- P510, AMWTP Waste Stream Profile BNINW218 and WSPF Update for the WIPP Operating Record, dated March 17, 2004
- P511, Acceptable Knowledge Summary for Building 374 Sludge, BNFL-5232-RPT-TRUW-15, dated March 17, 2004
- PTS/CTS printouts for graphite, Building 374 waste (acquired during inspection)
- Site project manager (SPM) qualification card, B. Broomfield, dated September 7, 2004
- SPQAO for validation and verification qualification card, C. Gomez, dated May 14, 2003
- U016, Quantification of Radionuclides, WIPP-0217-RTS-0192, undated (circa 1988)
- U030, VOC Gas Chromatography/Mass Spectrometry Results, IDCs 803 and 807, dated March 27, 1996
- U053, Building 374 Solidified Sludge, Rocky Flats Environmental Technology Site, undated
- U060, Chemical Constituents in Transuranic Storage Area (TSA) Waste, RWMC-803, dated 1998
- U082, Attachment 3, Acceptable Knowledge Source Document Summary for ID-RF-55126

[5] CCP claimed that this reference contained directly relevant information pertinent to the physical form of the waste.

- U085, Graphite Analytical Data and Summary of Samples from IDC 310 and IDC 312, dated January 22, 1998
- U086, Graphite Analytical Data and Summary of Samples from IDC 310 and IDC 312, dated January 22, 1998
- U089, Letter from K.J. Peters to S. Hailey, RE: Assessment of Graphite Waste Matrix and Solvent Usage, KRJ/004/0398, dated March 4, 1998
- U502, AMWTP Building 374 Sludge Waste Inventory Information, undated, AK review dated April 12, 2005
- U602, AMWTP Building 374 Sludge Waste Inventory Information, RTR, Headspace Gas, and Assay Batch Data, various authors/dates, signed April 12, 2005
- Waste Stream Profile Form (WSPF) ID-RF-S3121-374, Building 374 Sludge, draft, acquired during week of May 6, 2005 (includes payload management)
- Waste Stream and Residue Description and Characterization, Process Number 123-5-12, Americium Purification, dated April 17, 1992
- Waste Stream and Residue Description and Characterization, Process Number 881-21-3, Recovery Tech: Instruments and Equipment, Aqueous Wastes, dated April 17, 1992
- WSPF, ID-RF-S5126, TRU Mixed Graphite Debris, draft, acquired during week of May 6, 2005 (includes payload management)

The following drums and respective batch data reports (BDRs) were also examined:

Drum ID Number	RTR Batch ID	VE Batch ID	Assay Batch ID
10016080	ID05-NDE02-0006	WCV-IDRF001200851	INNDAWD-50004
10009600	ID05-NDE02-003	WCV-10009600	INNDA505004

The inspection team evaluated the adequacy of AK information specific to the CH TRU retrievably-stored debris and solid waste and made the following observations:

(1) The AK summaries for CH retrievably-stored graphite (S5000) and Building 374 sludge (S3000) TRU waste were sufficient. They were updated to include Load Management. The graphite and Building 374 sludge waste were defined clearly and AK was assembled based on data previously acquired for the same waste streams already reviewed and approved by EPA for shipment from other sites under the CCP program. In the future, EPA expects adherence to the definition of each waste stream with respect to DOE/WIPP-02-3122, "Contact-Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant," Revision 3, dated April 25, 2005 (CH-WAC), and the Waste Analysis Plan (WAP). Following the EPA approval of these two waste categories, if new waste streams were to be added to these two waste categories, INL-CCP must notify EPA of this as a T2 change and provide Waste Stream Profile Forms (WSPFs) and other supporting documentation for EPA examination.

The following AK summaries were examined during the inspection:

- CCP-AK-INL-002, Central Characterization Project Acceptable Knowledge Summary Report for the Idaho National Laboratory Rocky Flats Transuranic Graphite Debris Waste Stream ID-RF-S5125, Revisions 0 (March 18, 2005) and 1 (May 5, 2005)
- CCP-AK-INL-003, Central Characterization Project Acceptable Knowledge Summary Report for Rocky Flats Building 374 Sludge Stored at the Idaho National Laboratory, Waste Stream ID-RF-S3121-374, Revisions 0 (March 23, 2005) and 1 (May 5, 2005)

Both AK summaries were well written and relatively complete, although addressing supplemental information documentation and discrepancy documentation discussed under item 5, below, would make summaries more complete. Future versions of these two AK summaries would be improved by the following changes:

- Update Tables 5-1 presenting waste stream volume and generation dates to include the number of containers by item description code (IDC) and generation date ranges
- Include general estimates of WMPs by percentages (incorporating information obtained through RTR, etc.)
- Integrate additional information from the RFETS Waste Environmental Management System (WEMS), WSPFs, and other data sources that could augment the AK record (particularly important for wastes originating from the RFETS that have not yet been assessed by other sites)
- Add reference numbers to Section 6 supplemental waste stream information listings

The AK summaries provided were based on well-characterized and well-documented waste that had undergone previous characterization, not only by the RFETS generator site, but also as part of the INEEL 3100-m^3 project and ongoing Bechtel AMWTP efforts. As such, the waste streams were well defined, and the summaries detailed AK assembled based on data previously acquired for the same waste streams already reviewed and approved by EPA for shipment from other sites or programs. In the future, EPA expects the definition of each waste stream to be strictly adhered to with respect to the definition stated in both the CH-WAC and the WAP. EPA will also examine each new waste stream within an approved Summary Category Group as a Tier 2 analysis, and it will assess whether the complexity of new waste streams warrants examination of AK documentation and processes.

The graphite and Building 374 sludge AK summaries, Revision 0, were provided prior to the inspection, and both documents were amended (creating Revision 1) during the inspection. The primary difference between Revisions 1 and 0 is that Revision 1 includes passages that indicate that CCP intends to implement Load Management for both the graphite and Building 374 sludge waste streams. The passages were inserted to address Load Management and the AK requirements set forth in Appendix E of the CH-WAC, Revision 3. For future

inspections EPA expects that revised documents will be submitted to EPA at least 2 weeks prior to its inspection.

(2) Bechtel and CCP intended to characterize and ship the same waste streams. However, the AK summaries, WSPFs, and other related documentation prepared by each company/group are different for the same AMWTP waste stream.

CCP had prepared AK summaries, draft WSPFs, and other documents for the Building 374 sludge and graphite waste streams. The Building 374 sludge, however, had already been direct shipped under a separate WSPF and AK summary by BNFL (now Bechtel) from the AMWTP facility. Comparison of CCP and Bechtel documents for the same waste stream showed several discrepancies, including different interpretations of the same supporting or supplemental information. For example, the two AK summaries assign different numbers of WMCs, and provide different potential nuclides due to the possible presence of limited sealed sources. Both the EPA inspector and the CBFO QA auditor raised this as an issue during the inspection. CCP representatives agreed that having two active AK summaries with different information, shipping the same waste stream to the WIPP from the same site (i.e., INL) would be problematic. INL-CCP indicated during this inspection that the TRU waste containers characterized under their program would not be commingled with those characterized by AMWTP's contractor personnel and that these wastes will be identified as distinct in the WWIS database. The debris and solid waste from AMWTP characterized by CCP may not be commingled with the similar waste characterized by the AMWTP Contractor (currently Bechtel) for disposal at the WIPP.

CCP has no role in characterizing AMWTP sludge drums. Prior to inspection, Bechtel had given the CCP approximately twenty (20) sludge drums for characterization. Since the inspection, AMWTP (currently Bechtel) decided that INP CCP would not characterize AMWTP sludge waste.

(3) The inspection scope did not include retrievably-stored soil.

The inspection addressed CH retrievably-stored TRU debris and CH retrievably-stored TRU solid waste. No AK summaries or WSPFs for CH retrievably-stored soil were prepared or examined during the inspection.

(4) Communication between AK and NDA personnel was assessed and found to be well documented. However, inconsistencies were noted with respect to the formula used to calculate ^{234}U.

The AK-NDA memo detailed specifically how NDA personnel will use AK. This information was, in general, technically adequate. However, BNFL (now Bechtel) calculated the ^{234}U concentration for the same waste stream (Building 374 sludge) based on somewhat different assumptions and formulas than CCP. EPA found that, for wastes comprised of weapons-grade plutonium (WG Pu), the method used by CCP will always provide a ^{234}U value greater than that identified by the Bechtel formula, but the difference between two calculated values for the same container is very small (i.e., 27 versus 1 nCi/g for the worst-

case scenario, drum 1000007209, for which the test calculations were performed). That is, for WG Pu-bearing wastes, the differences between the two formulas are very small and likely insignificant. In addition, the Bechtel approach takes both ^{235}U and ^{238}U into account when both enriched uranium and depleted uranium are detected, which is intuitively more accurate than CCP approach which does not take into account the ^{238}U contribution. Further, both the Bechtel and CCP formulas apply to WG Pu but not to heat-source plutonium, which would have to be adjusted for the contribution of ^{234}U based on the decay of ^{238}Pu. EPA expects that it will be necessary for CCP to generate additional algorithms to calculate ^{234}U for heat-source plutonium, based on the ^{234}U ingrowth from the decay of ^{238}Pu.

(5) AK data assembly, compilation, and discrepancy resolution were adequate, including identification of mandatory and supplemental information.

CCP assembled and compiled AK supplemental and supporting information using Attachments 1 and 4 of procedure CCP-TP-005, Revision 15, to identify all source documents and to cross-correlate these with mandatory programmatic and waste stream-specific AK requirements. Data assembly and compilation were generally adequate, although, in some instances, CCP did not assemble information pertinent to a waste stream if that information was an AMWTP document. For example, BNFL-5232-RPT-TRUW-07, "Determination of Radioisotopic Content in TRU Waste Based on Acceptable Knowledge," Revision 5, documents radionuclide assignment by the AMWTP personnel, but CCP used the source documents for this report rather than the report itself. It is recommended that CCP assemble documents like BNFL-5232 as well as their source documents to understand the origin and source of different interpretations; this information should be addressed as a source document discrepancy in the AK summaries, as applicable.

In addition, CCP revised CCP-TP-005 to state that documentation of AK-AK discrepancies may occur either in the text of the AK summary or may be documented on Attachment 11, the AK source document discrepancy resolution form. EPA believes that the manner in which AK-AK discrepancies are documented can be flexible, so long as the AK summaries *clearly* identify these discrepancies, including how the discrepancies were resolved. Specifically, CCP must clearly identify the discrepancy in the text with an explanation of the resolution activities conducted and reference additional AK source documents, including interviews that were used to resolve the discrepancy. If CCP chooses to document discrepancies in the AK summary report, this report should also address all applicable requirements of Section 4.8 of CCP-TP-005. EPA has noted that Attachment 11 is particularly useful to document major discrepancies, such as WMC assignments, physical waste form issues, prohibited item identification, and radionuclide content discrepancies.

(6) Data/drum tracking was examined and found adequate, although there were initial difficulties during the inspection in deriving the population of containers for which full WC had been performed. Drum characterization status must be accurately tracked and readily available.

A list of containers that had undergone the entire characterization process was requested at the beginning of the inspection to facilitate traceability analysis from the drum to supporting AK documents. However, site personnel had difficulty producing this listing during the first day of the inspection, although the list was eventually provided. The source of this delay

could not be ascertained during the inspection, but the site (when preparing for inspection) must ensure that the status of each drum with respect to all characterization elements is readily known and retrievable to ensure that all characterization requirements are met. This is also necessary prior to the shipment of waste drums. Since both CCP and Bechtel characterize waste for shipment, adequate tracking of containers within respective characterization programs and in accordance with a planned hierarchy will be important to ensure that only those wastes that are specifically authorized by each program are shipped.

(7) AK accuracy was examined.

AK accuracy calculations had been performed for the example graphite (S5000 debris) and Building 374 sludge (S3000 solid) waste streams. The calculations were limited and prepared for demonstration purposes. Based on previous experience with CCP, this information (presented in Attachment 14 of procedure CCP-TP-005) provides an abbreviated discussion of AK accuracy with respect to that often prepared and presented by other sites. However, it does address whether each drum had to be reassessed for WMC or EPA hazardous waste code reassignment, or whether radiological data were "consistent" with AK. The miscertification rate calculations have not been performed for the INL-CCP site (an example CCP Savannah River Site [SRS] calculation was provided), and the WMP comparison report also had not been prepared (an example CCP SRS comparison report was provided). EPA has requested that INL-CCP provide these documents once they are completed. If CCP elects to document AK-AK data discrepancies in the text of the AK summary, the discrepancies should be clearly identified in the text with an explanation of the resolution activities conducted and a reference to additional AK source documents, including interviews that were used to resolve the discrepancy. If CCP chooses to document discrepancies in the AK summary report, this report should also address all applicable requirements of Section 4.8 of CCP-TP-005. EPA has noted that the Attachment 11 is particularly useful to document major discrepancies, such as WMC assignments, physical waste form issues, prohibited item identification, and radionuclide content discrepancies.

(8) AK data limitations were examined.

Data limitations were addressed on AK source document summaries (Attachment 3 of CCP-TP-005), and the examples examined were adequate.

(9) Several of the attachments and processes typically examined at a site were not complete for INL-CCP activities, but comparable documentation was provided for other CCP sites.

Similarly, the miscertification rate calculations had not been performed for the INL-CCP site (an example CCP SRS calculation was provided), and the WMP comparison report also had not been prepared (an example CCP SRS comparison report was provided). EPA has requested that these INL-specific documents be provided once they are completed.

(10) The AK record needs to include characterization information from DOE/CBFO concerning RFETS waste, now that RFETS has closed and the WEMS database and AK roadmap have been provided to DOE.

The AK record for sites managing stored RFETS waste should include, as applicable, RFETS-derived analytical or measurement information and pertinent supplemental AK information. CCP had focused on data from the 3,100 m^3 Project as the primary supporting AK information for the graphite and Building 374 sludge waste streams, but a substantial body of information should now be available through CBFO as part of the RFETS WEMS and reference library data transfers. Future waste streams characterized by CCP should include information from these sources, as applicable.

(11) As part of AK documentation, INL-CCP provided revisions to AK summaries for Load Management.

A discussion of Load Management is provided in Section 7.6, Item 5 of this report.

Findings

The EPA inspection team did not identify any findings in the areas of AK or Load Management during the inspection.

Concerns

The EPA inspection team did not identify any concerns in the areas of AK or Load Management during the inspection.

Baseline Approval

The AK and Load Management systems evaluated during this baseline inspection are approved for AMWTP-supplied debris and solids.

AK Tiers

Based on the inspection and the results discussed above, EPA assigns the following tiers:

Tier 1 AK Changes that will require EPA review and approval prior to implementation and apply to any new waste category not evaluated during the baseline inspection are:

- Newly-generated waste (e.g., INL Pit 4 waste); or
- Categories of retrievably-stored waste not approved in this baseline report (e.g., soil/gravel stored at AMWTP)

Tier 1 changes will be reported and documentation will be submitted when INL-CCP is ready for EPA review. Upon initial review, EPA will inform INL-CCP and CBFO whether a site inspection is necessary. EPA may request additional information, choose to conduct desktop review, and/or confer with INL-CCP AK personnel. Upon AK evaluation with or without site inspection, EPA will issue a decision. Only upon receiving EPA written approval, INL-CCP may dispose the new waste category at WIPP.

Tier 2 AK Changes that do not require EPA approval prior to implementation but require reporting and submitting documentation discussing changes by INL-CCP are:

- Changes made to AK procedure(s) that required CBFO approval;
- WSPFs, including updates or additions to WSPFs for waste stream(s) within an approved waste category; and
- Changes in load management status of approved waste stream(s).

Every three months form the date of EPA approval, INL-CCP will provide information concerning T2 changes. EPA will evaluate changes and communicate with INL-CCP whether changes raise any concerns and INL-CCP response is necessary or whether INL-CCP can continue to implement changes.

Note that EPA did not complete its evaluation of AK and Load Management processes for CH newly-generated debris, solid, and soil/gravel wastes from ICP Pit 4 during this baseline inspection. Prior to the inspection, we had informed CBFO that EPA may not be able to evaluate all waste stream categories included in the scope within the allotted inspection schedule as the scope of the inspection was excessively large. During the inspection, INL CCP did provide EPA inspectors with AK information for ICP Pit 4 wastes. CCP explicitly told EPA inspectors that the focus of document review should be on retrievably-stored waste that CCP intended to augment the AMWTP capacity to characterize. Under the tiering process, review of AK documentation for ICL Pit 4 is subject to the T1 change review process. EPA is currently reviewing the ICP Pit 4 AK documentation. Upon completion of this review, EPA will notify DOE of its decision regarding the disposal of ICP Pit 4 waste at WIPP.

7.3 Nondestructive Assay

EPA inspected four NDA systems to be used by INL-CCP to characterize waste from the Idaho Cleanup Project (ICP) (referred to as INL Pit 4 waste in the report). As part of the inspection, EPA reviewed the following elements of the NDA process:

- Capability of the measurement hardware and software to perform the required analyses for the wastes of interest
- Technical adequacy of the NDA documents, procedures, and controls
- Knowledge and understanding of the personnel involved in the NDA program

The checklists in Attachments A.4 through A.7 identify the specific pieces of objective evidence that were examined and used to complete the technical assessment for each of the systems. The list of documents provided below, in conjunction with those listed in the NDA checklists, includes all documents related to NDA that were evaluated to support the assessment of NDA at INL ICP/CCP:

- CCP-PO-002, CCP Waste Certification Plan, Revision 12, effective date March 10, 2005

- CCP-AK-INL-001, Central Characterization Project Acceptable Knowledge Summary Report for a Described Area in Pit 4 at the Idaho National Laboratory Transuranic Waste Streams: ID-DSA-PIT4-DEBRIS; ID-DSA-PIT4-SLUDGE; ID-DSA-PIT4-SOIL, Revision 1, dated April 15, 2005
- CCP-AK-INL-002, Central Characterization Project Acceptable Knowledge Summary Report for the Idaho National Laboratory Rocky Flats Transuranic Graphite Debris Waste Streams: ID-RF-S5126, Revisions 0, dated March 18, 2005, and 1, dated May 5, 2005
- CCP-AK-INL-003, Central Characterization Project Acceptable Knowledge Summary Report for Rocky Flats Building 374 Sludge Stored at the Idaho National Laboratory Waste Streams: ID-RF-S3121-374, Revisions 0, dated March 23, 2005, and 1, dated May 5, 2005
- CCP-TP-010, CCP Waste Assay Gamma Spectrometer (WAGS) and SWEPP Gamma-Ray Spectrometer (SGRS) Calibration Procedure, Revision 1, dated April 15, 2005
- CCP-TP-019, CCP Waste Assay Gamma Spectrometer (WAGS) Operating Procedure, Revision 1, dated April 16, 2005
- CCP-TP-107, Operating the CCP High Efficiency Neutron Counter Using NDA 2000, Revision 6, dated April 12, 2005
- CCP-TP-108, Calibrating the CCP High Efficiency Neutron Counter Using NDA 2000, Revision 4, dated April 15, 2005
- CCP-TP-109, Data Reviewing, Validating, and Reporting Procedure for the CCP High Efficiency Neutron Counter Using NDA 2000, Revision 3, dated April 12, 2005
- CCP-TP-110, Setup and Calibration of the CCP Tomographic Gamma Scanner, Revision 1, dated April 12, 2005
- CCP-TP-112, CCP Data Reviewing, Validating and Reporting for the TGS, Revision 0, dated April 2, 2004
- CCP-TP-115, CCP SWEPP Gamma-Ray Spectrometer (SGRS) Operating Procedure, Revision 1, dated April 15, 2004
- CCP-TP-019, CCP Waste Assay Gamma Spectrometer (WAGS) Operating Procedure, Revision 1, dated April 16, 2005
- CCP-INL-SGRS-001, SWEPP Gamma-Ray Spectrometer (SGRS) Calibration, Confirmation and Verification Report, Revision 0, dated April 27, 2005
- CCP-INL-SGRS-002, Total Measurement Uncertainty for the SGRS Assay System, no revision number indicated, dated April 21, 2005
- CCP-INL-HENC-001, CCP HENC Supplemental Calibration, Confirmation and Verification Report, Revision 0, dated April 28, 2005
- CCP-INL-HENC-002, Total Measurement Uncertainty for the CCP High Efficiency Neutron Counter (HENC), Revision 0, dated April 21, 2005

- CCP-INL-WAGS-001, Waste Assay Gamma Spectrometer (WAGS) Calibration, Confirmation and Verification Report, Revision 0, dated April 27, 2005
- CCP-INL-WAGS-002, Total Measurement Uncertainty for the WAGS System, no revision number indicated, dated April 20, 2005
- CCP-INL-TGS-001, Tomographic Gamma Scanner (TGS) Calibration and Confirmation Report, Revision 0, dated May 3, 2005
- HENC BDRs: INNDAH050001, INNDAH050002, INNDAH050003, INNDAH050004
- SGRS BDRs: INNDAS050003, INNDAS050004, INNDAS050005, INNDAS050006, INNDAS050007, INNDAS050009, INNDAS050010
- WAGS BDRs: INNDAW050001, INNDAW050002, INNDAW050004, INNDAW050005, INNDAW050006, INNDAW050007
- TGS BDRs: INNDAT050001, INNDAT050002, INNDAT050003, INNDAT050004

During the inspection, EPA assessed several technical elements of CCP's NDA processes for the four NDA systems in use at INL. Each of these is reflected in the checklists in Attachments A.4 though A.7 and is discussed in a separate section below.

7.3.1 High-Efficiency Neutron Counter

(1) The design of the CCP HENC was assessed.

The CCP HENC is housed in a trailer that is located in Building WMF-628 of the RWMC at INL. The system is a combination that incorporates both a passive neutron counter and an integral gamma-ray spectrometer running NDA 2000, Version 4.0. The passive neutron counter uses ^{3}He proportional counters, along with a multiplicity shift register and an Add-a-Source matrix correction to estimate the amount of spontaneously fissioning material inside the drum. This quantity, referred to as the ^{240}Pu-effective, is the amount of ^{240}Pu that would produce the observed true coincidence rate, after correcting for the neutron moderation properties of the waste matrix. The quantity of individual radionuclides can be related to the ^{240}Pu-effective if the relative ratios of the quantities of the radionuclides, including all spontaneously fissioning radionuclides, are measured or otherwise known. In the CCP HENC, the isotopic ratios are normally determined by Multi-Group Analysis (MGA) of the gamma-ray spectrum, measured by the integral gamma-ray spectrometer, described in the following paragraph. When plutonium isotopes are not detected, the software attempts to compute isotopic distributions for uranium isotopes using the Multi-Group Analysis Uranium (MGA-U) program. If measurement-based isotopics are not available, default AK values are used.

The integral gamma-ray spectrometer is a high-purity germanium (HPGe) detector used for two purposes: to acquire the gamma-ray spectrum to be analyzed by MGA; and, to provide direct quantification of a number of radionuclides, including ^{238}Pu, ^{239}Pu, ^{241}Pu, ^{241}Am, ^{233}U, ^{235}U, ^{238}U, ^{137}Cs, and ^{237}Np. For quantitative analyses, the spectrometer uses a multicurve efficiency calibration based on matrix density to correct for the attenuation of gamma rays

inside the drum. Isotopic analyses require a correlation for energy versus channel and resolution (see below).

(2) System calibration of the CCP HENC had been performed as required.

The initial gamma and neutron calibrations of the CCP HENC were performed at the Canberra Industries in Meriden, CT, and were verified in 2004 when the system was located at Lawrence Livermore National Laboratory (LLNL) in Livermore, CA. These are documented in CCP-LLNL-NDA-001, "CCP HENC Calibration and Validation Plan and Report," Revision 2, dated May 4, 2004. The calibration was applicable to S5400 heterogeneous debris waste packaged in 55-gallon drums. The neutron calibration verification was performed in March 2004 using combinations of WG Pu sources totaling 0.10, 1.0, 10, 35, 65, 90, 132, 167, and 200 g in a noninterfering matrix. The confirmation of the passive neutron calibration was performed by assaying surrogate drums containing 0.9, 24, and 132 g WG Pu in noninterfering and combustibles matrices. The operating range of the passive neutron system was stated as from the lower limit of detection (LLD) to 12 g ^{240}Pu-effective, the equivalent of approximately 200 g WG Pu or 195 g of ^{239}Pu. The calibration was verified upon the system's relocation to INL, as required by DOE/WIPP-02-3122, and is documented in CCP-INL-HENC-001, "CCP HENC Supplemental Calibration, Confirmation and Verification Report," Revision 0, dated April 28, 2005. The operational parameters at INL are essentially identical to LLNL and the HENC was approved for use at INL on April 3, 2005. A single integral gamma-ray detector is used for both quantitative and isotopic (relative) determination. It was initially calibrated in February 2004 using six ^{241}Am/^{152}Eu line sources in four surrogate waste drums, with waste matrix densities of 0.0187 g/cm^3, 0.440 g/cm^3, 0.660 g/cm^3, and 1.589 g/cm^3. For quantitative analyses, the efficiency of the detector was measured as a function of gamma-ray energy between 59 and 1,408 kiloelectron-volts (keV). For isotopic determinations, the same energy range applies although the required calibrations are energy versus channel and peak shape only. The gamma calibrations were confirmed using the same WG Pu sources used to confirm the passive neutron calibration. Because the gamma detector was replaced at INL a new efficiency calibration was performed using mixed gamma ^{152}Eu and ^{241}Am standards and confirmed using WG Pu standards in PDP-style drums. The INL calibration was performed with a cadmium filter in place to facilitate measurements of samples containing high concentrations of ^{241}Am and was approved on April 30, 2005. The gamma calibration is not a mass calibration in the strict sense, although CCP-INL-HENC-001 presents an operating range of the system LLD to 165 g of ^{239}Pu, as discussed below. Like other gamma systems, there is no upper mass limit, provided all operational parameters, such as deadtime and resolution (peak shape), are met. All calibration verification tests were within measurement criteria.

(3) The calibrated range and operational range of the HENC had been established and documented.

With respect to activity, the HENC has a calibrated range of zero to 12 g ^{240}Pu-effective, (approximately 200 g WG Pu or 195 g of ^{239}Pu) for neutrons, as stated above. CCP-INL-HENC-001 presents the HENC's operating range as the system LLD to 12 g ^{240}Pu-effective,

essentially the same as the calibrated range. For photons (gammas) the calibrated range is technically 59 keV to 1408 keV for both quantitative and isotopic analyses. Theoretically, the system calibration has no upper limit in terms of mass, i.e., any assay value based on measured photon emission within the efficiency calibration range of 59 to 1,408 keV where all operational parameters such as system deadtime and resolution (peak shape) are acceptable could be considered technically valid.[6] The summary table on page 3 of CCP-INL-HENC-001 presents a system operating range for gamma of LLD to 165 g ^{239}Pu.

With respect to matrix, the calibrated range for neutrons and photons covers materials with a density from 0.02 to 1.62 g/cc. This was derived using drums of four different matrices: plastic foam (0.02 g/cc); soft board (0.44 g/cc); particle board (0.66 g/cc); and, sand (01.62 g/cc). This calibrated density range corresponds to three matrix types: debris (S5000); homogeneous solids (S3000 sludges); and, soil/gravel (S4000) and is synonymous with the system's operational range.

(4) The total measurement uncertainty (TMU) of assays performed on the CCP HENC had been determined and documented.

The determination of the TMU of assays performed on the CCP HENC was documented in CI-INL-HENC-002, "Total Measurement Uncertainty for the CCP High Efficiency Neutron Counter (HENC)," Revision 0, dated April 21, 2005. Among the components of uncertainty included in the TMU determination for the passive neutron measurement were contributions from the calibration uncertainty, neutron counting statistics, matrix and source distribution effects, background effects for high Z waste matrices, and uncertainties due to isotopics, chemical forms, and neutron multiplication.

For the integral gamma-ray spectrometer, components of uncertainty included in the TMU determination included calibration source uncertainties, counting statistics, self-absorption effects, matrix nonhomogeneities, nonuniform source distributions, and isotopic measurement uncertainties. For absolute gamma spectrometry measurements on the CCP HENC, the energy-dependent efficiency curve for a waste drum was estimated by interpolation, using the energy-dependent efficiency curves of surrogate calibration drums with the next lower and higher densities. The density is calculated by dividing the net weight (or mass) of the drum by the volume of waste, based on the fill percentage typically estimated by radiography. The density determination had been problematic for the CCP HENC previously when it was deployed at LLNL, but this aspect was adequately addressed by CCP and was not an issue during this inspection.

(5) The LLD, including the minimum detectable concentration (MDC) of the CCP HENC, had been determined and documented.

[6] This applies also to the WAGS and SGRS gamma systems that are discussed in subsequent sections of this report. Calibration reports for gamma-based NDA systems typically report operating ranges in terms of mass in spite of the fact that they are not mass-calibrated. The expression of a gamma system's operational range in mass units based on an energy-derived efficiency calibration is simply a convention.

The LLD was defined in CCP-PO-002, "CCP Transuranic Waste Certification Plan," Revision 12, dated March 10, 2005, as "that level of radioactivity which, if present, yields a measured value greater than the critical level with a 95% probability, where the critical level is defined as that value which measurements of the background will exceed with 5% probability." The LLD of any given NDA measurement is likely to depend on the type of measurement (i.e., passive neutron vs. gamma spectrometry), the properties of the waste matrix being assayed, and the environmental background. For this reason, the LLD will vary from drum to drum and may even vary between measurements of the same drum. The NDA 2000 software estimates and reports the LLD of each of the 10 WIPP-tracked radionuclides for each measurement. Only measured values that exceed the reported LLD for that measurement will be reported and used in calculations of derived quantities, such as total TRU alpha activity and TRU alpha activity concentration.

The LLD determinations for the HENC are documented in CCP-INL-HENC-001. An LLD for each of the WIPP-tracked radionuclides was estimated using surrogate drums containing 50 kg of combustibles, 70.7 kg of metals, 72.5 kg of glass, and 178 kg of inorganic sludge for both the neutron and gamma modalities. CCP personnel stated that the HENC will be used to distinguish TRU and non-TRU wastes at the 100-nCi/g criterion, and CCP-INL-HENC-001 documents that this is achievable in neutron and gamma modalities. Reporting thresholds for ^{90}Sr and other radionuclides are determined and documented appropriately. However, a reporting threshold for ^{234}U is not determined, based on CCP's statement that it "is not technically feasible to determine a unique reporting threshold for ^{234}U," a technical position that is permitted by DOE/WIPP-02-3122 and was observed previously on a similar system at the Nevada Test Site.

(6) EPA replicate testing of waste containers on the CCP HENC was requested.

The purpose of the replicate testing performed as part of this inspection is to provide EPA with an independent means to verify that the CCP HENC can provide consistent, 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. This is normally accomplished by requesting that the site reassay drums that were previously characterized on the same system or instrument in order to demonstrate the following:

- The instrument produces 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.
- The instrument provides 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 part of the inspection to certify the CCP HENC, EPA requested that ICP/CCP reassay three drums that EPA randomly selected from a list of drums previously assayed on the HENC. Due to the HENC's operational status during and directly after the inspection, the containers selected by EPA were not assayed on the HENC and INL was not able to provide

replicate data for EPA review. The lack of replicate data prevented the EPA inspection team from completing its evaluation of the HENC, although, as stated above, all other aspects were found to be acceptable.

In September 2005, EPA received replicate data for the EPA-selected containers analyzed on HENC. Under the tiering process, review of the replicate data is subject to the T1 change review process. EPA is currently evaluating the replicate data. Upon completion of the review, EPA will make a determination about this equipment and will issue a separate approval letter.

7.3.2 Tomographic Gamma Scanner

(1) The design of the TGS was assessed.

The TGS is located in a trailer inside of Building WMF-628 of the RWMC at INL. This is an automated NDA system designed to quantify the amount of ^{239}Pu in a 55-gallon waste drum. The TGS used a single HPGe detector to detect gamma rays emitted by ^{239}Pu. A tungsten shield and collimator limits the detector view and provides shielding. In addition to measuring the emission rate of ^{239}Pu, the HPGe detector also measured the attenuation of gamma rays emitted by a ^{75}Se transmission source, located on the opposite side of the drum from the detector. An EG&G DSPEC™ signal processor analyzed detector signals, while ANTECH's MasterScan software package controlled the assay. The TGS used a ^{109}Cd source to correct for system deadtime (i.e., a rate-loss source). During the assay, the drum is rotated and translated vertically and horizontally. By viewing the drum from many positions, the ^{239}Pu emission and matrix attenuation properties are calculated for each volume element (voxel) of the drum. A voxel is approximately the size of a cube that is 2 inches × 2 inches × 2 inches (5 cm × 5 cm × 5 cm). By summing the quantity of ^{239}Pu in each voxel, the total quantity of ^{239}Pu in the drum is calculated.

The ratios of quantities of gamma-ray-emitting radionuclides to ^{239}Pu are measured using the Fixed-Energy Response Function Analysis with Multiple Efficiencies (FRAM) software installed on the same photon detector described above. By combining isotopic FRAM data and the total quantity of ^{239}Pu, the quantities of individual radionuclides are estimated, which allows for the calculation of other derived quantities, such as the total TRU alpha activity and TRU alpha activity concentration.

(2) System calibration of the TGS had been performed as required.

The calibration of the TGS was documented in CCP-INL-TGS-001, "Tomographic Gamma Scanner Calibration and Confirmation Report," Revision 0, dated May 3, 2005. The TGS was calibrated at INL prior to beginning routine operations. The calibration is applicable for S3000 sludge, S4000 soil/gravel, and S5000 debris wastes, as demonstrated in the matrix-specific qualifications performed and documented in CCP-INL-TGS-001. The calibration is a mass calibration in the strict sense and is pertinent to wastes packaged in 55-gallon (208 liters) drums with mass loadings between 0.10 g and 210 g of total plutonium, which corresponds to approximately 0.09 g to 195 g of ^{239}Pu. The calibration was confirmed by assaying combinations of WG PuO_2 sources in diatomaceous earth in a series of combinations that produced a range of ^{239}Pu values from 0.095 g to 195.216 g in a combustible matrix. All calibration confirmation and verification tests were within measurement criteria as required by DOE-WIPP-02-3122, Appendix A, i.e., accuracy (% Recovery) < 30% and precision (% Relative Standard Deviation) <14% for six replicates.

(3) The calibrated range and operational range of the TGS had been established and documented.

With respect to activity, CCP-INL-TGS-001 states that the TGS has a calibrated range of 0.10 g to 210 g of total plutonium, which corresponds to approximately 0.09 g to 195 g of ^{239}Pu[7]. In the case of the TGS, while there is no formal distinction made between the calibrated range and the operational range, the operational range would be a subset of the calibrated range. Functionally speaking, the system's operating range is from the established Lower Limit of Detection (LLD), discussed below, to the administrative upper limit of 200 g per waste drum. As stated in CCP-INL-TGS-001, "This dynamic range covers the expected range for CH-TRU wastes intended for shipment to the WIPP".

With respect to matrix, the calibrated range covers materials with an Atomic Number less than 15 ($Z < 15$) and a density less than or equal to 1.6 g/cc. The original calibration was performed with a debris (S5000) matrix. Sludges (S3000) and soil/gravel (S4000) are addressed through the use of Matrix Specific Qualifications (MSQs) that provide a matrix-specific bias correction that is applied to the original calibration function, as documented in CCP-INL-TGS-001. For the TGS the calibrated range and operational range are synonymous.

(4) The TMU for assays performed on the TGS had been determined and documented.

The determination of the TMU for the TGS was documented in CCP-INL-TGS-001, "Tomographic Gamma Scanner Calibration and Confirmation Report," Revision 0, dated May 3, 2005. The TMU determination included contributions from self-shielding (lumps of plutonium), source position/distribution, matrix properties, and system calibration. These components, when combined, were referred to as the system uncertainty. The uncorrected total uncertainty computations present a total 1-Sigma error of 17.8%, which incorporates all sources of uncertainty.

[7] In this context, units of mass and activity (grams and curies, respectively) are interchangeable and the use of mass units while discussing disintegration rate (activity) or vice versa is simply a matter of convenience.

(5) The LLD, including the MDC of the TGS, had been determined and documented.

The LLD is defined in CCP-PO-002 as "that level of radioactivity which, if present, yields a measured value greater than the critical level with a 95% probability, where the critical level is defined as that value which measurements of the background will exceed with 5% probability." The LLD of any given NDA measurement was likely to depend on both the properties of the waste matrix being assayed and the environmental background. For this reason, the LLD would vary from drum to drum and may even vary between measurements of the same drum. The determination of the LLD of the TGS had been documented in CCP-INL-TGS-001, "Tomographic Gamma Scanner Calibration and Confirmation Report," Revision 0, dated May 3, 2005, which presents a value of 0.092 g of ^{239}Pu for the combustibles matrix. Since ^{239}Pu is the only radionuclide actually measured, ratios of other radionuclides to the 413.7-keV line established previously at LANL are applied to relate the detectability of each to ^{239}Pu. This approach provides calculated LLD values for the 10 WIPP-tracked radionuclides, with the exception of ^{242}Pu, ^{234}U, and ^{137}Cs, for which the LLDs are derived by correlation to other measured quantities. The TGS will not be used to sort wastes at the 100-nCi/g criterion.

(6) Replicate testing of the TGS was performed and evaluated.

The purpose of the replicate testing performed as part of this inspection was to provide EPA with an independent means to verify that the TGS can provide consistent, 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. This is accomplished by reassaying drums that were previously characterized on the same system or instrument in order to demonstrate the following:

- The instrument produces 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.
- The instrument provides 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 part of the inspection to certify the TGS, EPA requested that ICP/CCP reassay three drums that EPA randomly selected from a list of drums previously assayed on the TGS. Drums Nos. IDRF001210739, ARP00227 and ARP00230 were reassayed five times and these values were compared to the original assays 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.1 through B.6.

The χ^2 tests for Containers ARP00227 and ARP00230 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. The *t* tests for both containers showed no statistically significant

differences between the original measurement assay values and the average of the five replicate measurements

The *t* test Container IDRF001210739 showed no statistically significant differences between the original measurement assay values and the average of the five replicate measurements The χ^2 for this container showed statistically significant differences between the original measurement assay values and the average of the five replicate measurements for the activities of ^{241}Pu, ^{241}Am and ^{242}Pu. Due to the progenitor-progeny relationship between ^{241}Am and ^{241}Pu, it is not unusual that both radionuclides show this trend. This also might have some bearing on the ^{242}Pu value it is not measured directly but is calculated based on the relationship among ^{238}Pu, ^{239}Pu, ^{240}Pu and ^{241}Pu. The χ^2 test results suggest the TMU for the TGS may be underestimated and correspondingly underreported.

7.3.3 Waste Assay Gamma Spectrometer

(1) The design of the WAGS was assessed.

The WAGS is located in Building WMF-610, formerly called the SWEPP, at the RWMC at INL, in the same location as when it was used for the 3100-m^3 Project at INEEL. The WAGS is a standard Canberra IQ3 gamma system, which is in use throughout the DOE complex. The WAGS performs isotopic and quantitative assays and consists of six high-resolution broad-energy germanium (BEGe) gamma detectors, a drum turntable, shielded enclosure, and supporting electronics. The six gamma detectors are arranged in two groups of three; the detectors in each group of three are aligned vertically (i.e., aligned to one central vertical axis). The north bank of three detectors (north top, north middle, and north bottom) acquires spectra for quantitative analyses, and these detectors are not fitted with cadmium filters. They are positioned 180 degrees from a set of three ^{133}Ba sources that are used for matrix density corrections. Spectra are acquired simultaneously and represent the upper, middle, and lower segments of the drum volume. Data may be individually transmission corrected to compensate for waste matrix density, or they may be summed and analyzed against an efficiency multicurve in cases when the matrix density prohibits sufficient transmission of the ^{133}Ba photons. The west bank of three detectors is vertically aligned in the same manner but is positioned 90 degrees to the north bank. These detectors have been fitted with cadmium filters to attenuate the low-energy (<~ 80 keV) photons associated with higher ^{241}Am concentrations for the purpose of decreasing system deadtime and improving isotopic determinations. The system runs NDA 2000 as well as MGA. When plutonium isotopes are not detected, the software attempts to compute isotopic distributions for uranium isotopes using the MGA-U program. The isotopic determination is performed simultaneously with the quantitative assay, and, if measurement-based isotopics are not available, default AK values are used. The WAGS derives a value for ^{242}Pu by correlation, and ^{90}Sr is determined by application of a scaling factor based on ^{137}Cs. ^{234}U is quantified based on measured values for ^{235}U and ^{238}U.

(2) System calibration of the WAGS had been performed and confirmed, and documented, as required.

The efficiency calibration of the WAGS is documented in CCP-INL-WAGS-001, "WAGS Calibration, Confirmation and Verification Report," Revision 0, dated April 27, 2005. This was a new calibration that was performed at INL using one set of six $^{241}Am/^{152}Eu$ line sources and produced the system's calibrated range of 59 to 1,408 keV. This is not a mass calibration in the strict sense, although CCP-INL-WAGS-001 presents an operating range of 0.010 to 200 g of total plutonium. Theoretically, the system has no upper mass limit, provided all operational parameters, such as deadtime and resolution (peak shape), are met. The calibration was confirmed used WG Pu sources of 41.738 g, 106.732 g, and 167.971 g in a PDP-style combustibles matrix drum. The sources used for initial calibration and calibration confirmation were different, as required by DOE/WIPP-02-3122. The system's range of operation in terms of density is from 0.02 to 1.62 g/cm^3 for materials with Z<15, which covers a wide range of materials or matrices, including S3000, S4000, and S5000 wastes. All calibration confirmation and verification tests were within measurement criteria.

(3) The calibrated range and operational range of the WAGS had been established and documented.

With respect to activity, CCP-INL-WAGS-001 states that the WAGS has a calibrated range for efficiency of 59 to 1,408 keV. Because this is not a mass calibration in the strict sense it mat seem inappropriate to state the calibrated range in terms of mass. However, as discussed previously under the HENC, reporting the operational range in mass units for a gamma system that is not strictly mass-calibrated is a convention. The operational range is functionally defined as the Lower Limit of Detection (LLD), discussed below, at the lower end, and the administrative limit of 200 g per waste container at the upper end. Theoretically, the system calibration has no upper limit in terms of mass. Any assay value based on measured photon emission within the efficiency calibration range (59 to 1,408 keV) where all operational parameters such as system deadtime and resolution (peak shape) are acceptable could be considered technically valid, as discussed previously for the HENC. The summary table on page 3 of CCP-INL-WAGS-001 presents an operating range of 0.010 to 200 g of total plutonium.

With respect to matrix, the system's calibrated range is expressed in terms of density, specifically for materials with Z<15 and a density from 0.02 to 1.62 g/cm^3. This covers a wide range of materials or matrices and includes S3000, S4000, and S5000 wastes. For the WAGS the calibrated range and operational ranges are synonymous.

(4) The TMU for assays performed on the WAGS had been determined and documented.

The TMU for the WAGS is documented in CCP-INL-WAGS-002, "Total Measurement Uncertainty for the WAGS System," dated April 20, 2005. This document does not have a revision number. The components of uncertainty included in the TMU determination consist of calibration source uncertainties, counting statistics, self-absorption effects, matrix nonhomogeneities, nonuniform source distributions, and isotopic measurement uncertainties.

The software for performing the TMU calculations is embedded in the NDA 2000 software. CCP-INL-WAGS-002 calls for administrative procedures that would define a minimum fill-height requirement to reduce the potential for increased uncertainties due to end effects. Addressing this is left to the expert reviewer, who "should assess those assays for the potential end effects uncertainties and add the appropriate uncertainty amounts to the TMU where applicable." Evidence of this was not observed in the WAGS BDRs evaluated during this inspection.

(5) The LLD of the WAGS had been determined and documented.

The LLD for the WAGS was determined and is documented in CCP-INL-WAGS-001. CCP personnel stated that this instrument will be used to make TRU/non-TRU distinctions at the 100-nCi/g level, and the documentation indicates that the WAGS can meet that criterion for all matrices evaluated. Reporting thresholds for ^{90}Sr and other radionuclides are determined and documented appropriately. However, a reporting threshold for ^{234}U is not determined, based on CCP's statement that it "is not technically feasible to determine a unique reporting threshold for ^{234}U," a technical position that is permitted by DOE/WIPP-02-3122 and was observed previously on a similar system at the Nevada Test Site.

(6) Replicate testing of the WAGS was performed and evaluated.

The purpose of the replicate testing performed as part of this inspection was to provide EPA with an independent means to verify that the WAGS can provide consistent, 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. This is accomplished by reassaying drums that were previously characterized on the same system or instrument in order to demonstrate the following:

- The instrument produces 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.
- The instrument provides 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 part of the inspection to certify the WAGS, EPA requested that ICP/CCP reassay two drums that EPA randomly selected from a list of drums previously assayed on the WAGS. Drum Nos.ARP00043 and IDRF001200851 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.11 through B.14.

Container IDRF001200851's χ^2 test showed that, within the statistical limits of the test, the observed variances in the replicate measurements are less than or equal to the reported uncertainties. The *t* test showed statistically significant differences between the original measurement assay values and the average of the five replicate measurements for the

activities of all plutonium isotopes, ^{241}Am, ^{237}Np, and the TRU alpha activity concentration. Drum No. IDRF001200851 contains S5126 Graphite Debris and had been repackaged following Visual Examination at the Argonne National Laboratory-West Hot Cell at INL. Upon completion of VE the drum had a net increase of 4.0 kg in mass (75 to 79 kg) and a 30% increase in fill height (50 to 80%) due to the inclusion of the materials generated during the VE process. These changes in the drum's contents and density created a different drum from the standpoint of NDA, i.e., the software used a different multi-curve density value for the new assays because the container's density did in fact change. This would help account for the different values for plutonium, ^{241}Am and ^{237}Np. The TRU values are different because they are a function of these radionuclide-specific values. The magnitude of the change is relatively small for the largest of value (0.165 Ci versus 0.1281 Ci for ^{239}Pu); the change of 854 nCi/g in the TRU Alpha Activity (3,170 to 2,316 nCi/g) is a direct result of this. The differences pre and post VE suggest that this container was not amenable to replicate testing since it did in fact change between the original and reassays. EPA may request the replicate analysis of a different waste container on the WAGS at a later date.

The χ^2 test for Container ARP00043 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. The *t* test for this container showed no statistically significant differences between the original measurement assay values and the average of the five replicate measurements.

7.3.4 SWEPP Gamma-Ray Spectrometer

(1) The design of the SGRS was assessed.

The SGGS is located in Building WMF-610, formerly called the SWEPP, of the RWMC at INL, in the same location as when it was used for the 3100-m^3 Project at INEEL. This is a gamma-based system that uses four high-resolution BEGe gamma detectors, a drum turntable, shielded enclosure, and supporting electronics. The SGRS performs quantitative assays and corrects the summed gamma peaks for attenuation using a multicurve calibration that computes efficiency as a function of waste density and photon energy. Live time corrections are performed using a pulser. Isotopics are determined from the same spectra using MGA and MGA-U. Default isotopics are employed when empirical results are not useable. The four gamma detectors are arranged vertically and acquire spectra for all vertical segments simultaneously. The system runs NDA 2000 as well as MGA and MGA-U. When plutonium isotopes are not detected, the software attempts to compute isotopic distributions for uranium isotopes using the MGA-U program. The isotopic determination is performed simultaneously with the quantitative assay, and, if measurement-based isotopics are not available, default AK values are used. The SGRS derives a value for ^{242}Pu by correlation, and ^{90}Sr is determined by application of a scaling factor based on ^{137}Cs. ^{234}U is quantified based on measured values for ^{235}U and ^{238}U.

(2) System calibration of the SGRS had been performed as required.

The efficiency calibration of the SGRS is documented in CCP-INL-SGRS-001, "SGRS Calibration, Confirmation and Verification Report," Revision 0, dated April 27, 2005. This was a new calibration that was performed and verified at INL using two sets of six $^{241}Am/^{152}Eu$ line sources and produced the system's calibrated range of 59 to 1,408 keV. The verification that was performed following calibration is not required by DOE/WIPP-02-3122 and should not be confused with the calibration verification that is required upon major system changes, failing a performance goal, or other events. Rather, this is an additional measurement control that the CCP technical contractor (Canberra) incorporates as a standard part of its calibration sequence. The SGRS calibration is not a mass calibration in the strict sense, although CCP-INL-SGRS-001 presents an operating range of 0.010 to 200 g of total plutonium. Like the WAGS, this system has no upper mass limit, provided all operational parameters, such as deadtime and resolution (peak shape), are met. The calibration was confirmed used WG Pu sources of 41.738 g, 106.732 g, and 167.971 g in a PDP-style combustibles matrix drum. The sources used for initial calibration and calibration confirmation were different, as required. The system's range of operation in terms of density is from 0.02 to 1.62 g/cm^3 for materials with Z<15, which covers a wide range of materials or matrices that including S3000, S4000, and S5000 wastes. All calibration confirmation and verification tests were within measurement criteria.

(3) The calibrated range and operational range of the SGRS had been established and documented.

With respect to activity, CCP-INL-SGRS-001 states that the SGRS has a calibrated range for efficiency of 59 to 1,408 keV. Because this is not a mass calibration in the strict sense it might seem inappropriate to state the calibrated range in terms of mass. However, as discussed previously under the HENC, reporting the operational range in mass units for a gamma system that is not strictly mass-calibrated is a convention. The operational range is functionally defined as the Lower Limit of Detection (LLD), discussed below, at the lower end, and the administrative limit of 200 g per waste container at the upper end. Theoretically, the system calibration has no upper limit in terms of mass. Any assay value based on measured photon emission within the efficiency calibration range (59 to 1,408 keV) where all operational parameters such as system deadtime and resolution (peak shape) are acceptable could be considered technically valid, as discussed previously for the HENC. The summary table on page 3 of CCP-INL- SGRS -001 presents an operating range of 0.010 to 200 g of total plutonium.

With respect to matrix, the system's calibrated range is expressed in terms of density, specifically for materials with Z<15 and a density from 0.02 to 1.62 g/cm^3. This covers a wide range of materials or matrices and includes S3000, S4000, and S5000 wastes. For the SGRS the calibrated range and operational ranges are synonymous.

(4) The TMU for assays performed on the SGRS had been determined and documented.

The TMU for the SGRS was documented in CCP-INL-SGRS-002, "Total Measurement Uncertainty for the SGRS System," dated April 21, 2005. This document does not have a revision number. The components of uncertainty included in the TMU determination consisted of calibration source uncertainties, counting statistics, self-absorption effects, matrix nonhomogeneities, nonuniform source distributions, and isotopic measurement uncertainties. The software for performing the TMU calculations is embedded in the NDA 2000 software. CCP-INL-SGRS-002 calls for "administrative procedures" that would define a minimum fill-height requirement to reduce the potential for increased uncertainties due to end effects. Addressing this is left to the expert reviewer, who "should assess those assays for the potential end effects uncertainties and add the appropriate uncertainty amounts to the TMU where applicable." Evidence of this was not observed in the SGRS BDRs evaluated during this inspection.

(5) The LLD, including the MDC of the SGRS, had been determined and documented.

Reporting thresholds for ^{90}Sr and other radionuclides are determined and documented appropriately. However, a reporting threshold for ^{234}U is not determined, based on CCP's statement that it "is not technically feasible to determine a unique reporting threshold for ^{234}U," a technical position that is permitted by DOE/WIPP-02-3122 and was observed previously on a similar gamma system at the Nevada Test Site.

(6) Replicate testing of the SGRS was performed and evaluated.

The purpose of the replicate testing performed as part of this inspection was to provide EPA with an independent means to verify that the SGRS can provide consistent, 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. This is accomplished by reassaying drums that were previously characterized on the same system or instrument in order to demonstrate the following:

- The instrument produces 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.
- The instrument provides 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 part of the inspection to certify the SGRS, EPA requested that ICP/CCP reassay two drums that EPA randomly selected from a list of drums previously assayed on the WAGS. Container Nos. ARP00243 and ARP00031 were reassayed five times and two statistical tests, a chi-squared (χ^2) test and a *t* test, were performed on the assay data. Data and results of the statistical analysis are included in Attachments B.7 through B.10.

The χ^2 tests for Containers ARP00243 and ARP00031 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. The *t* test for both containers showed no statistically significant differences between the original measurement assay values and the average of the five replicate measurements.

Findings

The EPA inspection team did not identify any findings in the area of NDA during this inspection.

Concerns

The EPA inspection team identified one concern in the area of NDA, summarized below, during this inspection:

***EPA Concern No. INL-CCP-NDA-05-001CR* :** The individual who was assigned to perform expert analysis of TGS data was not appropriately trained to the requirements of DOE/WIPP-02-3122, Section 3.3.1. This was determined by reviewing the paper copies of TGS BDRs in which errors in certain aspects of the required waste container information were noted. Upon interviewing the person who performed the expert analysis, it was determined that he was not familiar with the correct assignment of these quantities and, in fact, was not sufficiently familiar with DOE-WIPP-02-3122, the primary CBFO requirements document for NDA. Subsequent to the inspection, information was provided to EPA that demonstrated that the individual in question was no longer performing expert analysis in that capacity and that all of the TGS BDRs (100%) generated to date had been had been reviewed and corrected, as appropriate. This issue has been adequately addressed and EPA has no further concern in this area. The EPA concern tracking form that addresses this concern and was submitted to CBFO during the inspection is included in Attachment C.

Baseline Approval

The baseline conditions that the EPA inspection team evaluated during this baseline inspection consist of the three NDA systems described in this report:

- SWEPP Gamma Ray Spectrometer (SGRS) used for gamma–based determinations of isotopic distributions and quantitative assays as described above and detailed in the SGRS checklist (Attachment A.7) over the calibrated efficiency range of photon emission from 59 keV to 1,408 keV.
- Waste Assay Gamma Spectrometer (WAGS) used for gamma–based determinations of isotopic distributions and quantitative assays as described above and detailed in the WAGS checklist (Attachment A.6) over the calibrated efficiency range of photon emission from 59 keV to 1,408 keV.
- Tomographic Gamma Scanner (TGS) used for the gamma–based determination of ^{239}Pu in conjunction with isotopic distributions determined by PC-FRAM as described above

and detailed in the TGS checklist (Attachment A.5) over the calibrated range of 0.1 g to 210 g total plutonium, approximately 0.09 g to 195 g of ^{239}Pu.

Each system, along with its range of applicability for disintegration rate (activity) and matrix, and any limitations, is approved as described in this report and detailed in the NDA checklists (Attachment A.4 through A.7). Each system is currently configured to assay retrievably-stored or newly-generated S3000 solid, S4000 soil/gravel, and S5000 debris wastes.

As discussed previously in this report, the CCP HENC used to measure ^{240}Pu-effective, quantitative gamma and isotopic gamma values as described above and detailed in the HENC checklist (Attachment A.4) was part of the inspection's scope but is not approved at this time.

NDA Tiers

Based on the inspection and the results discussed above, EPA assigns the following tiers:

Tier 1 NDA changes that will require EPA review and approval prior to implementation are the following:

- New NDA equipment, (e.g., HENC);[8]
- Physical modifications to approved equipment affecting actual radioassay results (e.g., DQO compliance, TMU); and
- Extension of an approved calibration range(s) for approved equipment

For purposes of clarification, the last bullet above refers to the extension of a system's approved calibration range with respect to determination of disintegration rate (activity) or physical characteristics (matrix) of any of the three NDA systems approved during this inspection During an EPA technical inspection, several characteristics of a measurement system are evaluated. A key characteristic is the range of conditions for which the instrument is capable of producing technically defensible data with respect to two aspects:

- Activity – the nuclear disintegration rate of specific radiations types (neutron or gamma), typically Special Nuclear Material or Transuranic radionuclides; units of activity and mass are interchangeable;
- Physical Characteristics – the physical attributes of waste matrices as they relate to a radiometric system, i.e., how the matrix's physical properties interact with the radiations that originate within the sample and affect the system's ability to detect them. Examples include attenuation of photons (gamma), and moderation and absorption of neutrons.

[8] *New NDA equipment* refers to a system or component not previously evaluated by EPA. Specifically, this is defined as a physically distinct or different system or apparatus; an assay system that is reported to be the equivalent of or identical to a previously approved system but which has not been formally inspected and approved by EPA is a new system and must be approved by EPA prior to implementation to characterize WIPP wastes.

During the inspection, the system's technical capabilities that are evaluated represent the conditions observed and they define the operational envelope in which WIPP measurements will occur. Changes to a system's calibrated range with respect to disintegration rate and/or matrix may represent an essentially different set of conditions from those evaluated during the inspection. For this reason, a change to a system's calibrated range is considered a Tier 1 change. A system's operating range is generally a subset of a calibration range, i.e., systems that are calibrated to make valid measurements from 0 to 200 grams of SNM typically operate in a smaller range, the system's LLD to <200 g for WIPP. Provided the system's calibrated range is valid, a site is free to designate a different operating range(s) within the calibrated range as a Tier 2 change.

Similarly, for physical characteristics NDA systems are often calibrated with respect to a range of sample attributes, e.g., a matrix density range of 0.02 to 1.6 g/cm^3 for two of the gamma systems discussed in this report (WAGS and SGRS). This range may include materials that are commonly referred to using terms such as debris (S5000), soils & gravels (S4000), and solids (S3000), all of which are within the calibrated density range. Actual waste assays may be restricted to a portion or subset of this range, i.e., debris only, for a variety of technical and/or administrative reasons. Changing the calibrated range by extending it to greater than 1.6 g/cm^3 for these systems would constitute a Tier 1 change. Provided the original density range is valid, changing the operational range(s) within the 0.02 to 1.6 g/cm^3 interval is a Tier 2 change, as discussed below.

Tier 1 changes will be reported and documentation will be submitted when INL-CCP is ready for EPA review. In case of the first two T1 NDA changes, DOE should assume an EPA inspection is likely. In the case of a last T1 NDA change, EPA will inform INL-CCP and CBFO whether a site inspection is necessary. EPA may request additional information, choose to conduct a desktop review, and/or confer with INL-CCP NDA personnel. Note that until EPA approval is given, INL-CCP would continue to assay containers "at risk" with the understanding that the containers could not be disposed of at WIPP without EPA approval. Upon evaluation (with or without site inspection), EPA will issue an approval letter and only upon receiving the EPA approval may INL-CCP dispose of waste assayed on the equipment affected by the T1 change.

Tier 2 NDA Changes that do not require EPA approval prior to implementation but require reporting and submitting documentation discussing changes by INL-CCP are:

- Changes to software for approved equipment; and
- Changes to approved operating range(s) of approved NDA systems upon CBFO approval (see discussion, above)

For purposes of clarification, examples of the first bullet above would include:

- Changing a system's operating system, e.g., first use of Canberra NDA 2000
- Identification of a systematic problem with a software package and subsequent modifications to address the problem, e.g., use of an incorrect value for a radionuclide's transition probability in Genie 2000 in current use on the WAGS and SGRS

- Introduction of a new version of an existing software package beyond what is in current use, e.g., ANTECH's MasterScan beyond V5 1.5 that is in current use for the TGS

Regarding the second bullet above, reducing a system's operating range because of performance-related problems or equipment failures would be Tier 2 changes. For example, if, the HENC were to not pass a PDP cycle for a specific matrix or activity range and its use for those were formally restricted by the site or CBFO, this would be a Tier 2 change.

Every three months from the date of EPA approval, INL-CCP will provide information concerning T2 changes. EPA will evaluate changes and communicate with INL-CCP whether changes raise any concerns and INL-CCP response is necessary or whether INL-CCP can continue to implement changes.

7.4 Real-Time Radiography

As part of the inspection of the RTR activities, the team reviewed the elements of the RTR process listed below:

- Documentation of RTR activities through use of an approved procedure
- Proper execution of RTR activities
- Management oversight and independent review of RTR activities
- Statistical verification of RTR activities through VE (see Section 7.5.2)
- Training of RTR personnel

Emphasis was placed on overall procedural technical adequacy and implementation, as well as the identification of WMPs and prohibited items.

The RTR facility uses radiography to help determine the following aspects of TRU WC:

- Types and amounts of WMP
- Presence or absence of prohibited items
- Testing for new operators on the RTR system using specifically placed items

The following documents were among those examined to assess whether all RTR operations follow the appropriate approved procedures:

- CCP-TP-102, CCP RTR #2 Radiography Inspection Operating Procedure, Revision 6, dated April 15, 2005
- CCP-TP-028, CCP Radiographic Test and Training Drum Requirements, Revision 2, dated February 4, 2005
- CCP-TP-002, Training & Qualification Plan, Revision 16, dated December 7, 2004
- CCP-PO-002, Transuranic Waste Certification Plan, Revision 12, dated March 10, 2005

- RTR BDRs: ID05-NDE02-0001, ID05-NDE02-0002, ID05-NDE02-0003, ID05-NDE02-0004, ID05-NDE02-0005, ID05-NDE02-0006
- Training records for operators and RTR independent technical reviewer/technical supervisor/facility QA officer (ITR/TS/FQAO)

During the inspection, the following elements of the RTR process were investigated using the checklist contained in Attachment A.3:

(1) Overall procedural technical adequacy and implementation were evaluated.

The RTR procedure, documented in CCP-TP-102, "CCP RTR #2 Radiography Inspection Operating Procedure," Revision 6, dated April 15, 2005, contained specific information on performing nonintrusive radiography, including operational setup and checkout, identification of prohibited items, assignment of WMPs and estimation of weights and volumes, confirmation of WMCs, input of data, issuance of nonconformance reports (NCRs), and technical review of radiography results. At the time of the inspection, only one mobile RTR unit was on site, RTR Unit #2.

(2) Characterization of WMPs and prohibited items was evaluated.

CCP-TP-102, Revision 6, required that radiography calibration be conducted at the beginning of every shift in which drums are subject to examination. Although the inspector observed the RTR process for drum 1213864, the audio/visual calibration had already been performed by the operators prior to the demonstration. Adherence to calibration requirements was confirmed, however, through interviews with RTR operators, review of RTR BDRs, and video/audio tapes for drums IDR000108264 and 10009899.

At the beginning of a shift and prior to examining any waste containers, the operator performs a lines-pair (LP) resolution test to ensure that images are clearly visible. The procedure requires an image resolution of at least 5 LP/cm, and the test image is documented in "CCP Radiography Measurement Control Report", Attachment 7.

For each container undergoing examination, an audio/video recording of the RTR event is made. The first notations on the audio/video recording made by the operator are the drum number and the examination date and time. The examination begins at the top of the drum, where the operator determines if a rigid liner is present and if this liner is vented. The drum is rotated through 360 degrees so that all objects can be viewed from all sides. The operator has the ability to zoom both in and out and increase or decrease the scan energy in order to compensate for varying densities of the waste material examined. During examination, the operator also rocks the drum to determine the presence of free liquids. A second operator electronically records items identified by the operator scanning the drum on Attachment 6 of the procedure.

During examination of the drum, the operator determines the presence or absence of prohibited items, and this determination is documented on Attachment 6, as well as on the audio/visual recording. A standardized weight table for WMPs is contained in the RTR

procedure (Table 2) and is used by the operators to calculate WMP weights immediately after the scan is completed. Table 2 contains items expected to be found in the drums; new items can be added to this table but doing so requires a procedure revision. AK personnel are also informed of any additions so that the AK record can be updated. Layers of confinement and volume utilization of the drum are also documented on Attachment 6.

(3) Documentation of radiography activities was examined.

Simultaneous audio descriptions and video recordings are made as the waste is examined. This was observed by EPA inspectors during the examination of one waste container and further verified by a review of RTR videotapes for the above-referenced waste containers. An operator inputs the data into an electronic RTR waste container data form (Attachment 6) concurrently with the examination.

(4) Adequate documentation of radiography procedures was ascertained.

Radiography procedures are well defined, and the documents are controlled. During the inspection, EPA reviewed the adequacy and implementation of all radiography-related procedures.

QC examinations were performed as required. For example, in batch ID05-NDE02-0005, the replicate scan was performed on container IDRF00121118 and an independent observation was performed on container IDRF001210032 (debris drums). In batch ID05-NDE02-0003, the replicate scan was performed on container 10009600 and an independent observation was performed on container 10010514 (sludge drums).

Corrective action was implemented as needed. NCRs NCR-INL-0200-05 through NCR-INL-0202-05 were initiated for batch ID05-NDE02-0001, and NCRs NCR-INL-0203-05 through NCR-INL-02011-05 were initiated for batch ID05-NDE02-0003. Verification of NCRs associated with specific drums is a checklist item in the FQAO checklist for each BDR.

(5) Training of radiography personnel was adequate.

During the inspection, EPA reviewed documentation of the capability demonstration for radiography personnel. The test drum tapes for two of the operators were reviewed:

- Training drum (INL-NDE-TEST-01B) audio/video recording for operator G. Lamb, dated April 5, 2005
- Training drum (INL-NDE-TEST-01B) audio/video recording for operator T. Hasselstrom, dated April 5, 2005

The test drums contained all the required items (CCP-TP-028, R. 2), and the training was correctly documented.

The training records reviewed indicate that only trained personnel were operating the RTR equipment. RTR operators receive the results of the RTR/VE comparisons, although formal "lessons learned" training is not provided. Training documentation was complete and filed correctly for viewing and reference. The documents reviewed include the following:

- Training records for RTR operators ITR/TS/FQAO
- VE/RTR comparison e-mail and report, dated May 4, 2005

Findings

The EPA inspection team did not identify any findings in the area of RTR during this inspection.

Concerns

The EPA inspection team did not identify any concerns in the area of RTR during this inspection.

Baseline Approval

The baseline conditions that the EPA inspection team evaluated during this baseline inspection consisted of the following:

- Trained personnel: operator/ITR/TS/FQAO, SPM, and SPQAO
- Approved and controlled operating procedures: CCP-TP-102, Revision 6, CCP RTR #2 Radiography Inspection Operating Procedure, dated April 15, 2005, and CCP-TP-028, Revision 2, CCP Radiographic Test and Training Drum Requirements, dated February 4, 2005
- CCP Mobile RTR Unit No. RTR2
- RTR records and supporting data: CCP-TP-102, Revision 6, Attachments 6 and 7 and RTR BDRs

This system is suitable for RTR of S3000 and S5000 wastes.

RTR Tiers

Based on the inspection and the results discussed above, EPA assigns the following tiers:

There are no applicable Tier 1 RTR changes at this time.

Tier 2 RTR changes that do not require EPA approval prior to implementation but require reporting and submitting documentation discussing changes by INL-CCP are:

- New RTR equipment or modifications to approved equipment; and
- Changes made to RTR procedure(s) that require CBFO approval.

Every three months from the date of EPA approval, INL-CCP will provide information concerning T2 changes. If new RTR equipment is in use, EPA inspection may be necessary. EPA will evaluate changes and communicate with INL-CCP whether changes raise any concerns and INL-CCP response is necessary or whether INL-CCP can continue to implement changes.

7.5 Visual Examination

Two VE processes were assessed as part of the inspection activities—the Visual Examination Technique (VET) process for newly-generated (S3000, S4000, and S5000 from Pit 4) and VE as a quality control check for Real-Time Radiography for retrievably-stored (S3000 and S5000) wastes. Both are discussed in Sections, 7.5.1 and 7.5.2, respectively, below.

As part of the inspection of the VE activities, the inspector reviewed the elements of the VE processes listed below:

- Characterization of WMPs and prohibited items and confirmation of WMC
- Documentation of VE activities
- Adequate documentation of VE procedures
- Training of VE personnel

Emphasis was placed on overall procedural technical adequacy and implementation, identification of WMPs and prohibited items, and confirmation of the WMC. In this report, both VE processes are addressed in a single section with respect to *Findings*, *Concerns*, *Baseline Conditions*, *Tier 1 Changes*, and *Tier 2 Changes*, below.

7.5.1 Visual Examination Technique (VET) for Newly-Generated Waste

The VET process for newly-generated waste uses manual examination to determine the following aspects of TRU WC:

- Confirmation of WMPs and WMC
- Confirmation of presence or absence of prohibited items

The following documents were among those reviewed to assess whether VET operations follow the appropriate approved procedures and meet VET requirements:

- CCP-TP-006, CCP Visual Examination Technique for Idaho National Laboratory (INL) Newly-Generated TRU Waste Retrieved from Pits, Revision 4, dated April 19, 2005
- Training records for VET operators/ITR/TS/FQAO
- BDRs: IN-ARP-VE-000026, IN-ARP-VE-000032 (S4200), IN-ARP-VE-000117, IN-ARP-VE-000119 (S3900, S5400)

During the inspection, the technical elements of CCP's VET process were evaluated using the checklist contained in Attachment A.2. These aspects are summarized below:

(1) Overall procedural technical adequacy and implementation were evaluated.

The waste used in the demonstration consisted of graphite moulds (S5000) that were packaged into drum ARP00494. Although VET of debris waste only was demonstrated, this process is also applicable for S3000 (homogeneous solids) and S4000 (soil/gravel) waste.

The targeted waste is loaded into trays that have liners with four loops to facilitate loading the waste into a preweighed 55-gallon drum at the end of the VET process. The waste tray is pulled into a glove box, and operators use hand tools to sort through the waste. Waste items identified are recorded electronically in Attachment 1 of procedure CCP-TP-006, Revision 4. The weight of heavy items, such as graphite moulds, is determined by the difference between the fully loaded and empty drum weights.

The VET procedure, documented in CCP-TP-006, Revision 4, contains specific instructions for performing VET, including identification of prohibited items and WMPs and confirmation of WMCs.

(2) Characterization of WMPs as required by 40 CFR 194.24 was assessed.

VET for newly-generated waste does not require generation of an audio/visual recording of the VET event. Attachment 1, used for the electronic recording of VET data, contains all of the targeted waste items expected to be found in Pit 4. As items were identified during the demonstration, an operator documented them in the appropriate WMP cell of Attachment 1, Section 2. Attachment 1 has a software program embedded in it to calculate WMP weights. After loading the waste into a preweighed drum, the volume utilization percentage of the drum is estimated. The final weight of the loaded drum is determined after the drum has been closed.

(3) Documentation of VET activities was examined.

Several operators worked with the waste tray in a glove box, sorting and identifying the waste, and another operator entered the VE data into Attachment 1 of the procedure. Attachment 1 requires entries for the drum information (Section 1), WMPs (Section 2), prohibited items (Section 3), waste packaging (Section 4), and waste data (Section 5), including waste stream and WMCs. Completion of the required documentation was verified by review of BDRs IN-ARP-VE-000026, IN-ARP-VE-000032, IN-ARP-VE-000117, and IN-ARP-VE-000119.

(4) Calculation of miscertification rates is not applicable because all newly-generated waste will undergo VET.

(5) Documentation of VET procedures is adequate.

During the inspection, EPA reviewed the adequacy of the VET procedure. One EPA concern was identified, EPA Concern No. INL-CCP-VE-05-004CR, related to the VET procedure for newly-generated waste. Procedure CCP-TP-006, Revision 4, Section 4.2.4, does not describe actual practice with regard to weighing items during the VE process. Weights for heavy items, such as graphite moulds, are determined by the difference between the full and empty drum weights, minus any items actually weighed.

(6) Training of VET personnel was evaluated.

The personnel executing the VET demonstration were A. Romo and L.J. Walker, who are designated SMEs, and operators M. Duenes and R. Draper. The inspector reviewed the following training records during the onsite inspection:

- Qualification cards for SMEs A. Romo and L.J. Walker
- Qualification cards for operators C. Bottoms, L. Alade, R. Draper, B. Stark, and M. Holverson

Training documentation was complete and filed correctly for viewing and reference.

7.5.2 Visual Examination as a Quality Control Check of Real-Time Radiography

VE as a QC check of RTR is performed at the Materials and Fuels Complex (MFC), formerly called the Argonne National Laboratory-West facility, and is performed in a glove box. The EPA inspector observed the VE evaluation for drum IDRF001213626 (debris), together with completion of the required documentation. Although the inspector only observed this VE process for debris waste (S5000), it is also applicable to the examination of S3000 waste. The audio/visual recording for drum 10009600 (S3121) was reviewed as part of the inspection, together with BDRs for both S3000 and S5000 waste.

The following documents were among those reviewed to assess whether VE operations follow the appropriate approved procedures and meet the appropriate technical requirements:

- HFEF-OI-6890, TWCP Visual Examination; TWCP Issue, Revision 5, dated May 20, 2003
- MCP-2610, QA Program Administrative Controls for TWCP, Revision 4, dated April 3, 2003
- Training qualification for WC operators T. Tripp and B. Lundell
- BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126), WCV-10010345, WCV-10009600 (S3121)
- Posted Operator Aids Nos. 15 and 38
- VE/RTR comparison e-mail and report, dated May 4, 2005

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

(1) Overall procedural technical adequacy and implementation and identification of WMPs and prohibited items were examined.

The VE procedure, documented in HFEF-OI-6890, "TWCP Visual Examination; TWCP Issue," Revision 5, dated May 20, 2003, contains specific instructions for performing VEs, including operational setup and checkout, removal of waste from the container, identification of prohibited items, assignment of WMPs and estimation of weights and volumes, and input of data. These activities, except for operational setup and checkout, were demonstrated to the EPA inspector during the examination of drum IDRF001213626 (debris). The operator had already performed the required audio/visual checks for the day of the demonstration, but the inspector observed the camera images recorded for this examination. Additionally, the audio/visual recording for drum 10009600 (S3121) was reviewed as part of the inspection.

(2) Characterization of WMPs as required by 40 CFR 194.24 was assessed.

For each container undergoing examination, an audio/video recording of the event is made. In a glove box, the operators remove all of the waste items from the drum and the Visual Examination Expert (VEE) identifies them. The audio/visual operator documents items as called out by the VEE and makes voice entries of the same. Appendix A of procedure HFEF-OI-6890, Revision 5, is used to document the VE data as they are generated. As part of the VE examination, the presence or absence of prohibited items is also documented.

Operator Aid No. 15, Revision C, is a list of waste items and their associated weights, a table for the calculation of cylinder volumes, and WMP densities. This operator aid is used to calculate the weight of the waste items removed from the drum. Operator Aid No. 38 is used to calculate the volume of sludge in S3121 drums. For debris waste, percent utilization of the repackaged drum is calculated from the height of the waste.

(3) Documentation of VE activities was examined.

Simultaneous audio descriptions and video recordings are made as the waste is examined. The EPA inspector observed this process during the examination of one waste container (drum number IDRF001213626). Two operators worked in the glove box, emptying the waste from the drum, and the VEE identified waste items. A third operator ensured that an audio/video recording of the operation was made and also input entries electronically in Appendices A and B of the procedure.

The inspector reviewed the audio/video recording for drum 10009600 (S3121) and BDRs WCV-IDRF001208619, WCV-IDRF001209273 (S5126), WCV-10010345, and WCV-10009600 (S3121). The BDRs contained the radiography/VE comparison report and project-level review checklists.

(4) Calculation of miscertification rates was examined.

At the time of the inspection, only six containers had undergone VE as a QC check of RTR, and the site had not established a site-specific miscertification rate (S3000 and S5000). An initial miscertification rate of 11% was being used to calculate the number of waste containers to be examined by VE.

(5) Documentation of VE procedures is adequate.

The VE procedure was well defined, and the documents are controlled. During the inspection, EPA reviewed the documentation and adequacy of the VE procedure and related documents. Operators consistently used the procedure as a working guide during the VE operations.

(6) Training of VE personnel was evaluated.

The training records reviewed indicate that only trained personnel are performing VE. During the inspection, EPA reviewed training documentation for the following two VE operators:

- Training qualification for WC operator T. Tripp
- Training qualification for WC operator B. Lundell

Training documentation was complete and filed correctly for viewing and reference.

Findings

VET for Newly-Generated Waste: The EPA inspection team did not identify any findings in the area of VE of newly-generated waste during this inspection.

VE as a QC Check of RTR: The EPA inspection team did not identify any findings in the area of VE as a QC check of RTR during this inspection.

Concerns

VE for Newly-Generated Waste: The EPA inspection team identified one concern, summarized below, in the area of VE for newly-generated waste during this inspection:

***EPA Concern No. INL-CCP-VE-05-004CR*:** Procedure CCP-TP-006, Revision 4, Section 4.2.4, does not describe the actual practice for the weighing of items during the VE process. Weights for heavy items, such as graphite moulds, are determined by the difference between the full and empty drum weights, minus any items actually weighed. Subsequent to the inspection, information was provided to EPA that demonstrated that the appropriate modification was made such that written procedure CCP-TP-006, Revision 4, did in fact reflect the actual practice and that item weights were determined and recorded as required. This issue has been adequately addressed, and EPA has no further concern in this area.

VE as a QC Check of RTR: The EPA inspection team did not identify any concerns in the area of VE as a QC check of RTR during this inspection.

Baseline Approval

VET for Newly-Generated Waste: The VET system for newly-generated waste from Pit 4 that the EPA inspection team evaluated during this baseline inspection consisted of the following:

- Trained personnel: operators, SMEs, SPM, and SPQAO
- Approved and controlled operating procedure: CCP-TP-006, Revision 4, CCP Visual Examination Technique for Idaho National Laboratory (INL) Newly-Generated TRU Waste Retrieved from Pits, dated April 19, 2005
- VET records and supporting data: CCP-TP-006, Revision 4, Attachment 1, and BDRs

This system is suitable for VET of S3000, S4000, and S5000 wastes.

VE as a QC Check of RTR: The VE system used as a QC check for RTR system evaluated during this baseline inspection consisted of the following:

- Trained personnel: operators, VEE, SPM, and SPQAO
- Approved and controlled operating procedure: HFEF-OI-6890, Revision 5, TWCP Visual Examination; TWCP Issue, dated May 20, 2003
- VE records and supporting data: HFEF-OI-6890, Revision 5, Appendix A, and VE BDRs

This system is suitable for VE as a QC of RTR for S3000 and S5000 wastes.

VE and VET Tiers

Based on the inspection and the results discussed above, EPA assigns the following tiers:

Tier 1 VE or VET changes that will require EPA review and approval prior to implementation are:

- Addition of a new vendor or other entity, not previously approved under this program, to conduct VE or VET processes.

Tier 2 VE and VET changes that do not require EPA approval prior to implementation but require reporting and submitting documentation are:

- Changes made to VE or VET procedure(s) that require CBFO approval.

Every three months from the date of EPA approval, INL-CCP will provide information concerning T2 changes. EPA will evaluate changes and communicate with INL-CCP whether changes raise any concerns and INL-CCP response is necessary or whether INL-CCP can continue to implement changes.

7.6 WIPP Waste Information System

At the time of the inspection, CCP did not have approved WSPFs for the INL waste streams and could not, therefore, submit container data for certification. Draft WSPFs for waste streams ID-RF-S5126 (debris) and ID-RF-S3121-374 (sludge) were available for review during the inspection. The CCP procedures, practices, and personnel who will process container data will be the same as those used at other approved sites where numerous containers have been successfully submitted to the WWIS.

The CCP SPM will submit the characterization data required for approval of the WSPFs to CBFO. The WWIS data administrator will enter these data into the WWIS for verification by CCP. After approval, the waste stream profile (WSP) will be entered into the WSP reference data list, which documents approved waste streams. CCP anticipates that both retrievably-stored debris (S5000) and sludge (S3000) wastes will be processed for the Advanced Mixed Waste Project. Additionally, newly-generated S3000, S4000 and S5000 wastes will be processed for the Pit 4 project.

Personnel entering data into the WWIS can only do so after being granted access by the WWIS administrator, and access is password protected. After the data have been through every level of review and approval, they are compiled into a drum file and entered into a controlled Excel spreadsheet by the data entry personnel. The waste certification official (WCO) reviews the data to ensure that they are WIPP complaint and signs the form to accept the data. At this point data are converted into ASCII format files and transmitted to the WWIS. The information contained in the drum file is subsequently used for transportation activities. For the purpose of demonstration, a WCO entered data into the temporary module of the WWIS for container IDRFRD1214748.

The following documents were reviewed prior to or during the inspection to guide investigation and questions:

- CCP-TP-030, TRU Waste Certification and WWIS Data Entry, Revision 15, March 14, 2005
- WWIS Data Entry Summary—characterization and certification for drums IDRFR201268B and 10010514
- Waste container data report for container IDRFRD1214748

During the inspection, the technical elements of the INL-CCP WWIS process (see Attachments A.8 and A.9) were evaluated:

(1) Overall procedural technical adequacy and implementation were evaluated.

The WWIS procedure, documented in CCP-TP-030, Revision 15, contains complete instructions for entering, reviewing, and transmitting data. Adequate reviews are incorporated into the WWIS data entry procedure to minimize the transmittal of noncompliant or incorrect data. Additionally, specific instructions were provided to data entry personnel for the entry of Pit 4 sludge and debris waste data. Based on the review of the procedure and actual WWIS practices, the overall WWIS data entry process implemented by CCP at INL was adequate.

(2) Documentation of WWIS activities was examined.

During the inspection, WWIS data entry for drum IDRFRD1214748 was demonstrated by a WCO. This demonstration conformed to the requirements in the governing procedure. Because there were no approved WSPFs at the time of the inspection, the demonstration drum data was entered into a temporary module of the WWIS. The inspector, therefore, was not able to observe the transfer of actual INL characterization data.

Data storage and retrieval were demonstrated. CCP personnel were able to retrieve and print the certification data contained in the waste container data report for demonstration drum IDRFRD1214748.

(3) Adequate documentation of the WWIS procedure was ascertained.

The WWIS procedure was well defined and controlled. The Excel spreadsheet, used for data entry, was also adequate and controlled.

(4) Training of WWIS personnel was evaluated.

The actual job performance of a WCO was observed to verify training and qualification. Training and qualifications packages were reviewed for data entry personnel and the WCO who performed the data entry demonstration. Required training included use of the WWIS User's Manual, and the required reading list included the WIPP WAP and DOE/CBFO QA program document.

(5) Load management was evaluated.

The EPA inspector verified that the procedure and process used for load management conform to the requirements contained in Appendix E of the CH-WAC.

The following documents were reviewed prior to or during the inspection to guide investigation and questions:

- CCP-TP-030, TRU Waste Certification and WWIS Data Entry, Revision 15, March 14, 2005

- CCP-PO-002, CCP Transuranic Waste Certification Plan, Revision 12, dated March 10, 2005
- DOE/WIPP-02-3122, Contact-Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant, Revision 3.0, dated April 25, 2005

Attachment 8 of the certification plan (CCP-PO-002, Revision 12) and procedure CCP-TP-030, Revision 15, contain the same requirements for load management as those found in Appendix E of the CH-WAC. CCP-TP-030 and CCP-TP-086, containing CCP's load management procedures and practices, are approved procedures. Although CCP had not processed any drums for payload management at INL at the time of the inspection, the process intended for use is the same as that successfully implemented at other sites.

The SPM assesses drums for Load Management, ensuring that all candidate drums are from the same waste stream. For the purpose of demonstration, a WCO entered data into the WWIS test module as if drums were candidates for load management. A standard waste box (SWB) was selected as the load container. The first drum used for the demonstration of load management was FBL00005, then container FBL00007, and finally container FBL00013. As each container was added, a waste container data report for the SWB was printed. Through review of the waste container data reports, the inspector verified the changing average TRU activity as each container was added. The WWIS also recalculated other criteria that must be met for shipping (requirements from the U.S. Nuclear Regulatory Commission document entitled, "Contact-Handled Transuranic Waste Authorized Methods for Payload Control (CH-TRAMPAC)"). The weight used to calculate the alpha activity of the drums in the load includes the drums, waste, and liners. INL-CCP will use approved 10-drum overpacks or SWBs as load managed containers.

INL-CCP met all the requirements for load management contained in Appendix E of the CH-WAC.

Findings

The EPA inspection team did not identify any findings related to the WWIS during this inspection.

Concerns

The EPA inspection team did not identify any concerns related to the WWIS during this inspection.

Baseline Approval

The system used for container certification and load management that was evaluated during this baseline inspection consisted of the following:

- Trained WWIS data entry personnel and WCO
- Approved and controlled operating procedure, CCP-TP-030, Revision 15, TRU Waste Certification and WWIS Data Entry, dated March 14, 2005
- Approved and controlled Excel spreadsheet, WWIS Data Entry Summary – Characterization and Certification

This system was suitable for submitting data to the WWIS for container certification and payload management for all waste summary category groups (S3000, S4000, and S5000).

WWIS Tiers

Based on the inspection and the results discussed above, EPA assigns the following changes:

Tier 1 WWIS Changes that require EPA review and approval prior to implementation:

- Changes to WWIS algorithms specific to load management requiring revisions to the load management provisions of DOE's CH WAC

This Tier 1 change will be reported and documentation will be submitted when INL-CCP is ready for EPA review. Upon review, EPA may request additional information, choose to conduct a desk-top review, and/or confer with INL-CCP WWIS personnel. Upon evaluation, EPA will issue an approval letter and only upon receiving the EPA approval INL-CCP can use the changed algorithms.

Tier 2 WWIS Changes that do not require EPA approval prior to implementation but require reporting and submitting documentation discussing changes by INL-CCP are:

- Changes made to site's WWIS algorithms corresponding to the changes to the load management provisions of the CH WAC that require CBFO approval; and
- Changes in load management status of approved waste category(s).

Every three months from the date of EPA approval, INL-CCP will provide information concerning T2 changes to EPA. EPA will evaluate changes and will inform INL-CCP whether the changes raise any concerns and INL-CCP's response is necessary, or whether INL-CCP can continue to implement the proposed changes.

8.0 RESPONSE TO COMMENTS

By the end of the comment period (October 24, 2005), EPA received one set of public comments. (Comments are available from EPA Docket A-98-49, Item II-A3-39.) EPA

evaluated those comments and revised the report. Attachment D provides EPA's response to the public comments.

9.0 SUMMARY OF RESULTS

9.1 Findings

During this inspection of INL-CCP, the EPA inspection team did not identify any findings in the areas of AK, NDA, RTR, VE, or the WWIS.

9.2 Concerns

The EPA inspection team identified two concerns during this inspection, one for NDA and one for VE of newly-generated waste. Both concerns were addressed on EPA concern tracking forms that were submitted to CBFO during the inspection, copies of which are included in Attachment C. The concerns are summarized below:

***EPA Concern No. INL-CCP-NDA-05-001CR*:** The individual who was assigned to perform expert analysis of TGS data was not appropriately trained to the requirements of DOE/WIPP-02-3122, Section 3.3.1. This was determined by reviewing the paper copies of TGS BDRs in which errors in certain aspects of the required waste container information were noted. Upon interviewing the EA, it was determined that he was not familiar with the correct assignment of these quantities and, in fact, was not sufficiently familiar with DOE-WIPP-02-3122, the primary requirements document for NDA. Subsequent to the inspection, information was provided to EPA that demonstrated that the individual in question was no longer performing in that capacity and that all (100%) of the TGS BDRs generated to date had been had been reviewed and corrected, as appropriate. This issue has been adequately addressed, and EPA has no further concern in this area.

***EPA Concern No. INL-CCP-VE-05-004CR*:** Procedure CCP-TP-006, Revision 4, Section 4.2.4, does not describe actual practice with regard to the weighing of items during the VE process. Weights for heavy items, such as graphite moulds, are determined by the difference between the full and empty drum weights, minus any items actually weighed. Subsequent to the inspection, information was provided to EPA that demonstrated that the appropriate modification was made such that written procedure CCP-TP-006, Revision 4, did in fact reflect the actual practice, and that item weights were determined and recorded as required. This issue has been adequately addressed, and EPA has no further concern in this area.

9.3 Conclusions

During inspection EPA took sample of each of the waste characterization processes implemented by INL-CCP to characterize AMWTP-supplied CH retrievably-stored debris and solid waste and newly-generated debris, solids, and soil from the ICP Pit 4. EPA's inspection team determined that INL-CCP's WC activities were technically adequate. EPA is approving the following scope of waste characterization activities for INL-CCP.

(1) The AK and Load Management process for CH retrievably-stored, AMWTP supplied, TRU debris and solid waste

(2) The TGS, SGRS, and WAGS NDA systems for assaying solid, soil/gravel, and debris waste

(3) VE as a quality control (QC) check of the RTR process for retrievably-stored solid and debris waste

(4) The VET process for newly-generated debris, solid, and soil/gravel waste

(5) The NDE (RTR) process for retrievably-stored solid and debris waste

(6) The WWIS process for tracking of waste contents of debris, solid, and soil/gravel waste

Any changes to the waste characterization activities from the date of the baseline inspection must be reported to, and, if applicable, approved by EPA according to the following table.

Tiering of TRU Waste Characterization Processes Implemented by CCP at INL (Based on May 3-5, 2005 Baseline Inspection)

WC Process Elements	INL-CCP WC Process Specific T1 Changes	INL-CCP WC Process Specific T2 Changes*	INL-CCP General T2 Changes*
AK including Load Management	Any new summary category group for TRU waste Changes to WWIS algorithms specific to load management requiring revisions to the load management provisions of DOE's CH Waste Acceptance Criteria (WAC)	Waste Stream Profile Forms including updates or additions to waste stream(s) within an approved waste category (See Section 7.2) Changes in load management status of approved waste stream(s) Changes to the WWIS algorithms corresponding to the changes to the load management provisions of the CH WAC	Changes to site procedures requiring CBFO approvals
NDA	New equipment or physical modifications to approved equipment affecting actual radioassay results (e.g. DQO compliance, TMU) Changes to approved calibration range for approved equipment (see Section 7.3)	Changes to software for approved equipment (see Section 7.3 Changes to operating range(s) upon CBFO approval	Same as above
RTR	N/A	New equipment or changes to approved equipment	Same as above
VE and VET	Addition of a new vendor or other entity to conduct VE or VET processes	N/A	Same as above
WWIS	N/A	N/A	Same as above

* Upon receiving EPA approval, every three (3) months INL-CCP will report to EPA all T2 changes

All T1 changes must be submitted to EPA for approval before their implementation. Initially, EPA expects the submission of T2 changes listed above every three months. If EPA determines that the submission frequency is excessive, EPA will discuss the issue with CBFO to agree upon a different schedule for reporting of the T2 changes.

This approval allows INL-CCP to dispose of CH TRU debris and solid waste from AMWTP at WIPP. As discussed in the inspection report, EPA has identified the following limitations and conditions that apply to the INL-CCP waste characterization program:

- Retrievably-stored debris and solid waste at AMWTP characterized by CCP using the approved processes cannot be sent for super compaction and must be disposed of at WIPP as direct load or load managed in accordance with the Appendix E of the WIPP Waste Acceptance Criteria.

- In order for waste characterized by AMWTP and INL CCP to be disposed of in the same payload container (i.e., ten drum overpack, standard waste box), DOE must be able to track the individual containers in the payload container or DOE must provide new AK documentation that applies to the entire payload container and thereby resolves any difference between the AK documentation for AMWTP and INL CCP.

- This approval does not apply to newly-generated, CH TRU, debris, solid, and soil/gravel waste from ICP Pit 4. EPA must review the AK documentation for Pit 4 waste as a Tier 1 change prior to disposing of these wastes at WIPP.

- Replicate testing data for the HENC was not available at the time of EPA's inspection. Therefore, INL-CCP is not currently authorized to dispose of waste that has been characterized using the HENC.

EPA is aware that DOE intends to request the following additions to the INL-CCP approved waste characterization activities: 1) ICP Pit 4 AK documentation, 2) HENC replicate testing data, and 3) use of AMWTP's VE as a QC check of RTR at INL-CCP. According to the tiering established in this letter, these changes are Tier 1 and require EPA approval prior to implementation. Upon receipt of DOE's request for changes, EPA will conduct an evaluation and notify DOE, in writing, of decisions regarding these activities.

10.0 REFERENCES

"Contact-Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant (CH-WAC)," Revision 3, April 25, 2005.

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

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

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

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

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

U.S. Department of Energy, Title 40 CFR Part 191, Certification Application for the Waste Isolation Pilot Plant, DOE/CAO 1996-2184, 1966, Carlsbad, New Mexico

Attachments A.1 through A.9

Attachment A.1: Acceptable Knowledge Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
Procedures require staff to be: • Familiar with applicable technical procedures • Familiar with QAOs • Qualified to assemble, compile, and confirm AK data		CCP-TP-005, Revision 15; CCP-QP-002, Revision 16	Employee's explanation of job duties was consistent with applicable procedures Employee could identify the mandatory AK items for assembly Employee's identification of applicable procedures was correct Employee adequately explained how to assemble, compile, and confirm data Employees responsible for AK documentation were trained and qualified in accordance with applicable procedures	Y	Site qualification cards for Barbara Broomfield and Christine Gomez; interviews with Jeff Harrison and Kevin Peterson. Job duties and AK mandatory items, procedures were well understood, and Mr. Harrison and Mr. Peters, through a long history and experience in the CCP AK program, demonstrated exceptional knowledge regarding compilation, assembly, and confirmation of AK data.
Procedures demonstrate a logical progression from general facility information to more detailed waste stream-specific information			This logical sequence can be demonstrated through traceability analysis. (Traceability analysis and linkages may include but need not be limited to individual container data for radionuclides and WMPs, IDCs, and waste streams) AK documentation is traceable to the drum level	Y, in part	CCP-AK-INL-002, CCP-AK-INL-003, D001, P033, P028, P015, P212, P218, P507, P510, P511, PTS/CTS printouts, U060, U502, WSPFs ID-RF-S3121-374, ID-RF-S5126. BDRs for drums P10016080, 10001347, 10009600. CCTP-TP-005 Attachment 8, container lists, both waste streams. CCP acquired drum listings from Bechtel that are presented on the WSPFs and documented in PTS/CTS. Did not see full drum listing for all drums available; although some lists were available as part of the AK record (see Refs. U502, U602). CCP did not import historic drum "traveler" or other shipment documentation from INL into AK record. A list of containers that had undergone the entire characterization process was requested at the beginning of the inspection to facilitate traceability analysis from the drum to supporting AK documents. However, site personnel had difficulty producing this listing during the first day of the inspection, although the list was eventually provided. The source of this delay could not be ascertained during the

Attachment A.1: Acceptable Knowledge Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
					inspection, but the site (when preparing for inspection) must ensure that the status of each drum with respect to all characterization elements is readily known and retrievable to ensure that all characterization requirements are met. This is also necessary prior to shipment of waste drums. Further, since CCP and Bechtel will both be characterizing waste for shipment, adequate tracking of containers within their respective characterization programs and along a planned hierarchy will be important to ensure that only those wastes that are specifically authorized by each program are shipped.
Procedures for AK processes are consistent with each other		CCP-TP-005, Revision 15; CCP-PO-002, Revision 11; CCP-PO-001 Revision 10	Procedures for AK processes are implemented consistently	Y	CCP-TP-005 is consistently implemented at all CCP sites; use of this procedure was satisfactorily implemented. Note that the implementation of two different procedures (Bechtel and CCP) to characterize a waste stream could impart AK differences, but it should not be an issue with respect to CCP at INL if CCP and Bechtel keep the commitment not to ship the waste streams at the same time. (It would be better if both sites never shipped any waste characterized by the other program.)
The site's TRU waste management program has procedures to determine: • Waste categorization schemes (e.g., consistent definitions of waste streams) and terminology • Breakdown of the types and quantities of TRU waste generated/stored at the site • How waste is tracked and managed at the generator site (including historical and current operations)		CCP-TP-005, Revision 15		Y, in part	CCP-AK-INL-002, CCP-AK-INL-003, WSPFs ID-RF-S3121-374, ID-RF-S5126, P033, P028, P238, P507, P510, P511, U002, U085, U502, U602. Waste stream definition is consistent with how this waste was categorized and shipped at RFETS and INEEL; EPA expects a stringent adherence to the definition of waste stream in the WAC and WAP. Note that CCP did not produce a complete drum listing; also, tracking of drums by CCP to generate a drum status listing proved to be a

Attachment A.1: Acceptable Knowledge Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
					challenge. Drum status must be quickly retrievable and drum tracking must be maintained.
Procedures call for AK information to be collected for: ^{241}Am, ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{233}U, ^{234}U, ^{238}U, ^{90}Sr, ^{137}Cs, and unexpected radionuclides ferrous metals (in containers) cellulosics, plastics, rubber nonferrous metals (in containers)	Y	CCP-TP-005, Revision 15	AK information is collected for: ^{241}Am, ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{233}U, ^{234}U, ^{238}U, ^{90}Sr, ^{137}Cs, and unexpected radionuclides ferrous metals (in containers) cellulosics, plastics, rubber nonferrous metals (in containers) Specify isotopes/quantities defined by AK: • Must be appropriate and result in unbiased values for cumulative activity and mass of radionuclides Is AK information collected for isotopes?	Y	CCP-AK-INL-002, CCP-AK-INL-003, WSPFs ID-RF-S3121-374, ID-RF-S5126, P033, CCP-TP-005 Attachment 7, NDA-AK memo for both graphite and Building 374 sludges. The AK memo and AK summaries provide estimates of the top 10 radionuclides present in sludge and graphite; however, the documents do not include a quantitative estimate of important WMPs. Since graphite and sludge waste are predominantly these matrices, an estimate may not be available by AK for these waste streams. However, CCP must integrate ongoing and historic actual data collection results (i.e., RTR) and revise forthcoming versions of the AK summaries to include these numeric values. Forthcoming AK summaries for other wastes should include estimates, as available and appropriate.
Procedures require documentation of radionuclide process origin	Y	CCP-TP-005, Revision 15	Identified radionuclides and their isotopic distributions are consistent and accurate See AK confirmation	Y	CCP-AK-INL-002, CCP-AK-INL-003, WSPFs ID-RF-S3121-374, ID-RF-S5126, P033, CCP-TP-005 Attachment 7, NDA-AK memo for both graphite and Building 374 sludges, C102, P004, P015, P028, P174, P212, P218, P221, P205, P227, P238, P507, P511, P510. Waste-generating processes for wastes in terms of nuclide content are well documented and backed up by actual characterization data obtained by RFETS and INEEL.
			Radionuclides identified by AK and isotopic distributions are provided to NDA/radioassay personnel If AK data are provided to NDA personnel, data are available to operators	Y, in part	CCP-AK-INL-002, CCP-AK-INL-003, WSPFs ID-RF-S3121-374, ID-RF-S5126, P033, CCP-TP-005 Attachment 7, NDA-AK memo for both graphite and Building 374 sludges. NDA AK memo provided that documents calculation of ^{240}Pu and quantities derived using

Attachment A.1: Acceptable Knowledge Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
			prior to determination of isotopic quantities. Data use and limitations are well defined (refer to NDA checklist)		AK (^{242}Pu, ^{234}U, ^{90}Sr). The ^{234}U calculation was different than that used by Bechtel for the same wastes, although the difference in terms of calculated values using the two formulas is minimal. However, the formula for ^{234}U is only applicable to WG Pu; new formula must be acquired and used when heat-source plutonium is present.
Procedures require: • Assembling AK information • Compiling AK documentation into an auditable record (the process should include review of AK information to determine the WMPs and radionuclides present, as well as source info discrepancy resolution) • Assigning waste streams/WMCs • Identifying physical forms, WMPs, and radionuclides (including, if possible, isotopic ratios) • Resolving data discrepancies • Identifying management controls for discrepant items/containers/waste streams • Confirming AK information with other analytical results (done by comparing AK characterization data with that obtained through NDE and/or visual examination, including discrepancy resolution) • Auditing AK records	Y	CCP-TP-005, Revision 15	Compilation of AK documentation is adequately demonstrated From the CH-WAC If AK data discrepancy is identified, site will evaluate the source of the discrepancy to determine if discrepant information is credible. Information that is not credible will be identified as such and reasons for dismissing will be justified in writing. Limitations concerning information will be documented in the AK record and summarized in the AK report. If a discrepancy cannot be resolved, the site will perform direct measurements for the impacted population. Discrepancies are adequately resolved		CCP-AK-INL-002, CCP-AK-INL-003, WSPFs ID-RF-S3121-374, ID-RF-S5126, CCP-TP-005 Attachments 1, 4, 5, 6, 7, 8, 10, and 14 for both Graphite and 374 sludge, D122, C159, D001, NCR-INL-0216-05, NCR-0213-05, P015, P020, P028, P059, P169, P174, P212, P218, P507, P510, P511, U082, U085, U502, U602. CCP assembled and compiled AK supplemental and supporting information using Attachments 1 and 4 of procedure CCP-TP-005, Revision 15, to identify all source documents and to cross-correlate these with mandatory programmatic and waste stream-specific AK requirements. Data assembly and compilation were generally adequate. However, the site should assemble INL documentation (i.e., BNFL-5232-RPT-TRUW-07, Rev. 5, *Determination of Radioisotopic Content in TRU Waste Based on Acceptable Knowledge)*, as it is directly relevant to the subject waste streams. Also, the AK record for sites managing stored RFETS waste should include, as applicable, RFETS-derived analytical or measurement information and pertinent supplemental AK information, not just 3100-m^3 INEEL project data. Future waste streams characterized by CCP should include information from these sources, as applicable. If CCP elects to document AK-AK data discrepancies in the text of the AK summary, then

Attachment A.1: Acceptable Knowledge Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
					CCP must clearly identify the discrepancy in the text with an explanation of the resolution activities conducted and reference additional AK source documents, including interviews that were used to resolve the discrepancy. Data limitations examined were adequately documented, and discrepancies provided were resolved.
From the CH-WAC: • If AK was used (i.e., data collected prior to QA program), what method was employed to qualify the information? Approved methods or peer review, corroborating data, confirmatory testing, and QA program equivalency? • At a minimum, to confirm existing AK data, it is necessary to compare ratios of the two most prevalent radionuclides in the isotopic mix	Y	CCP-TP-005, Revision 15	AK confirmation based on NDE and/or visual examination is adequately demonstrated: (1) ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{241}Pu, ^{242}Pu and ^{241}Am: - Confirmation can be accomplished via comparison of measured and AK values for ^{239}Pu/ ^{240}Pu for WG Pu; ^{238}Pu/ ^{239}Pu for heat-source plutonium - Measured ^{241}Am can be used to calculate ^{241}Pu (for subsequent AK comparison) if time of chemical separation is known (no ^{241}Am at time of separation assumed) - ^{241}Pu can be compared (by ratio) to confirm AK of any plutonium isotope associated with WG/RG (i.e., ^{239}Pu or ^{240}Pu) - ^{238}Pu from AK for WG/RG Pu is assumed to be valid if the AK values of ^{239}Pu and ^{240}Pu have been confirmed by measurement - ^{242}Pu calculated by correlation techniques, since it can't be measured	Y, in part	CCP-AK-INL-002, CCP-AK-INL-003, BDRs for drums P10016080, 10001347, 10009600, CCP-TP-005 Attachments 7 and 13 for graphite and Building 374 sludge, P507, P510, P511, P169, P227, P238, U502, U602. The AK-NDA memo documents how AK will be used by NDA and states that, "in the event that an NDA measurement does not yield isotopic analysis results, default Pu isotopics will be used to compute results for Pu^{239} weapons grade material and default U isotopics will be used to compute U-234. If U^{235} and U^{238} are not detected, they will be reported as zero and <LLD respectively in accordance with the CH WAC." RFETS is all WG Pu. ^{242}Pu is calculated via ^{239}Pu proportionality. The derivation of ^{241}Am is not addressed in the memo. See the above concerns regarding calculation of ^{234}U based on EU/DU detection. ^{90}Sr/^{137}Cs assumed scaling of 1:1.1. Note that we expect memos for sources other than RFETS to address different components (i.e., heat-source Pu) and that these AK memos will differ in content from the two memos examined during the inspection. The two most prevalent isotopes by weight were identified.

Attachment A.1: Acceptable Knowledge Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
			(2) ^{235}U, ^{233}U, ^{238}U, ^{234}U: - Were they tracked or measured in AK information? - If no valid AK exists, data generated can only be used to detect or calculate, or confirm absence ratios for ^{234}U calculated from ^{235}U enrichment - If valid AK exists, confirm with certified systems - ^{234}U calculated by ^{235}U enrichment, because ^{234}U can't be measured (3) ^{137}Cs and ^{90}Sr: - Confirmed by WIPP-certified system (direct measurement or comparison of ^{241}Am peak at 662 keV to other ^{241}Am peaks (disproportionate ^{241}Am peak at 662 keV could mean presence of ^{137}Cs) - ^{90}Sr calculated from ^{137}Cs using scaling factors (4) Other radionuclides: - must identify via NDA and should identify via AK		
Procedures require that: • AK information must be compiled in an auditable record, including a road map for all applicable information • A reference list must be provided that identifies documents, databases, QA protocols, and other sources of information that support AK information	Y	CCP-TP-005, Revision 15	AK information is compiled in an auditable record, including a road map for all applicable information A reference list is provided that identifies documents, databases, QA protocols, and other sources of information that support AK information The overview of the facility and TRU waste management operations in the	Y	CCP-TP-005 Attachments 1 and 4, both graphite and Building 374 sludge, CCP-AK-INL-002, CCP-AK-INL-003, P015, P020, P028, P059, P169, P174, P212, P218, P221, P238, P502, P507, P510, P511, P169, P227, P238, U502, U602, NCR-INL-0216-05, NCR-0213-05. AK summaries and supporting documentation provided the mandatory programmatic and stream-specific AK information. As mentioned above,

Attachment A.1: Acceptable Knowledge Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
• The overview of the facility and TRU waste management operations in the context of the facility's mission must be correlated to specific waste stream information • Correlations between waste streams, with regard to time of generation, waste-generating processes, and site-specific facilities must be clearly described. For newly generated wastes, the rate and quantity of waste to be generated shall be defined • Nonconforming waste must be segregated			context of the facility's mission is correlated to specific waste stream information Correlations between waste streams, with regard to time of generation, waste-generating processes, and site-specific facilities, are clearly described. For newly generated wastes, the rate and quantity of waste to be generated are defined Nonconforming waste is segregated		EPA expects all waste streams to meet the specific definitions of waste stream in the CH-WAC and WAP; for example, if the components to the Building 374 sludge were debris and had not been "hopelessly commingled" as the wastewater sludges were, these components would be considered separate waste streams.
Procedures require that the following information will be included in the AK record: • Map of the site that identifies the areas and facilities involved in TRU waste generation, treatment, and storage • Facility mission description related to TRU waste generation and management • Description of the operations that generate TRU waste at the site and process information, including: — Area(s) or building(s) from which the waste stream was or is generated — Estimated waste stream volume and time period of generation — Waste-generating process description for each building or area — Process flow diagrams, if appropriate	Y	CCP-TP-005 Revision 15; CCP-PO-002, Revision 11; CCP-PO-001 Revision 10; Ch-WAC, Revision 3	The following information is in the AK record: • Map of the site that identifies the areas and facilities involved in TRU waste generation, treatment, and storage • Facility mission description related to TRU waste generation and management • Description of the operations that generate TRU waste at the site and process information, including: — Area(s) or building(s) from which the waste stream was or is generated — Estimated waste stream volume and time period of generation — Waste-generating process description for each building or	Y	CCP-TP-005. Attachments 1,4, and 7 for both Graphite and Building 374 Sludge., CCP-AK-INL-002, CCP-AK-INL-003, P212, P218, P221, P238, P502, P507, P510, P511, U082, WSPFs for Graphite and Building 374 Sludges, Process # 881-21-3 data. CCP has done a good job of assembling mandatory and supplemental information for the Graphite and Building 374 Sludge Waste streams, even though additional supplemental information should be incorporated into the record (see previous comment). NCRs are resolved prior to shipment. AK Summaries could be improved to include more information regarding the time of waste generation, etc. Future projections with respect to CCP managed waste should indicate whether the projected amount is part of a larger stream, all of the containers identified to date in a given stream, etc. CH-WAC requirements with respect to isotopic composition, processes, and numeric adjustments are addressed in the AK-NDA memo.

Attachment A.1: Acceptable Knowledge Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
— Generalized material inputs or other information that identifies the radionuclide content of the waste stream and the physical waste form — Types and quantities of TRU waste generated, including historical generation through future projections From the CH-WAC: • Waste identification/categorization schemes relevant to the isotopic composition of waste and description of isotopic composition of each waste stream • Physical/chemical waste composition that could affect isotopic distribution (i.e., processes to remove ingrown ^{241}Am) • Statement of all numerical adjustments applied to derive the material's isotopic distribution (e.g., scaling factors, decay/ingrowth corrections, and secular equilibrium considerations) • Specification of isotopic ratios for the 10 WIPP-tracked radionuclides and, if applicable, the radionuclides that comprise 95% of the hazard			area — Process flow diagrams, if appropriate — Generalized material inputs or other information that identifies the radionuclide content of the waste stream and the physical waste form — Types and quantities of TRU waste generated, including historical generation through future projections From the CH-WAC: • Waste identification/categorization schemes relevant to the isotopic composition of waste and description of isotopic composition of each waste stream • Physical/chemical waste composition that could affect isotopic distribution (i.e., processes to remove ingrown ^{241}Am) • Statement of all numerical adjustments applied to derive the material's isotopic distribution (e.g., scaling factors, decay/ingrowth corrections, and secular equilibrium considerations) • Specification of isotopic ratios for the 10 WIPP-tracked radionuclides and, if applicable, the radionuclides that comprise 95% of the hazard		
The site has procedures for the collection of supplemental information	Y	CCP-TP-005, Revision 15	Samples of supplemental information are sufficiently detailed and are	Y, in part	C063, C102, C159, P059, P169, P147, P174, P502, U082.

Attachment A.1: Acceptable Knowledge Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
			appropriate to the waste being characterized From the CH-WAC, examples of supplemental information include: • Safeguards and security and other material control systems/programs • Reports of nuclear safety or criticality • Accidents involving SNM waste packaging, and waste disposal • Building or nuclear material management area logs or inventory records • Site databases that provide SNM or nuclear material information test plans • Research project reports, or laboratory notebooks that describe the radionuclide content of materials used in experiments • Information from site personnel • Historical analytical data relevant to isotopic distribution in the waste stream		Several examples of supplemental information sources were examined. As discussed above, the AK records should also include additional supplemental information from the INL AMWTP record for applicable and common waste streams. Further, the site should assemble, in the future, analytical data from RFETS WEMS and other databases now present in Carlsbad as an additional source of supplemental information, as applicable.
Site documents/procedures require the facility to prepare an AK summary document that summarizes all information collected, including the basis for all waste stream designations	Y	CCP-TP-005 Revision 15; CCP-PO-002, Revision 11; CCP-PO-001, Revision 10	The AK summary is available for EPA review and contains the required information, including the basis for all waste stream designations	Y, in part	CCP-AK-INL-002, CCP-AK-INL-003. AK summaries examined were relatively complete, although the following changes should be made in the next revision: • Table 5-1 presenting waste stream volume and generation dates must be updated to include the number of containers by IDC and generation date ranges

Attachment A.1: Acceptable Knowledge Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
					• General estimates of WMPs by percentages (incorporating information obtained through RTR, etc.) • Integrate additional information from RFETS WEMs, WSPFs, and other data sources that could augment the AK record; this will be particularly important for wastes originating from RFETS that have not yet been assessed by other sites • Add reference numbers to Section 6 supplemental waste stream information listings Note that the AK summaries provided prior to inspection did not include load management. A revision to each was provided during the inspection that adequately addresses the facility's intent to perform load management. In the future, EPA requires notification of a site's intent to implement load management at least 2 weeks prior to any inspection.
Site procedures require that additional information be collected before waste may be shipped if the required AK information is not available for a waste stream	Y	CCP-TP-005, Revision 15	Additional information is collected before waste may be shipped if the required AK information is not available for a waste stream	Y	No additional information is required; all required data are present.
The site has a written procedure for the confirmation of AK information using analytical data, including NDA/NDE and/or VE This procedure applies to both retrievably stored and newly generated waste This procedure requires a reevaluation of AK if NDE/NDA or VE identify it to be a different WMC. This procedure describes how the waste must be reassigned, based on the AK reevaluation	Y	CCP-TP-005, Revision 15; CCP-PO-002, Revision 11; CCP-PO-001, Revision 10	AK information is confirmed using analytical data, including NDA/NDE and/or VE Has the AK expert calculated the percent changes in MPCs based on AK and NDE/VE? Were accuracy evaluations assigned? Are these acceptable?	Y, in part	CCP-TP-005 Attachment 10 (LLNL example). No WMC changes were yet identified, so no site-specific Attachment 10 could be provided. Note that the percent MPC changes and miscertification rate calculations had not been made for the graphite and Building 374 waste streams; examples from other facilities were provided, but site-specific percent changes and miscertification rate calculations must be provided when ready.

Attachment A.1: Acceptable Knowledge Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
Procedures require the following steps to be followed if wastes are reassigned to a different WMC based on NDA/NDE or VE: • Review existing information based on the container ID number and document all differences • Reassess and document all analytical data associated with the waste • Reevaluate WMP determinations and document any changes • Reevaluate the radionuclide content and document any changes • Verify and document that the reassigned WMC was generated within the specified time period, area and buildings, and waste-generating process, and that the process material inputs are consistent with the WMPs identified during radiography or VE • Record all changes to AK records • If discrepancies exist in the AK information for the reassigned WMC, complete a nonconformance report, document the segregation of this container, and define the corrective actions necessary to fully characterize the waste	Y	CCP-TP-005 Revision 15	The following steps are followed if wastes are reassigned to a different WMC: • Review existing information based on the container ID number and document all differences • Reassess and document all analytical data associated with the waste • Reevaluate WMP determinations and document any changes • Reevaluate the radionuclide content and document any changes • Verify and document that the reassigned WMC was generated within the specified time period, area and buildings, and waste-generating process, and that the process material inputs are consistent with the WMPs identified during radiography or VE • Record all changes to AK records • If discrepancies exist in the AK information for the reassigned WMC, complete a nonconformance report, document the segregation of this container, and define the corrective actions necessary to fully characterize the waste	Y	No examples to date; CCP-TP-005 Attachment 10 for LNL provided to demonstrate that the form can be filled out by CCP.
Does the site have procedures for shipment revocation and procedures for notification of CBFO when a container is revoked?	Y	CCP-TP-005, Revision 15	Has a waste stream been revoked based either on AK information or reassessment as part of reconfirmation? If so, was the procedure(s) followed?	Y	No shipments have been revoked from CCP INL to date.

Attachment A.1: Acceptable Knowledge Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
Until discrepancies are resolved, shipment of the waste stream to the WIPP is prohibited	Y	CCP-TP-005, Revision 15	If data consistently indicate discrepancies with AK information, the site increases sampling, reassesses the materials and processes that generate the waste, and resubmits waste stream profile information	Y	See above.

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
Site procedures identify required training and qualifications for VE personnel	Y	CCP-QP-002, Revision 16; CCP-TP-006, Revision 4, Table 1; HFEF-OI-6890, Revision 5, Appendices A and B; BBWI INEEL MCP-2610, Revision 4	• VE expert's explanation of job duties was consistent with applicable procedures • VE expert could name prohibited items • VE expert's explanation of required actions if prohibited items were encountered was consistent with procedure • VE expert could identify applicable policies and procedures governing the operation of VE equipment • VE expert adequately explained the consequences of misidentifying prohibited items	Y	Two distinct VE activities were inspected—VE as QC check of RTR (retrievably stored waste, S3000 and S5000) and VE for newly generated waste from Pit 4 (S3000, S4000 and S5000). VE of Newly Generated Waste (Pit 4): The process used for VE of newly generated waste from Pit 4 was demonstrated for the EPA inspector. Earth-moving equipment is used to uncover the buried containers and retrieve the waste. This process follows a predetermined pattern so that the site can identify the type of waste unearthed at each location. As one section is completed, the excavated soil is used to back fill the trenches. The targeted waste is identified by a retrieval specialist using two cameras loaded onto the excavator. The waste is then loaded into trays that have liners with four loops that facilitate the loading of the waste into a preweighed 55-gallon drum at the end of the VE process. The waste tray is loaded and pulled into a glove box. Operators use hand tools to sort through the waste and identify items contained in the tray. Waste items identified are recorded electronically in Attachment 1 of procedure CCP-TP-006, Revision 4. Heavy items, such as graphite moulds, are not weighed, and their weight is determined by the difference between the fully loaded and empty drum weights. Attachment 1 has an embedded software program to calculate material parameter weights. Weights for heavy items, such are graphite moulds, are determined by the difference between the full and empty drum weights (minus any items actually weighed). Attachment 1, Section 3, is used to verify the absence of prohibited items. The waste used in the demonstration consisted of graphite moulds (S5000). Although only VE of debris waste was demonstrated, this process is also appropriate for S3000 (homogeneous solids) and S4000 (soil/gravel) waste. Batches for this VE process are not restricted to waste of the same Waste matrix code. BDRs were reviewed on site during the inspection.

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
					EPA Concern/Finding, Issue No. INL-CCP-VE-05-003CR: During the inspection, a recurring problem was identified in the spreadsheet software used to calculate material parameter weights in the VE process at Pit 4. The inspection team found several material parameters that were incorrect, specifically concrete, graphite, ceramics, and plastic. ICP-CCP personnel had identified this problem independently and had initiated NCR ICP-CCP NCR0004-05 on March 10, 2005, to address this issue. EPA Concern/Finding, Issue No. INL-CCP-VE-05-004CR: The procedure (CCP-TP-006, Revision 4, Section 4.2.4) does not describe actual practice with regard to weighing items during the VE process. Objective evidence reviewed: (1) EPA Concern/Finding, Issue No. INL-CCP-VE-05-003CR (2) EPA Concern/Finding, Issue No. INL-CCP-VE-05-004CR (3) BDRs: IN-ARP-VE-000026, IN-ARP-VE-000032 (S4200) IN-ARP-VE-000117, IN-ARP-VE-000119 (S3900, S5400) VE as QC Check of RTR: This examination takes place in the Materials and Fuels Complex (formerly the ANL-W facility) and is performed in a glove box. The EPA inspector observed the VE evolution for drum IDRF001213626 (debris), together with completion of the required documentation. The personnel performing this demonstration were Jim Magnan, VEE; Julie Colborn and Terry Tripp, operators; and Brian Lundell, audio/visual recording operator and individual who completed the required documentation. The operators process the drum and remove the waste items, which are then identified by the VEE. The audio/visual operator documents items as called out by the VEE and makes voice entries of the same. Appendix A of procedure HFEF-OI-6890, Revision 5, is used to document the VE data as they are generated. As part of the VE examination, the presence or absence of prohibited items is also documented in Appendix B of the procedure. If a prohibited item is

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
					found in the subject drum, first an IDR is initiated, followed by an NCR. Operator Aid #15, Revision C, is a list of waste items and their associated weights, a table for the calculation of cylinder volumes, and waste matrix parameter densities. This operator aid is used to calculate the weights of the waste items removed from the drum. Operator Aid #38 is used to calculate the volume of sludge in S3121 drums. For debris waste, percent utilization is calculated from the height of the waste in the repackaged drum. Waste is repackaged into a new drum upon completion of the VE event. Although this VE technique was observed only for debris waste (S5000), it is also applicable for homogeneous solids (S3000). Training records for the VE personnel were reviewed during the inspection. Objective evidence reviewed: (1) ANL-W training qualification for waste characterization operators Terry Tripp, Brian Lundell (2) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121) (3) Posted Operator Aid #15 (4) Posted Operator Aid #38 (5) ANL-W IDR #38099 (6) NCR #38099
	Y	CCP-QP-002, Revision 16; BBWI INEEL MCP-2610, Revision 4	• VE expert's training was consistent with applicable procedures • VE expert's certification is current	Y	<u>VE of Newly Generated Waste (Pit 4)</u>: The personnel executing the VE demonstration were A. Romo and L.J. Walker, who are designated SMEs, and operators Mary Duenes and Roger Draper. VE personnel training records for the SMEs and operators were reviewed during the onsite inspection. The training was current and adequately documented. Objective evidence reviewed:

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
					(1) Qualification cards for SMEs A. Romo, L.J. Walker (2) Qualification cards for operators Carol Bottoms, Lashell Alade, Roger Draper, Brad Stark, Maggie Holverson VE as QC Check of RTR: This examination takes place in the Materials and Fuels Complex (formerly the ANL-W facility). The EPA inspector observed the VE evolution for drum IDRF001213626 (debris), together with completion of the required documentation. For the graphite waste contained in the demonstration drum, the weight is calculated by the difference between the weight of the full drum minus the weight of other waste items contained within the drum. The utilization of the drum is calculated independently by the VEE and audio/visual operator as a QC check of the calculation. Training records for the VEE and operators were reviewed on site during the inspection. Objective evidence reviewed: (1) ANL-W training qualification for waste characterization operators Terry Tripp, Brian Lundell (2) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121)
	Y	CCP-QP-002, Revision 16; CCP-TP-006, Revision 4, Attachment 1; HFEF-OI-6890, Revision 6, Section	• VE expert identified the types of waste matrices, parameters, and specific items likely to be encountered at this specific site • Operator identified typical items • Operator identified the various waste container	Y	VE of Newly Generated Waste (Pit 4): Attachment 1, used for the electronic recording of VE data, contains all of the targeted waste items expected to be found in Pit 4. If an item not in the Attachment is consistently found, it can be added. An NCR would be issued for the item and the AK group would be informed of the addition so that the AK record could be updated. If an item is infrequently found, it is entered into Attachment 1, Section 2, No. 12, "Waste Parameter and Item Description," heading "h, Other." The VE evolution for debris during the inspection was evaluated and

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
		8.1.1 [1], Attachment A; Operator Aid #15, Revision C; Operator Aid #38; BBWI INEEL MCP-2610, Revision 4	packaging configurations and liners • VE expert had been tested on examining waste containers with items common to the waste streams generated/stored at the site		training records and BDRs were reviewed. Objective evidence reviewed: (1) Qualification cards for SMEs A. Romo, L.J. Walker (2) Qualification cards for operators Carol Bottoms, Lashell Alade, Roger Draper, Brad Stark, Maggie Holverson (3) BDRs: IN-ARP-VE-000026, IN-ARP-VE-000032 (S4200) IN-ARP-VE-000117, IN-ARP-VE-000119 (S3900, S5400) VE as QC Check of RTR: This examination takes place in the Materials and Fuels Complex (formerly the ANL-W facility) and is performed in a glove box. The EPA inspector observed the VE evolution for drum IDRF001213626 (debris), together with completion of the required documentation. The personnel performing this demonstration were Jim Magnan, VEE; Julie Colborn and Terry Tripp, operators; and Brian Lundell, audio/visual recording operator and completer of required documentation. The operators process the drum and remove the waste items, which are then identified by the VEE. The audio/visual operator documents items as called out by the VEE and makes voice entries of the same. Appendix A of procedure HFEF-OI-6890, Revision 5, is used to document the VE data as they are generated. As part of the VE examination, the presence or absence of prohibited items is also documented. Operator Aid #15, Revision C, is a list of waste items and their associated weights, a table for the calculation of cylinder volumes, and waste matrix parameter densities. This operator aid is used to calculate the weights of the waste items removed from the drum. Operator Aid #38 is used to calculate the volume of sludge in S3121 drums. For debris waste, percent utilization is calculated from the height of the waste in the repackaged drum. Training records for the VE personnel were reviewed during the inspection.

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
					Although this VE technique was observed only for debris waste (S5000), it is also applicable for homogeneous solids (S3000). Objective evidence reviewed: (1) ANL-W training qualification for waste characterization operators Terry Tripp, Brian Lundell (2) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121) (3) Posted Operator Aid #15 (4) Posted Operator Aid #38
	Y	CCP-TP 006, Revision 4, Attachment 1; HFEF-OI-6890, Revision 5, Sections 8.1.2, 8.2.3, Appendices A and B; Operator Aid #15; Revision C; Operator Aid #38	• VE expert/reader's explanation of how to operate the data recording system was consistent with applicable procedures • The video camera was focused prior to the start of VE • VE expert's verbal description of the inner bag/packages inventory was recorded • If an automated data entry system is used, the VE expert could navigate through the various screens	Y	<u>VE of Newly Generated Waste (Pit 4)</u>: Video/audio recording is not required for VE of newly generated waste. Attachment 1, used for the electronic recording of VE data, contains all of the targeted waste items expected to be found in Pit 4. As items were identified during the demonstration, an operator entered their descriptions into the electronic form. The presence of bags and packages is documented in Attachment 1, Section 4. If an unopened bag is found in the waste, the operator calls the facility manager for instructions on how to proceed with the VE. Due to safety considerations, unopened bags are considered prohibited items by the facility manager and dispositioned accordingly. The absence of listed prohibited items is documented in Attachment 1, Section 3. Objective evidence reviewed: (1) BDRs: IN-ARP-VE-000026, IN-ARP-VE-000032 (S4200) IN-ARP-VE-000117, IN-ARP-VE-000119 (S3900, S5400) <u>VE as QC Check of RTR</u>: The EPA inspector observed the VE evolution for drum IDRF001213626 (debris), together with completion of the required documentation. For the VE demonstration, the operator had already performed the required audio/visual checks, but the inspector observed the camera images recorded for this examination. Additionally, the

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
					audio/visual recording for S3121 drum 10009600 was reviewed as part of the inspection. The operators process the drum and remove the waste items, which are then identified by the VEE. The audio/visual operator documents items as called out by the VEE and makes voice entries of the same. Appendix A of procedure HFEF-OI-6890, Revision 5, is used to document the VE data as they are generated. As part of the VE examination, the presence or absence of prohibited items is also documented in Appendix B of the procedure. Objective evidence reviewed: (1) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121) (2) Posted Operator Aid #15 (3) Posted Operator Aid #38
Current versions of all relevant procedures and technical guidance documents were located in the VE room	Y	CCP-TP-006, Revision 4, Tables 3 and 4, Attachment 1; HFEF-OI-6890, Revision 5, Appendices A and B; Operator Aid #15, Revision C; Operator Aid #38	VE procedures: • Instruct employees on how to conduct a VE from start to finish • Are sufficiently detailed to enable the operator to determine if a waste container meets the criteria of 40 CFR 194.24 with regard to identifying applicable parameters with waste limits • Outline the steps to be taken by the examiner if a prohibited item is identified • Establish standard nomenclature, based on current site practice, so that all staff recognize waste by the same descriptors	Y	<u>VE of Newly Generated Waste (Pit 4)</u>: Attachment 1, used for electronic recording of VE data, contains all of the targeted waste items expected to be found in Pit 4. As items were identified during the demonstration, an operator entered their descriptions into the electronic form. Waste material parameter estimates are document in Section 2 of Attachment 1. The absence of prohibited items is documented in Attachment 1, Section 3. If a prohibited item is found, the VE evolution is stopped so that the facility manager can be consulted for disposition. VE evolution and completion of Attachment 1 for debris waste were observed during the inspection. Objective evidence reviewed: (1) BDRs: IN-ARP-VE-000026, IN-ARP-VE-000032 (S4200) IN-ARP-VE-000117, IN-ARP-VE-000119 (S3900, S5400) <u>VE as QC Check of RTR</u>: The EPA inspector observed the VE evolution for drum IDRF001213626 (debris), together with completion of the required

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
					documentation. For the VE demonstration, the operator had already performed the required audio/visual checks, but the inspector observed the camera images recorded for this examination. Additionally, the audio/visual recording for S3121 drum 10009600 was reviewed as part of the inspection. The operators process the drum and remove the waste items, which are then identified by the VEE. The audio/visual operator documents items as called out by the VEE and makes voice entries of the same. Appendix A of procedure HFEF-OI-6890, Revision 5, is used to document the VE data as they are generated. As part of the VE examination, the presence or absence of prohibited items is also documented in Appendix B of the procedure. Objective evidence reviewed: (1) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121) (2) Posted Operator Aid #15 (3) Posted Operator Aid #38
	Y	CCP-TP-006, Revision 4, Section 4.2; HFEF-OI-6890, Revision 56, Sections 6.7, 8.1.1 [1], Appendix A; Operator Aid #15, Revision C; Operator Aid #38	• If the bags are not opened, a brief written description of the contents of the bags is prepared with estimates of the amount of each waste type in the bags • The site uses AK to identify the matrix parameter category and to estimate WMPs present	Y	<u>VE of Newly Generated Waste (Pit 4)</u>: During the VE evolution, the WMPs are estimated and the WMC confirmed (Attachment 1, Sections 2 and 5). The presence of bags and packages is documented in Attachment 1, Section 4. If an unopened bag is found in the waste, the operator calls the facility manager for instructions on how to proceed with the VE. Due to safety considerations, unopened bags are considered prohibited items by the facility manager and dispositioned accordingly. Objective evidence reviewed: (1) BDRs: IN-ARP-VE-000026, IN-ARP-VE-000032 (S4200) IN-ARP-VE-000117, IN-ARP-VE-000119 (S3900, S5400) <u>VE as QC Check of RTR</u>: All bags are opened during VE as a QC check of RTR. During the demonstration, two inner bags were described, documented, and then opened. Waste items of this type are not weighed, but their weights are

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
					calculated using Operator Aid #15. Operator Aid #15 includes items that the waste streams examined are expected to contain. Objective evidence reviewed: (1) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121) (2) Posted Operator Aid #15
There is a procedure for handling instances when the VE expert is unable to see through the inner plastic bags/packages/containers of waste	Y	HFEF-OI-6890, Revision 5, Section 6.7; Operator Aid #15, Revision C	• The VE expert has decisionmaking criteria for assessing the need to open the bags/packages in order to identify all of their contents	Y	<u>VE of Newly Generated Waste (Pit 4)</u>: The presence of bags and packages is documented in Attachment 1, Section 4. If an unopened bag is found in the waste, the operator calls the facility manager for instructions on how to proceed with the VE. Due to safety considerations, unopened bags are considered prohibited items by the facility manager and dispositioned accordingly. Objective evidence reviewed: (1) BDRs: IN-ARP-VE-000026, IN-ARP-VE-000032 (S4200) IN-ARP-VE-000117, IN-ARP-VE-000119 (S3900, S5400) <u>VE as QC Check of RTR</u>: All bags are opened during VE as a QC check of RTR. During the demonstration, two inner bags were described, documented, and then opened. Waste items of this type are not weighed, but their weights are calculated using Operator Aid #15. Operator Aid #15 includes items that the waste streams examined are expected to contain. Objective evidence reviewed: (1) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121) (2) Posted Operator Aid #15
	Y	HFEF-OI-6890, Revision 5, Section 8.1.1; Operator	Prior to starting the VE, the VE expert reviewed all documented data related to the waste container and its contents:	Y	<u>VE of Newly Generated Waste (Pit 4)</u>: The presence of bags and packages is documented in Attachment 1, Section 4. If an unopened bag is found in the waste, the operator calls the facility manager for instructions on how to proceed with the VE. Due to safety considerations, unopened bags are considered prohibited

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
		Aid #15, Revision C	• If the VE expert determined in advance to open all bags/packages in a waste container of a particular TRUCON code, matrix parameter category, and/or IDC, this decision was based on AK or data from previous examinations of the waste • The VE expert documented the basis for these decisions		items by the facility manager and dispositioned accordingly. Objective evidence reviewed: (1) BDRs: IN-ARP-VE-000026, IN-ARP-VE-000032 (S4200) IN-ARP-VE-000117, IN-ARP-VE-000119 (S3900, S5400) <u>VE as QC Check of RTR</u>: All bags are opened during VE as a QC check of RTR. During the demonstration, two inner bags were described, documented, and then opened. Waste items of this type are not weighed, but their weights are calculated using Operator Aid #15. Operator Aid #15 includes items that the waste streams examined are expected to contain. Objective evidence reviewed: (1) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121) (2) Posted Operator Aid #15
	Y	CCP-TP-006, Revision 4, Tables 3 and 4, Attachment 1; HFEF-OI-6890, Revision 5, Appendices A and B; Operator Aid #15, Revision C; Operator Aid #38	VE staff have access to standardized charts or tables to aid in the consistent estimation/assignment of weights, WMPs, and WMCs: • The estimated WMP weights are determined by compiling an inventory of waste items, residual materials, and packaging materials • The items on the inventory list are sorted by WMP and combined with a standard weight lookup table to provide an estimate of WMP weights	Y	<u>VE of Newly Generated Waste (Pit 4)</u>: Attachment 1, used for electronic recording of VE data, contains all of the targeted waste items expected to be found in Pit 4. As items were identified during the demonstration, an operator entered their descriptions into the electronic form. WMP estimates are documented in Section 2 of Attachment 1. During the VE evolution, the waste stream and WMC are confirmed and documented in Attachment 1, Section 5. The absence of prohibited items is documented in Attachment 1, Section 3. If a prohibited item is found, the VE evolution is stopped so that the facility manager can be consulted for disposition. VE evolution and completion of Attachment 1 for debris waste were observed during the inspection. EPA Finding INL-CCP-VE-05-003CR was issued with regard to the calculation software for WMP weights.

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
			• References tables are updated as the site gains information from VE		Objective evidence reviewed: (1) BDRs: IN-ARP-VE-000026, IN-ARP-VE-000032 (S4200) IN-ARP-VE-000117, IN-ARP-VE-000119 (S3900, S5400) VE as QC Check of RTR: The operators process the drum and remove the waste items, which are then identified by the VEE. The audio/visual operator documents items as called out by the VEE and makes voice entries of the same. Appendix A of procedure HFEF-OI-6890, Revision 5, is used to document the VE data as they are generated. As part of the VE examination, the presence or absence of prohibited items is also documented on Appendix B of the procedure. Operator Aid # 15, Revision C, is a list of waste items and their associated weights, a table for the calculation of cylinder volumes, and waste matrix parameter densities. This operator aid is used to calculate the weights of the waste items removed from the drum. Operator Aid #38 is used to calculate the volume of sludge in S3121 drums. For debris waste, percent utilization is calculated from the height of the waste in the repackaged drum. Although this VE technique was observed only for debris waste (S5000), it is also applicable for homogeneous solids (S3000). Objective evidence reviewed: (1) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121) (2) Posted Operator Aid #15 (3) Posted Operator Aid #38
	Y	CCP-TP-006, Revision 4, Sections 4.2.4, 4.3, Attachment 1; HFEF-OI-6890, Revision 5,	The VE expert's description of the contents of the waste container includes: • Height and shape of the waste in the container, so that the volume of the container and the volume utilization percentage can be determined	Y	VE of Newly Generated Waste (Pit 4): The waste and tray liner are loaded into a preweighed 55-gallon drum after completion of the VE event. The tray liner is attached to a hoist by the four tray liner loops and is raised above the tray. Operators manipulate the waste items to minimize protrusions that could cause the liner to tear during drum loading. As needed, the operators apply tape to the outside of the liner to add extra protection to the liner. The waste and tray liner are loaded into the drum through a sleeve, which forms the drum liner. After loading the waste into a drum, the height of the

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
		Section 8.2.3 [1], Appendices A and B; Operator Aid #15, Revision C; Operator Aid #38	• Estimation of the utilized waste container volume percentage using the highest point and shape of waste in a waste container The VE expert describes the location, container, and estimated volume (as a percent of the container volume and depth of liquid within the container) of any liquids detected		waste is measured and the volume utilization calculated. The drum liner material is cut and closed. The drum is then closed with a vented lid, and the final drum weight is documented. Attachment 1, Section 4, is used to document the closure data for the drum. Objective evidence reviewed: (1) BDRs: IN-ARP-VE-000026, IN-ARP-VE-000032 (S4200) IN-ARP-VE-000117, IN-ARP-VE-000119 (S3900, S5400) <u>VE as QC Check of RTR</u>: The operators process the drum and remove the waste items, which are then identified by the VEE. The audio/visual operator documents items as called out by the VEE and makes voice entries of the same. Appendix A of procedure HFEF-OI-6890, Revision 5, is used to document the VE data as they are generated. As part of the VE examination, the presence or absence of prohibited items is also documented on Appendix B of the procedure. Operator Aid # 15, Revision C, is a list of waste items and their associated weights, a table for the calculation of cylinder volumes, and waste matrix parameter densities. This operator aid is used to calculate the weights of the waste items removed from the drum. Operator Aid #38 is used to calculate the volume of sludge in S3121 drums. After repackaging debris waste into a 55-gallon drum, percent utilization of the drum is calculated from the height of the waste. Training records for the VE personnel were reviewed during the inspection. Although this VE technique was observed only for debris waste (S5000), it is also applicable for homogeneous solids (S3000). Objective evidence reviewed: (1) ANL-W training qualification for waste characterization operators Terry Tripp, Brian Lundell (2) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121) (3) Posted Operator Aid #15 (4) Posted Operator Aid #38

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
	Y	CCP-TP-006, Revision 4, Tables 3 and 4, Attachment 1; HFEF-OI-6890, Revision 5, Sections 8.1.2 [4], 8.2.3 [8], Appendix A; Operator Aid #15, Revision C	VE staff record the VE image and observations: • A VE data form is used to document the matrix parameter category and estimated WMP weights of the waste • An audio/videotape is made of the waste container exam and maintained as a nonpermanent record	Y	<u>VE of Newly Generated Waste (Pit 4)</u>: Video/audio recording is not required for VE of newly generated waste. Attachment 1 is used to document the matrix parameter category and estimated WMP weights of the waste. Objective evidence reviewed: (1) BDRs: IN-ARP-VE-000026, IN-ARP-VE-000032 (S4200) IN-ARP-VE-000117, IN-ARP-VE-000119 (S3900, S5400) <u>VE as QC Check of RTR</u>: The EPA inspector observed the VE evolution for drum IDRF001213626 (debris), together with completion of the required documentation. For the VE demonstration, the operator had already performed the required audio/visual checks, but the inspector observed the camera images recorded for the demonstration VE. Additionally, the audio/visual recording for S3121 drum 10009600 was reviewed as part of the inspection. Although this VE technique was observed only for debris waste (S5000), it is also applicable for homogeneous solids (S3000). Operator Aid #15, Revision C, is a list of waste items and their associated weights, a table for the calculation of cylinder volumes, and waste matrix parameter densities. This operator aid is used to calculate the weights of the waste items removed from the drum. BDRs for both S5000 and S3000 waste streams were reviewed during the onsite inspection. Objective evidence reviewed: (1) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121) (2) Posted Operator Aid #15 (3) Posted Operator Aid #38
	Y	CCP-TP-006, Revision 4,	The number of liners and types of liners present in the waste container is documented:	Y	<u>VE of Newly Generated Waste (Pit 4)</u>: The waste and tray liner are loaded into a pre-weighed 55-gallon drum after completion of the VE event. The tray liner is attached to a hoist

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
		Section 4.1.6, Attachment 1; HFEF-OI-6890, Revision 5, Section 8.2.2, Appendix A; Operator Aid # 15, Revision C	• Individual inner bags/packages, if present, are removed from the poly liner(s) • All inner bag/packages are labeled and weighed using a calibrated mass balance		by the four tray liner loops and is raised above the tray. Operators manipulate the waste items to minimize protrusions that could cause the liner to tear during drum loading. As needed, the operators apply duct tape to the outside of the liner to add extra protection to the liner. The drum is loaded through a sleeve, which forms the drum liner. After loading the waste into a drum, the height of the waste is measured and the volume utilization calculated. The drum liner material is cut and closed. The drum is then closed with a vented lid, and the final drum weight is documented. Attachment 1, Section 4, is used to document the closure data for the drum. Specially, Attachment 1, Section 4, Nos. 19 and 20, document the inner bags and liners present. Objective evidence reviewed: (1) BDRs: IN-ARP-VE-000026, IN-ARP-VE-000032 (S4200) IN-ARP-VE-000117, IN-ARP-VE-000119 (S3900, S5400) <u>VE as QC Check of RTR</u>: All bags are opened during VE as a QC check of RTR. During the demonstration, two inner bags were described, documented, and then opened. Waste items of this type are not weighed, but their weights are calculated using Operator Aid #15. Operator Aid #15, Revision C, is a list of waste items and their associated weights, a table for the calculation of cylinder volumes, and waste matrix parameter densities. During the demonstration, the bottom of the liner bag could not be removed from the original drum. This event was recorded visually and documented on the audio recording. Objective evidence reviewed: (1) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121) (2) Posted Operator Aid #15
	Y	CCP-TP-006, Revision 4, Attachment	The inventory includes a description of all waste items, residual materials, packaging materials, and/or WMPs	Y	<u>VE of Newly Generated Waste (Pit 4)</u>: Video/audio recording is not required for VE of newly generated waste. Attachment 1 is used to document the matrix parameter category and

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
		1; HFEF-OI-6890, Revision 5, Section 8.2.3 [8], Appendices A and B; Operator Aid #15, Revision C	contained both in and outside of the inner bag/package: • Estimates of the weights of the waste items, residual materials, packaging materials, and/or WMPs are recorded on both audiotape and the VE data form • The weight of the empty container and its rigid poly liner, if present, is recorded and documented • The gross weight of the waste container (container plus contents) is recorded on the VE data form • The total number of bags/packages is recorded on the data form		estimated WMP weights of the waste. Heavy items, such as graphite moulds, are not weighed, and their weight is determined by the difference between the fully loaded and empty drum weights. Attachment 1 has an embedded software program to calculate material parameter weights. Attachment 1, Section 4, Nos. 19 and 20, document the inner bags and liners present. Scale checks are performed and documented in Attachment 1, Section 1. Prior to loading the waste, the weight of the empty drum and lid is documented on Attachment 1. After loading and closure, a final weight of the full drum is documented. The scale used for obtaining the drum weights is calibrated before use (Attachment 1, Section 1). EPA Finding INL-CCP-VE-05-003CR was issued with regard to the calculation software for WMP weights. Objective evidence reviewed: (1) BDRs: IN-ARP-VE-000026, IN-ARP-VE-000032 (S4200) IN-ARP-VE-000117, IN-ARP-VE-000119 (S3900, S5400) <u>VE as QC Check of RTR</u>: The operators process the drum and remove the waste items, which are then identified by the VEE. The audio/visual operator documents items as called out by the VEE and makes voice entries of the same. Appendix A of procedure HFEF-OI-6890, Revision 5, is used to document the VE data as they are generated. As part of the VE examination, the presence or absence of prohibited items is also documented on Appendix B of the procedure. Operator Aid #15, Revision C, is a list of waste items and their associated weights, a table for the calculation of cylinder volumes, and waste matrix parameter densities. This operator aid is used to calculate the weights of the waste items removed from the drum. Although this VE technique was observed only for debris waste (S5000), it is also applicable for homogeneous solids (S3000). Objective evidence reviewed: (1) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126)

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Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
					WCV-10010345, WCV-10009600 (S3121) (2) Posted Operator Aid #15
	Y	CCP-TP-006, Revision 4, Section 4.4, Attachment 2-4; HFEF-OI-6890, Revision 5, Appendix A	VE testing data reports: • Provide batch/sample ID number • Identify the appropriate matrix parameter categories listed in the BIR that contain information sufficient to estimate weights of WMPs • Contain data review checklists for each test verifying that the data generation-level review, validation, and verification took place	Y	<u>VE of Newly Generated Waste (Pit 4)</u>: BDRs were reviewed during the onsite inspection. All of the BDRs reviewed contained completed Attachment 1 forms and data generation- and project-level review checklists. Objective evidence reviewed: (1) BDRs: IN-ARP-VE-000026, IN-ARP-VE-000032 (S4200) IN-ARP-VE-000117, IN-ARP-VE-000119 (S3900, S5400) <u>VE as QC Check of RTR</u>: BDR project level reviews by the SPM and SPQAO are performed by CCP personnel. The data packages, for VE as a QC check of RTR, contain the project-level review checklists and the "CCP Radiography/Visual Examination Comparison Report" (CCP-TP-003-A13, Revision 0). Objective evidence reviewed: (1) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121)
	Y	CCP-TP-006, Revision 4, Attachments 1 and 4; HFEF-OI-6890, Revision 5, Appendices A and B; Operator Aid #15, Revision C	• The procedure is adequately implemented • Corrective actions are taken when necessary	Y	<u>VE of Newly Generated Waste (Pit 4)</u>: The VE process for debris (S5000) waste and completion of the required documentation (Attachment 1) were observed. None of the BDRs reviewed had NCRs associated with them, but the FQAO checklist requires verification of the disposition of any NCRs associated with batch drums. The BDRs were complete and contained Attachment 1 forms and data generation- and project-level review checklists. Objective evidence reviewed: (1) BDRs: IN-ARP-VE-000026, IN-ARP-VE-000032 (S4200) IN-ARP-VE-000117, IN-ARP-VE-000119 (S3900, S5400)

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
					VE as QC Check of RTR: This examination takes place in the Materials and Fuels Complex (formerly the ANL-W facility) and was performed in a glove box. The EPA inspector observed the VE evolution for drum IDRF001213626 (debris), together with completion of the required documentation. This VE procedure was implemented as documented in HFEF-OI-6890, Revision 5. The operators process the drum and remove the waste items, which are then identified by the VEE. The audio/visual operator documents items as called out by the VEE and makes voice entries of the same. Appendix A of procedure HFEF-OI-6890, Revision 5, is used to document the VE data as they are generated. As part of the VE examination, the presence or absence of prohibited items is also documented on Appendix B of the procedure. Operator Aid #15, Revision C, is a list of waste items and their associated weights, a table for the calculation of cylinder volumes, and waste matrix parameter densities. This operator aid is used to calculate the weights of the waste items removed from the drum. Operator Aid #38 is used to calculate the volume of sludge in S3121 drums. Percent utilization of the drum is calculated from the height of the waste. Waste is repackaged into a new drum upon completion of the VE event. NCRs are initiated as required, and the VE personnel were able to explain the process used. An IDR is completed, and then an NCR is initiated if required (for example, a prohibited item is found). Although this VE technique was observed only for debris waste (S5000), it is also applicable for homogeneous solids (S3000). Objective evidence reviewed: (1) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121) (2) Posted Operator Aid #15 (3) Posted Operator Aid #38 (4) ANL-W IDR #38099 (5) NCR #38099

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
	NA		The site evaluates the accuracy and reproducibility of data, for example: • Independent replicate weighing of 1/20 items and replicate observations of the VE video are performed • Independent replicate exams are performed on one waste container per day per testing (whichever is less frequent) • Independent observations of one exam (not the replicate exam) are performed once per day per testing, whichever is less frequent, by a qualified VE expert (anyone but the initial VE expert)	NA	VE of Newly Generated Waste (Pit 4): This not applicable for VE of newly generated waste. VE as QC Check of RTR: This is not applicable for VE as a QC check of RTR.
	Y	HFEF-OI-6890, Revision 5, Section 6.10, Appendix A	• The VE expert assesses the accuracy of the TRUCON code, matrix parameter category, and/or IDC • The VE expert recommends and documents changes	Y	VE of Newly Generated Waste (Pit 4): VE for newly generated waste requires the operator to confirm that the waste is assigned to a waste stream that has the correct summary category group for that waste. This verification is documented in Attachment 1, Section 5, No. 37, "Waste Stream and WMC." Additionally, the absence of prohibited items is verified and documented on Attachment 1. Objective evidence reviewed: (1) BDRs: IN-ARP-VE-000026, IN-ARP-VE-000032 (S4200) IN-ARP-VE-000117, IN-ARP-VE-000119 (S3900, S5400) VE as QC Check of RTR: The VE/RTR comparison VE event is limited to confirmation of the WMPs, prohibited items, and WMC.

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
					Objective evidence reviewed: (1) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121)
	Y	HFEF-OI-6890, Revision 5, Section 8.1.2 [2], Appendix A	Prior to videotaping/recording a VE, operational checks are conducted at the beginning of each work shift: • These checks include observation of a test pattern to ensure that the VE system has adequate video quality	Y	<u>VE of Newly Generated Waste</u>: This not applicable for VE of newly generated waste. <u>VE as QC Check of RTR</u>: The EPA inspector observed the VE evolution for drum IDRF001213626 (debris), together with completion of the required documentation. For the VE demonstration, the operator had already performed the required audio/visual checks, but the inspector observed the camera images recorded for this examination. The satisfactory operation of the video equipment and the video tape ID number are recorded on Appendix A of the procedure. Additionally, the audio/visual recording for S3121 drum 10009600 was reviewed as part of the inspection. Objective evidence reviewed: (1) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121)
The site has a procedure for using the data obtained from VE to determine the percentage of miscertified waste containers: • The site uses an historical miscertification rate of 2% to calculate the number of waste containers that must undergo VE in the first year • The site established a site-specific miscertification rate • The site's revised miscertification rate is based on the last 12 (or more)	Y		• The annual number of waste containers undergoing characterization is appropriately calculated • The miscertification rate is within the range presented in Table 5-1, p. 19, of the QAPP (1% to 6%). If not, alternative calculations are provided for review • Only waste containers certified for compliance with the WIPP-WAC and TRAMPAC were randomly	Y	<u>VE of Newly Generated Waste (Pit 4)</u>: This is not applicable for VE of newly generated waste from Pit 4 because it will all undergo VE. <u>VE as QC Check of RTR</u>: At the time of the inspection, only six containers had undergone VE as a QC check of RTR, and the site had not established a site-specific miscertification rate. An initial miscertification rate of 11% was being used to calculate the number of waste containers to be examined by VE. Objective evidence reviewed: (1) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121) (2) VE/RTR comparison e-mail and report, dated May 4, 2005

Attachment A.2: Visual Examination Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
months of certification activities • The facility has a procedure for randomly selecting waste containers			selected		
The facility has a replacement strategy for selecting waste containers: • The replacement strategy is restricted to a waste stream or waste stream lot that, through the random selection process, happens to have container(s) identified for VE	Y		• Replacement VE is performed on the sampled containers • If fewer containers were visually examined than were sampled, the replacements were selected randomly from the population of sampled containers • The replacement containers were from a different lot	Y	VE of Newly Generated Waste (Pit 4): This is not applicable for VE of newly generated waste from Pit 4 because it will all undergo VE. VE as QC Check of RTR: At the time of the inspection, only six containers had undergone VE as a QC check of RTR, and the site had not established a site-specific miscertification rate. An initial miscertification rate of 11% was being used to calculate the number of waste containers to be examined by VE. The site had not been required, at the time of the inspection, to select replacement drums. Objective evidence reviewed: (1) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121) (2) VE/RTR comparison e-mail and report, dated May 4, 2005
	Y		• Once containers have been visually examined, the UCL_{90} for the proportion miscertified is calculated • The site adequately demonstrated that corrective actions taken after VE of containers to improve certification accuracy are not used to adjust the visual examination results and the UCL_{90} • The site has used the appropriate distribution for	Y	VE of Newly Generated Waste (Pit 4): This is not applicable for VE of newly generated waste from Pit 4 because it will all undergo VE. VE as QC Check of RTR: At the time of the inspection, only six containers had undergone VE as a QC check of RTR, and the site had not established a site-specific miscertification rate. An initial miscertification rate of 11% was being used to calculate the number of waste containers to be examined by VE. Objective evidence reviewed: (1) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (S5126) WCV-10010345, WCV-10009600 (S3121) (2) VE/RTR comparison e-mail and report, dated May 4, 2005

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Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comment
			the UCL_{90} calculation to determine N		

Attachment A.3: Real-Time Radiography Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/ Comment
Site procedures identify required training and qualifications for RTR personnel • RTR operators are instructed in the specific waste-generating practices and typical packaging configurations expected to be found in each matrix parameter category at the site	Y	CCP-QP-002, Revision 16; CCP-TP-102, Revision 6	• Employees explanation of job duties was consistent with applicable procedures • Operator could name prohibited items • Operator's explanation of required actions if prohibited items were encountered was consistent with procedure • Operator could identify applicable policies and procedures governing the operation of RTR equipment • Operator adequately explained the consequences of misidentifying prohibited items • RTR operators passed a training drum test that includes items common to the waste streams generated/stored at the site • RTR operators identify the limitations of their system and explain the process of identifying and managing drums with prohibited items	Y	Unit RTR2 was used for the RTR evolution observed during the inspection. This is the only mobile RTR unit onsite. The BDRs reviewed contained both S3000 (homogeneous solid) and S5000 (debris) drums processed on this equipment. Audio/visual recordings from the unit for summary category groups S3000 and S5000 were also reviewed during the inspection. Observed RTR of drum 1213864 during the inspection. One operator scans the drum and calls out waste items found. A second operator types the waste item description into the electronic version of Attachment 6 (CCP Radiography Data Sheet, CCP-TP-102, Revision 6). Immediately upon completion of the scan, the operators use Table 2 (Waste Item Weights, CCP-TP-102, Revision 6) to calculate weights of the waste item in the drum. Attachment 6 (CCP Radiography Data Sheet, CCP-TP-102, Revision 6) requires the operators to verify if prohibited items are contained within the drum. Completed Attachment 6 sheets were included in the BDRs reviewed. The waste stream and TRUCON code information for each drum is located on the drum traveler. For the RTR demonstration, the operators had already set up the RTR system. Therefore, the image test pattern test was not observed for the demonstration drum (1213864). However, Attachment 7 (CCP-RTR Measurement Control Report, CCP-TP-102, Revision 6), which contains the image test pattern test result, was included in the BDRs reviewed. Attachment 7 in the BDRs, stamped "Information Only," indicates that the image test pattern was performed that day for a previous batch. This meets the requirements for performing the image check once per day. The operators were able to describe the process that takes place if a prohibited item is found. Free liquids were

Attachment A.3: Real-Time Radiography Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/ Comment
					identified in drum 10009852, batch ID05-NDE02-0003, and an NCR (NCR-INL-0205-05) was initiated. The drum was subsequently returned to INL. Drum IDRF000108853, batch ID05-NDE-0006, contained a sealed cardboard box greater than 4 liters, and NCR-INL-0216-05 was initiated. This drum was also returned to INL. Operators are trained on the AK summary for the waste streams they examine so that they are familiar with waste items that may be contained in the drums. The training records for selected operators were reviewed. The training drum (INL-NDE-TEST-01B) audio/video recording for operator Greg Lamb, dated April 5, 2005, was reviewed. The training drum (INL-NDE-TEST-01B) audio/video recording for operator Thad Hasselstrom, dated April 5, 2005, was reviewed. The test drums contained all the required items (CCP-TP-028, Revision 2), and the training was correctly documented. <u>Objective evidence reviewed</u>: (1) Qualification card for Thad Hasselstrom, RTR operator/ITR/TS/FQAO (2) Qualification card for Greg Lamb, RTR operator/ITR/TS/FQAO (3) Qualification card for Kenneth Dale Simpson, RTR operator/ITR/TS/FQAO (4) BDRs: Waste matrix code S5126 (debris): ID05-NDE02-0001, ID05-NDE02-0002, ID05-NDE02-0005, ID05-NDE02-0006 Waste matrix code S3121 (homogeneous

Attachment A.3: Real-Time Radiography Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/ Comment
					solid): ID05-NDE02-0003, ID05-NDE02-0004 (5) AK summary report for ID-RF-S5126, dated May 3, 2005 (6) AK summary report for ID-RF-ID-RF-S3121-374, dated May 3, 2005
	Y	CCP-QP-002, Revision16, Attachment 5d; CCP-TP-028, Revision 2	• Operator training was consistent with applicable procedures • Operator certification is current	Y	Reviewed operator certification during the inspection. The qualification cards for operators also included qualification for data generation level review (ITR/TS/QAO). The test drum tapes for two of the operators were also reviewed—the training drum (INL-NDE-TEST-01B) audio/video recording for operator Greg Lamb, dated April 5, 2005, and the training drum (INL-NDE-TEST-01B) audio/video recording for operator Thad Hasselstrom, dated April 5, 2005. The test drums contained all the required items (CCP-TP-028, Revision 2), and the training was correctly documented. Objective evidence reviewed: (1) Qualification card for Thad Hasselstrom, RTR operator/ITR/TS/FQAO (2) Qualification card for Greg Lamb, RTR operator/ITR/TS/FQAO (3) Qualification card for Kenneth Dale Simpson, RTR operator/ITR/TS/FQAO
There is a procedure for determining if the resolution of the RTR equipment is sufficient to image the types of waste and waste containers likely to be encountered at this site The procedure allows the operator to adjust RTR to accommodate the physical properties of the waste and	Y	CCP-TP-102, Revision 6, Sections 4.4.2, 4.5.5	• Operator adequately explained how to adjust the system to image the range of wastes likely to be encountered at this specific site • The RTR system could be adjusted	Y	During the RTR demonstration for drum 1213864, the operator changed the Kv setting to accommodate the density of the material contained within the drum. The operator checks for free liquids by “rocking” the drum. The presence or absence of prohibited items is recorded by the second operator on an electronic form Attachment 6, CCP Radiography Data Sheet, CCP-TP-102, Revision 6.

Attachment A.3: Real-Time Radiography Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/ Comment
waste containers likely to be encountered at this site			• Operator adequately explained how the presence of free liquids is determined • Operator adequately explained how the acceptability of an image is determined • Operator adequately explained what is done if an image is unacceptable (e.g., the waste is solidified or the container is lead lined) • The X-ray producing device has controls that allow the operator to vary voltage, thereby controlling image quality • High-density material was examined with the X-ray device set on the maximum voltage • Low-density material was examined at lower voltage settings to improve contrast and image definition		For the RTR demonstration, the operators had already set up the RTR system; therefore, the image test pattern test was not observed for the demonstration drum (1213864). However, Attachment 7 (CCP-RTR Measurement Control Report, CCP-TP-102, Revision 6), which contains the image test pattern test result, was included in the BDRs reviewed. Attachment 7 in the BDRs, stamped "Information Only," indicates that the image test pattern was performed that day for a previous batch. This meets the requirements. The audio/visual recordings for debris (S5000) drum IDR000108264 and for homogenous solid (S3000) drum 10009899 were reviewed during the inspection. The image test pattern test was reviewed for the batches containing these drums. If an operator cannot determine the presence of absence of prohibited items in the drum, or if a prohibited item is identified, an NCR is initiated. <u>Objective evidence reviewed</u>: (1) Qualification card for Thad Hasselstrom, RTR operator/ITR/TS/FQAO (2) Qualification card for Greg Lamb, RTR operator/ITR/TS/FQAO (3) Qualification card for Kenneth Dale Simpson, RTR operator/ITR/TS/FQAO (4) BDRs: Waste matrix code S5126 (debris): ID05-NDE02-0001, ID05-NDE02-0002, ID05-NDE02-0005, ID05-NDE02-0006 Waste matrix code S3121 (homogeneous solid): ID05-NDE02-0003, ID05-NDE02-0004
	Y	CCP-TP-	• RTR tape is high quality, the sound track is audible, and the	Y	The audio/visual recordings and BDRs for debris (S5126) drum IDR000108264 (batch ID05-NDE02-

Attachment A.3: Real-Time Radiography Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/ Comment
		102, Revision 6, Sections 4.2, 4.5.3–4.5.4; Attachment 3, #10; Attachment 4, I d	required information is contained on the audible portion of the tape. The RTR tape is consistent with the data package for the same drum		0005) and for homogenous solid (S3121) drum 10009899 (batch ID05-NDE02-0004) were reviewed during the inspection. The data package and audio/visual recording were consistent for these drums. Objective evidence reviewed: (1) BDRs: Waste matrix code S5126 (debris): ID05-NDE02-0001, ID05-NDE02-0002, ID05-NDE02-0005, ID05-NDE02-0006 WMC S3121 (homogeneous solid): ID05-NDE02-0003, ID05-NDE02-0004
Procedures require that RTR operators receive the results of the VE/RTR comparison	Y		• RTR operators receive the results of the VE/RTR comparison	Y	This was an initial certification inspection and so only six drums had been through the VE as a QC check of RTR process. The VE/RTR comparison tables for this activity are part of the VE BDRs. An e-mail providing the results of the VE/RTR comparisons was sent to the RTR operators on May 4, 2005. This e-mail contained the VE/RTR comparison (three containers) for waste stream ID-RF-S5126. Objective evidence reviewed: (1) VE/RTR comparison e-mail and report, dated May 4, 2005 (2) BDRs: WCV-IDRF001208619, WCV-IDRF001209273 (debris) WCV-10010345, WCV-10009600 (sludge)
There is a procedure for determining whether the waste stream assignment, hazardous waste codes, and weights were correctly assigned	Y	CCP-TP-102, Revision 6, Sections 4.6.1–4.6.2, 4.6.8–4.6.9, Table 2	• The procedure is adequately implemented • Corrective actions are taken when necessary • Does the RTR operator use a standard weight lookup table to	Y	Observed RTR examination of drum 1213864 during the inspection. One operator scanned the drum and called out waste items found. A second operator entered the waste item description into the electronic version of Attachment 6 (CCP Radiography Data Sheet, CCP-TP-102, Revision 6). Immediately upon completion of the scan, the operators use procedure CCP-TP-102, Revision 6, Table 2, “Waste Packaging

Attachment A.3: Real-Time Radiography Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/ Comment
			provide an estimate of WMP weights? If so, has the table been updated to reflect additional information gained through previous RTR/VE exams or updated AK information?		and Container Weights," to calculate the weights for items identified. This table contains weights for items found in the waste streams examined. If a new item is added to the list, a procedure revision has to be prepared. Corrective action was implemented as needed. For example, NCRs NCR-INL-0200-05 through NCR-INL-02020-05 were initiated for batch ID05-NDE02-0001, and NCRs NCR-INL-0203-05 through NCR-INL-02011-05 were initiated for batch ID05-NDE02-0003. The audio/visual recordings for debris (S5000) drum IDR000108264 and for homogenous solid (S3000) drum 10009899 were reviewed during the inspection. BDRs for Waste matrix code S5126 (debris) were reviewed during the inspection: ID05-NDE02-0001, ID05-NDE02-0002, ID05-NDE02-0005, ID05-NDE02-0006. BDRs for Waste matrix code S3121 (homogeneous solid) were reviewed during the inspection: ID05-NDE02-0003, ID05-NDE02-0004. <u>Objective evidence reviewed</u>: (1) BDRs: Waste matrix code S5126 (debris): ID05-NDE02-0001, ID05-NDE02-0002, ID05-NDE02-0005, ID05-NDE02-0006 Waste matrix code S3121 (homogeneous solid): ID05-NDE02-0003, ID05-NDE02-0004
	Y	CCP-TP-102, Revision 6, Sections 4.9 and 4.10,	The site evaluates the accuracy and reproducibility of data, for example: • Independent replicate scans and	Y	The replicate scans and independent observations were performed by a qualified operator other than the RTR operator who performed the first examination. The BDRs reviewed contained both independent replicate scans and independent observations as required. For

Attachment A.3: Real-Time Radiography Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/ Comment
		Attachments 3–5	replicate observations of the RTR recording are performed • Independent replicate examinations are performed on one waste container per day per testing (whichever is less frequent) • Independent observations of one examination (not the replicate) are performed once per day per testing, whichever is less frequent, by a qualified RTR operator (anyone but the initial RTR operator) • Oversight functions, including periodic audio/videotape reviews of accepted waste containers, are performed by qualified radiography personnel other than the operator		example, for batch ID05-NDE02-0003 (S3121), the independent replicate scan was performed on drum 10009600, and the independent observation was performed on drum 10010514. In batch ID05-NDE02-0005 (S5126), the independent replicate scan was performed on drum IDRF001211318, and the independent observation was performed on drum IDRF001210032. The procedure requires verification that a replicate scan and independent observation is performed by the ITR, TS, and QAO and included in their respective review checklists. Also, the SPM project-level review checklist requires verification that a replicate scan and independent observation is performed. The data-generation-level and project-level review checklists are included in the BDRs. Objective evidence reviewed: (1) BDRs: Waste matrix code S5126 (debris): ID05-NDE02-0001, ID05-NDE02-0002, ID05-NDE02-0005, ID05-NDE02-0006 Waste matrix code S3121 (homogeneous solid): ID05-NDE02-0003, ID05-NDE02-0004
	Y	CCP-TP-102, Revision 6, Attachments 6 and 7	• Site implemented an automated RTR data entry system to facilitate data entry to the WWIS • Direct data entry into an electronic form is performed by the RTR operator using a computer while the operator is still in the RTR booth • The electronic data file undergoes the same QC checks	Y	During the demonstration, one operator performed the scan on the subject drum and called out his identification of waste while a second operator entered the items into an electronic form (Attachment 62, CCP Radiography Data Sheet, CCP-TP-102, Revision 6). Attachment 7 of the procedure is completed electronically with the radiography measurement control data. Attachments 6 and 7, in the BDRs reviewed, were complete and the data subjected to data generation and project level reviews.

Attachment A.3: Real-Time Radiography Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/ Comment
			used for handwritten data entries		Data are reviewed, at data generation level, by the ITR, TS, and QAO. Project-level reviews are performed by the SQAO and SPM. Objective evidence reviewed: (1) BDRs: Waste matrix code S5126 (debris): ID05-NDE02-0001, ID05-NDE02-0002, ID05-NDE02-0005, ID05-NDE02-0006 Waste matrix code S3121 (homogeneous solid): ID05-NDE02-0003, ID05-NDE02-0004
	Y		• The RTR operator has received lessons-learned information based on the comparison of RTR and VE data	Y	There is no formal documented training for lessons learned, but RTR operators receive the results of the RTR/VE comparison. This was an initial certification inspection; therefore, only six drums had been through the VE as a QC check of the RTR process. The comparison tables for this activity are part of the VE BDRs. An e-mail providing the results of the VE/RTR comparisons was sent to the RTR operators on May 4, 2005. This e-mail contained the VE/RTR comparison (three containers) for waste stream ID-RF-S5126. Objective evidence reviewed: (1) VE/RTR comparison e-mail and report, dated May 4, 2005 (2) BDRs IN-ARP-VE-000117, IN-ARP-VE-000119, IN-ARP-VE-000026, IN-ARP-VE-000032
	Y	CCP-TP-102, Revision 6, Section 4.0	• RTR operator adequately explained the process followed for examining a drum and entering data into data forms (whether hard copy or electronic data entry is used)	Y	Unit RTR2 was used for the RTR evolution observed during the inspection. This is the only mobile RTR unit on the site. The BDRs reviewed contained both S3000 (homogeneous solid) and S5000 (debris) drums processed on this equipment. Audio/visual recordings from the unit, for summary category groups S3000 and

Attachment A.3: Real-Time Radiography Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/ Comment
					S5000, were also reviewed during the inspection. The RTR of drum 1213864 was observed during the audit. One operator scans the drum and calls out waste items found. A second operator types the waste item description into the electronic version of Attachment 6 (CCP Radiography Data Sheet, CCP-TP-102, Revision 6). Immediately upon completion of the scan, the operators use Table 2 (Waste Item Weights, CCP-TP-102, Revision 6) to calculate waste item weights in the drum. Attachment 6 (CCP Radiography Data Sheet, CCP-TP-102, Revision 6) requires operators to verify if prohibited items are contained within the drum. Completed Attachment 6 sheets were included in the BDRs reviewed. For the RTR demonstration, the operators had already set up the RTR system; therefore, the image test pattern test was not observed for the demonstration drum (1213864). However, Attachment 7 (CCP-RTR Measurement Control Report, CCP-TP-102, Revision 6), which contains the image test pattern test result, was included in the BDRs reviewed. Attachment 7 in the BDRs, stamped "Information Only," indicates that the image test pattern was performed that day for a previous batch. This meets requirements. The operators were able to describe the process that takes place if a prohibited item is found and an NCR is initiated. Free liquids were identified in drum 10009852, batch ID05-NDE02-0003, and an NCR (NCR-INL-0205-05) was written. The drum was subsequently returned to INL. Drum IDRF000108853, batch ID05-NDE-0006,

Attachment A.3: Real-Time Radiography Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/ Comment
					contained a sealed cardboard box greater than 4 liters, and NCR-INL-0216-05 was initiated. This drum was also returned to INL. Operators are trained on the AK summary for the waste streams they examine so that they are familiar with waste items that may be contained in the drums. The training records for selected operators were reviewed—the training drum (INL-NDE-TEST-01B) audio/video recording for operator Greg Lamb, dated April 5, 2005, and the training drum (INL-NDE-TEST-01B) audio/video recording for operator Thad Hasselstrom, dated April 5, 2005. The test drums contained all the required items (CCP-TP-028, Revision 2), and the training was correctly documented. Objective evidence reviewed: (1) Qualification card for Thad Hasselstrom, RTR operator/ITR/TS/FQAO (2) Qualification card for Greg Lamb, RTR operator/ITR/TS/FQAO (3) Qualification card for Kenneth Dale Simpson, RTR operator/ITR/TS/FQAO (4) BDRs: Waste matrix code S5126 (debris): ID05-NDE02-0001, ID05-NDE02-0002, ID05-NDE02-0005, ID05-NDE02-0006 Waste matrix code S3121 (homogeneous solid): ID05-NDE02-0003, ID05-NDE02-0004

Attachment A.4: Nondestructive Assay Checklist: High Efficiency Neutron Counter (HENC)

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
General Reporting Requirements					
Procedures require assay systems to report quantitative values and uncertainties for ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{241}Am, ^{233}U, ^{234}U, ^{238}U, ^{90}Sr, and ^{137}Cs.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Quantitative values and uncertainties for ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{241}Am, ^{233}U, ^{234}U, ^{238}U, ^{90}Sr, and ^{137}Cs are reported.	Y	Reviewed Radioassay Data Sheets in Batch Data Reports INNDAH05001, NNDAH05002, NNDAH05003 & NNDAH05004.
Procedures require that each container disposed of at WIPP contains TRU waste.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Containers to be disposed of at WIPP meet the definition of TRU waste.	Y	Only payload containers with 100 nCi/g or more of TRU radionuclides are eligible for disposal at WIPP.
NDA instruments and procedures are appropriate for the waste streams and/or waste content codes being assayed.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	NDA instruments and procedures are appropriate for the waste streams and/or waste content codes being assayed.	Y	The CCP-HENC and its associated procedures are appropriate for S3000 homogenous solids, S4000 soils/gravel and S5000 debris waste.
NDA instruments and procedures result in unbiased values for the cumulative activity of the WIPP radionuclide inventory.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	NDA instruments and procedures result in unbiased values for the cumulative activity of the WIPP radionuclide inventory.	Y	Reviewed calibration of the CCP-HENC documented in CCP-INL-HENC-001, Revision 0.
Acceptable Knowledge (AK)					
Isotopic ratios for use in qualifying radionuclides are performed by direct measurement or, when AK is used, are qualified by confirmatory testing.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Isotopic ratios for use in quantifying radionuclides are performed by direct measurement or, when AK is used, are qualified by confirmatory testing.	Y	Isotopic ratios are measured with Multi-Group Analysis (MGA) or MGA-U. Isotopics based on AK are documented.
Lower Level of Detection					
Procedures require that the LLD for each NDA system is determined.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	The LLD for each NDA system has been determined.	Y	The LLD determination is technically acceptable and is documented in CCP-INL-HENC-001, Revision 0, Sections 6.0 & 7.0
Procedures require that site-specific environmental backgrounds and container specific interferences must be	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Site-specific environmental backgrounds and container specific interferences are accounted for in	Y	An assay-event specific LLD for each radionuclide is provided by the NDA2000

Attachment A.4: Nondestructive Assay Checklist: High Efficiency Neutron Counter (HENC)

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
accounted for in LLD determinations.			LLD determinations.		software.
NDA instruments performing TRU/non-TRUl waste discrimination measurements are required to have a LLD no greater than 100 nCi/g.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	NDA instruments performing TRU/low-level waste discrimination measurements are required to have a LLD no greater than 100 nCi/g.	Y	Only assay values above the LLD will be reported.
The method used to calculate the total measurement uncertainty (TMU) for all required quantities must be documented and technically justified.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Révision 9, Section A.3	The method used to calculate the total measurement uncertainty (TMU) for all required quantities are documented and technically justified.	Y	The uncertainty in the density of the waste matrix is included in the TMU determination. TMU was adequately addressed
Methods to determine TMU must be reviewed and approved by CBFO for each NDA instrument.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Révision 9, Section A.3	Method to determine TMU has been reviewed and approved by CBFO for each NDA instrument.	Y	The TMU document was reviewed and approved by the CTAC Technical Specialist during the inspection.
Calibration					
Procedures require that each NDA instrument is calibrated before its initial use.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	The NDA instrument has been calibrated before its initial use.	Y	The original CCP HENC passive neutron calibration was performed at Canberra Industries in Meriden, CT and verified at LLNL in March 2004; this is a mass calibration based on ^{240}Pu effective. The gamma calibration was performed at INL in April 2005. This is not a mass calibration; energy, efficiency and resolution calibrations were performed.
Site procedures must specify the range of applicability of system calibrations.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	The range of applicability of system calibrations has been specified.	Y	The passive neutron calibration range is from 0 to 12 g ^{240}Pu effective (~200 g WG Pu). The gamma energy calibration is from 59 to 1408 keV. The gamma efficiency is applicable for matrix densities between 0.02 and 1.62 gcm^3. System

Attachment A.4: Nondestructive Assay Checklist: High Efficiency Neutron Counter (HENC)

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
					has no true upper mass limit provided energy calibration range and assay-specific performance criteria are met.
Procedures require that any matrix/source surrogate waste combinations are representative of the activity ranges and relevant waste matrix characteristics (i.e. densities, effective atomic number, neutron absorber and moderator content) planned for measurement by the system.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Matrix/source surrogate waste combinations used are representative of the activity ranges and relevant waste matrix characteristics planned for measurement by the system.	Y	Gamma calibration was performed using surrogate matrices with densities of 0.02, 0.44, 0.66, and 1.62 g/cm^3. The neutron calibration was verified using WG Pu in surrogate drums (glass, metals, combustibles & inorganic sludge) spanning the expected moderator index.
Procedures require the use of consensus standards, when such standards exist. If consensus standards do not exist, the calibration technique must be approved by CBFO.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Consensus standards have been used, when such standards exist. If consensus standards do not exist, the calibration technique has been approved by CBFO.	Y	For gamma calibration, six (6) ^{241}Am/^{152}Eu line sources used. For passive neutron calibration, weapons grade plutonium oxide (PuO_2) used.
Procedures require that primary standards be obtained from suppliers maintaining a nationally accredited measurement program.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Primary standards have been obtained from suppliers maintaining a nationally accredited measurement program	Y	Copies of source certificates for ^{241}Am/^{152}Eu line sources and PuO_2 sources were provided.
Calibration Verification					
Procedures require that verification of an NDA instrument's calibration is performed after any of the following occurrences: major system repairs and/or modifications, replacement of the system's components, significant changes to the system's software, and relocation of the system.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Verification of an NDA instrument's calibration has been performed when required.	Y	Passive neutron calibration was verified at INL in April 2005 using WG Pu sources following relocation of the system from LLNL to INL. Gamma system was rerecalibrated at INL, verification NA.
Procedures require recalibration of the system if the calibration verification demonstrates that the system's response	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Recalibration of the system has been performed if the calibration verification demonstrates that the	Y	Verification of the passive neutron calibration indicated that the system's response had

Attachment A.4: Nondestructive Assay Checklist: High Efficiency Neutron Counter (HENC)

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
has significantly changed.			system's response has significantly changed.		not significantly changed. No recalibration was required.
Calibration Confirmation					
Procedures require confirmation of the calibration of a system by performing replicate measurements of a non-interfering matrix.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	The gamma calibration of a system has been confirmed by performing replicate measurements of a non-interfering matrix an INL. The passive neutron calibration had been confirmed previously at LLNL.	Y	Gamma calibration was confirmed by making six (6) replicate measurements of a combustibles matrix drum for each of three (3) different plutonium loadings, 41.738, 106.732 & 160.050 g.
Procedures require that replicate measurements be performed with containers of the same nominal size as those used for actual waste assays.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Replicate measurements have been performed with containers of the same nominal size as those used for actual waste assays.	Y	Replicate measurements were made using 55-gallon drums, like those normally assayed.
Procedures require that replicate measurements be performed according to the same procedures used for actual waste assays.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Replicate measurements have been performed according to the same procedures used for actual waste assays.	Y	CCP-TP-107, *Operating the CCP High Efficiency Neutron Counter Using NDA 2000*, was used for replicates.
Procedures require that replicate measurements be performed using nationally recognized standards or standards derived from nationally recognized standards that span the range of use of the instrument.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Replicate measurements have been performed using nationally recognized standards or standards derived from nationally recognized standards that span the range of use of the instrument.	Y	^{241}Am/^{152}Eu line sources were used for gamma calibration confirmation. Neutron calibration confirmation was performed at LLNL and is NA for this inspection.
Procedures require that the standards used for calibration confirmation are not the same sources for the most recent calibration.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	The standards used for calibration confirmation are not the same sources for the most recent calibration.	Y	^{241}Am/^{152}Eu line sources used for gamma calibration were not used for calibration confirmation. Confirmation was done with WG Pu sources.
Requirements for accuracy, expressed as %R, and precision, expressed as %RSD, must be met.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Requirements for accuracy and precision have been met.	Y	Requirements for accuracy (70% < %R < 130%) and precision (%RSD < 14%) have been met for all assays.
General Quality Control					
Procedures require that all radioassay	Y	*CCP Transuranic Waste*	All radioassay and data validation	Y	Operators and data reviewers

Attachment A.4: Nondestructive Assay Checklist: High Efficiency Neutron Counter (HENC)

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
and data validation be performed by appropriately trained and qualified personnel.		*Plan*, CCP-PO-002, Revision 16, Section A.4.1	has been performed by appropriately trained and qualified personnel.		demonstrated the experience and expertise necessary.
Procedures require that requalification of personnel be based on evidence of continued satisfactory performance and is performed at least every two years.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.1	Requalification of personnel is based on evidence of continued satisfactory performance and has been performed at least every two years.	Y	Interview with CCP and MCS personnel.
Procedures require that all computer programs, including spreadsheets used for data reduction or analysis, meet the applicable requirements in the QAPD.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.1	All computer programs, including spreadsheets used for data reduction or analysis, meet the applicable requirements in the QAPD.	Y	Software used for data acquisition and analysis includes NDA 2000, Genie 2000, Multi-Group Analysis (MGA & MGA-U).
Procedures require that site participate in any relevant measurement comparison programs sponsored or approved by CBFO, including the Performance Demonstration Program (PDP).	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.1	The site has participated in relevant measurement comparison programs sponsored or approved by CBFO.	Y	CCP HENC had not participated in Cycle 12A of the PDP due to detector problems. It was unclear if HENC NDA personnel would request an extension.
Background and Performance Checks					
Procedures require daily background measurements, unless otherwise approved by CBFO. Contributions to backgrounds from nearby radiation sources must be carefully controlled, or more frequent backgrounds must be measured.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	Daily background measurements have been taken, unless otherwise approved by CBFO. Contributions to backgrounds from nearby radiation sources have been carefully controlled.	Y	Background checks are performed daily in accordance with Section 4.3 of CCP-TP-107, *Operating the CCP High Efficiency Neutron Counter Using NDA 2000*. Control charts are include in BDRs.
Procedures require that system performance checks be performed at least once per operational day.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	Performance checks have been performed at least once per operational day.	Y	Quality Control (QC) calibration checks are performed daily in accordance with CCP-TP-107. Control charts are include in BDRs.
System performance checks must include, as applicable, efficiency, matrix correction checks, and for spectrometry systems peak position and	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	Performance checks include, as applicable, efficiency, matrix correction checks, and for spectrometry systems peak position	Y	For gamma modality, performance checks include the centroid of the 414 keV peak, the full width half-maximum

Attachment A.4: Nondestructive Assay Checklist: High Efficiency Neutron Counter (HENC)

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
resolution.			and resolution.		(FWHM) of the 414 keV peak, and ^{239}Pu mass of a ~10 g WG Pu source. For passive neutron modality, performance checks include ^{240}Pu effective of ~10 g WG Pu source.
Procedures require that at least once per operational week an interfering matrix is used to assess the long term stability of the NDA instrument and its matrix corrections.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	An interfering matrix is used to assess the long-term stability of the NDA instrument and its matrix corrections at least once per operational week.	Y	Weekly Interfering Matrix checks are performed daily in accordance with CCP-TP-107.
Procedures require that interfering surrogate waste matrices be constructed in a way that the matrix characteristics do not change over time.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	Interfering surrogate waste matrices have been constructed in a way that the matrix characteristics do not change over time.	Y	Interview with CCP and MCS personnel.
Procedures require that sources used for performance checks either be long-lived or decay-corrected.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	Sources used for performance checks either are long-lived or decay-corrected.	Y	Plutonium sources used for performance checks are long-lived. Short-lived sources (i.e., ^{252}Cf) are decay corrected.
Procedures require that performance checks be quantitative and based on 2 and 3 sigma limits.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	Performance checks are quantitative and based on 2 and 3 sigma limits.	Y	Limits are based on Student t-test for 95% and 99% confidence intervals.
Data Management					
Procedures require that all radioassay data be reviewed and approved by qualified personnel before being reported to WWIS.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.5.1	All radioassay data has been reviewed and approved by qualified personnel before being reported to WWIS.	Y	Reviewed Batch Data Reports (BDRs) listed below using electronic copy provided by J. Harvill.
Procedures require that radioassay testing batch reports consist of the following: • Testing facility name, testing batch number, container numbers, and signature of the Site Project Officer (SPO) or designee(s)	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.5.2	Radioassay testing batch reports consist of the following: • Testing facility name, testing batch number, container numbers, and signature of the Site Project Officer (SPO) or designee(s)	Y	Reviewed BDR Nos. INNDAH05001 - 05004. Radioassay Data Sheets (RDS) for each container were reviewed. All BDRs were reviewed using an electronic copy (CD) provided by J. Harvill during the inspection.

Attachment A.4: Nondestructive Assay Checklist: High Efficiency Neutron Counter (HENC)

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
• Table of Contents • Background and performance check data or control charts for the relevant time period. • Data validation per the QAPD and site procedures • Separate testing report sheets for each container.			• Table of Contents • Background and performance check data or control charts for the relevant time period. • Data validation per the QAPD and site procedures • Separate testing report sheets for each container.		
Procedures require that testing report sheets include: • Title "Radioassay Data Sheet" • Method/procedure used • Date of radioassay • Activities and associated TMU for individual radionuclides • TRU alpha concentration and its associated TMU • Operator signature • Reviewer signature	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.5.2	Testing report sheets include: • Title "Radioassay Data Sheet" • Method/procedure used • Date of radioassay • Activities and associated TMU for individual radionuclides • TRU alpha concentration and its associated TMU • Operator signature • Reviewer signature	Y	Reviewed RDSs for containers in each of the four (4) BDRs listed above. All appropriate listings for each container were represented in its BDR.
Procedures require that the following nonpermanent records be maintained at the radioassay-testing facility or forwarded to the site project office: • Testing batch reports • All raw data, including instrument readouts, calculation records, and radioassay QC results	Y	CCP-PO-002, Revision 6, Section A.4.5.3	The following nonpermanent records be maintained at the radioassay-testing facility or forwarded to the site project office: • Testing batch reports • All raw data, including instrument readouts, calculation records, and radioassay QC results	Y	HENC Operators back-up data to compact discs daily. Raw data are included on compact discs in records sent to site office

Attachment A.4: Nondestructive Assay Checklist: High Efficiency Neutron Counter (HENC)

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
• All applicable instrument calibration reports			• All applicable instrument calibration reports		

Attachment A.5: Nondestructive Assay (NDA) Checklist
Tomographic Gamma Scanner – TGS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
General Reporting Requirements					
Procedures require assay systems to report quantitative values and uncertainties for ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{241}Am, ^{233}U, ^{234}U, ^{238}U, ^{90}Sr, and ^{137}Cs.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Quantitative values and uncertainties for ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{241}Am, ^{233}U, ^{234}U, ^{238}U, ^{90}Sr, and ^{137}Cs are reported.	Y	Reviewed Radioassay Data Sheets (RDSs) in Batch Data Reports (BDRs) INNDAT050001 - 050004.
Procedures require that each container disposed of at WIPP contains TRU waste.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Containers to be disposed of at WIPP meet the definition of TRU waste.	Y	Only payload containers with 100 nCi/g or more of TRU radionuclides are eligible for disposal at WIPP.
NDA instruments and procedures are appropriate for the waste streams and/or waste content codes being assayed.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	NDA instruments and procedures are appropriate for the waste streams and/or waste content codes being assayed.	Y	The TGS and its associated procedures are appropriate for S3000 homogenous solids, S4000 soils/gravel and S5000 debris waste.
NDA instruments and procedures result in unbiased values for the cumulative activity of the WIPP radionuclide inventory.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	NDA instruments and procedures result in unbiased values for the cumulative activity of the WIPP radionuclide inventory.	Y	Reviewed calibration of the TGS documented in CCP-INL-TGS-001, Revision 0, dated May 3, 2005.
Acceptable Knowledge (AK)					
Isotopic ratios for use in qualifying radionuclides are performed by direct measurement or, when AK is used, are qualified by confirmatory testing.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Isotopic ratios for use in quantifying radionuclides are performed by direct measurement or, when AK is used, are qualified by confirmatory testing.	Y	Isotopic ratios are measured with PC-FRAM and ratioed to the measured ^{239}Pu value. Isotopics based on AK are documented.
Lower Level of Detection					
Procedures require that the LLD for each NDA system is determined.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	The LLD for each NDA system has been determined.	Y	The LLD is based on the detection of the ^{239}Pu 414 keV line. It is documented in CCP-INL-TGS-001, Revision 0, Section 6.
Procedures require that site-specific	Y	*CCP Transuranic Waste*	Site-specific environmental	Y	An assay-event specific LLD

Attachment A.5: Nondestructive Assay (NDA) Checklist
Tomographic Gamma Scanner – TGS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
environmental backgrounds and container specific interferences must be accounted for in LLD determinations.		*Plan*, CCP-PO-002, Revision 16, Section A.3	backgrounds and container specific interferences are accounted for in LLD determinations.		for each radionuclide is provided.
NDA instruments performing TRU/non-TRU waste discrimination measurements are required to have a LLD no greater than 100 nCi/g.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	NDA instruments performing TRU/low-level waste discrimination measurements are required to have a LLD no greater than 100 nCi/g.	Y	Only assay values above the LLD will be reported.
The method used to calculate the total measurement uncertainty (TMU) for all required quantities must be documented and technically justified.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Révision 9, Section A.3	The method used to calculate the total measurement uncertainty (TMU) for all required quantities are documented and technically justified.	Y	TMU for the TGS is documented in CCP-INL-TGS-001, Revision 0, dated May 3, 2005
Methods to determine TMU must be reviewed and approved by CBFO for each NDA instrument.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Révision 9, Section A.3	Methods to determine TMU have been reviewed and approved by CBFO for each NDA instrument.	Y	The CTAC Technical Specialist (J. Oliver) reviewed and approved the TGS TMU document during this inspection
Calibration					
Procedures require that each NDA instrument is calibrated before its initial use.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.3	The NDA instrument has been calibrated before its initial use.	Y	The TGS was calibrated at INL in April 2005 using PuO_2 standards prior to routine use.
Site procedures must specify the range of applicability of system calibrations.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.3	The range of applicability of system calibrations has been specified.	Y	The TGS calibration range is from 0.10 to 210 g of Total Pu although the radionuclide actual measured is ^{239}Pu. The TGS efficiency is applicable for matrix densities with Z < 15 and less than 1.6 gcm^3.
Procedures require that any matrix/source surrogate waste combinations are representative of the activity ranges and relevant waste matrix characteristics (i.e. densities, effective atomic number, neutron	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.3	Matrix/source surrogate waste combinations used are representative of the activity ranges and relevant waste matrix characteristics planned for measurement by the system.	Y	The calibration is based on initial determination using a combustible drum followed by Matrix Specific Qualifications (MSQ) for calibration included surrogate

Attachment A.5: Nondestructive Assay (NDA) Checklist
Tomographic Gamma Scanner – TGS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
absorber and moderator content) planned for measurement by the system.					matrices with densities of 0.0187, 0.440, 0.660, and 1.589 g/cm^3.
Procedures require the use of consensus standards, when such standards exist. If consensus standards do not exist, the calibration technique must be approved by CBFO.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.3	Consensus standards have been used, when such standards exist. If consensus standards do not exist, the calibration technique has been approved by CBFO.	Y	For gamma calibration, six (6) Weapons grade plutonium oxide (WG PuO_2) sources were used.
Procedures require that primary standards be obtained from suppliers maintaining a nationally accredited measurement program.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.3	Primary standards have been obtained from suppliers maintaining a nationally accredited measurement program	Y	Copies of source certificates for the WG PuO_2 sources are included in Appendix 1 of the calibration report.
Calibration Verification					
Procedures require that verification of an NDA instrument's calibration is performed after any of the following occurrences: major system repairs and/or modifications, replacement of the system's components, significant changes to the system's software, and relocation of the system.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.3	Verification of an NDA instrument's calibration has been performed when required.	Y	Verification of the original calibration that was performed at INL was not yet required. The requirement is NA for the TGS at this time.
Procedures require recalibration of the system if the calibration verification demonstrates that the system's response has significantly changed.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.3	Recalibration of the system has been performed if the calibration verification demonstrates that the system's response has significantly changed.	Y	Verification of the calibration was not performed. The requirement is NA for the TGS at this time.
Calibration Confirmation					
Procedures require confirmation of the calibration of a system by performing replicate measurements of a non-interfering matrix.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.3	The calibration of a system has been confirmed by performing replicate measurements of a non-interfering matrix.	Y	The TGS calibration was confirmed by making three (3) replicate measurements at each of three ^{239}Pu mass loadings for a combustibles drum.
Procedures require that replicate	Y	*CCP Transuranic Waste*	Replicate measurements have been	Y	Replicate measurements were

Attachment A.5: Nondestructive Assay (NDA) Checklist
Tomographic Gamma Scanner – TGS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
measurements be performed with containers of the same nominal size as those used for actual waste assays.		*Plan*, CCP-PO-002, Revision 12, Section A.3	performed with containers of the same nominal size as those used for actual waste assays.		made using 55-gallon drums, like those normally assayed.
Procedures require that replicate measurements be performed according to the same procedures used for actual waste assays.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.3	Replicate measurements have been performed according to the same procedures used for actual waste assays.	Y	CCP-TP-097, *Operating the CCP Tomographic Gamma Scanner (TGS)*, was used for replicate measurements. This is the same procedure as is used for routine waste assays.
Procedures require that replicate measurements be performed using nationally recognized standards or standards derived from nationally recognized standards that span the range of use of the instrument.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.3	Replicate measurements have been performed using nationally recognized standards or standards derived from nationally recognized standards that span the range of use of the instrument.	Y	Sources totaling 1.04, 49.31, and 1379.1g $^{239}Pu0_2$ were used for calibration confirmation
Procedures require that the standards used for calibration confirmation are not the same sources for the most recent calibration.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.3	The standards used for calibration confirmation are not the same sources for the most recent calibration.	Y	The $^{239}Pu0_2$ sources used for the initial system calibration were not used for calibration confirmation
Requirements for accuracy, expressed as %R, and precision, expressed as %RSD, must be met.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.3	Requirements for accuracy and precision have been met.	Y	Requirements for accuracy (70% < %R < 130%) and precision (%RSD < 14%) have been met for each of the three drums assayed.
General Quality Control					
Procedures require that all radioassay and data validation be performed by appropriately trained and qualified personnel.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.4.1	All radioassay and data validation have been performed by appropriately trained and qualified personnel.	N	Individual performing Expert Analysis (EA) of TGS data is not adequately trained.
Procedures require that requalification of personnel be based on evidence of continued satisfactory performance and is performed at least every two years.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.4.1	Requalification of personnel is based on evidence of continued satisfactory performance and has been performed at least every two years.	Y	Interview with CCP and MCS personnel.
Procedures require that all computer	Y	*CCP Transuranic Waste*	All computer programs, including	Y	Software used for data

Attachment A.5: Nondestructive Assay (NDA) Checklist
Tomographic Gamma Scanner – TGS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
programs, including spreadsheets used for data reduction or analysis, meet the applicable requirements in the QAPD.		*Plan*, CCP-PO-002, Revision 12, Section A.4.1	spreadsheets used for data reduction or analysis, meet the applicable requirements in the QAPD.		acquisition and analysis includes ANTECH MasterScan & MasterAnalysis in a Windows 2000 operating
Procedures require that site participate in any relevant measurement comparison programs sponsored or approved by CBFO, including the Performance Demonstration Program (PDP).	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.4.1	The site has participated in relevant measurement comparison programs sponsored or approved by CBFO.	Y	The TGS has participated in Cycle 12A of the NDA PDP by assaying a zero matrix, combustible and sludge matrices, but had not yet reported results.
Background and Performance Checks					
Procedures require daily background measurements, unless otherwise approved by CBFO. Contributions to backgrounds from nearby radiation sources must be carefully controlled, or more frequent backgrounds must be measured.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.4.2	Daily background measurements have been taken, unless otherwise approved by CBFO. Contributions to backgrounds from nearby radiation sources have been carefully controlled.	Y	Background checks are performed daily in conjunction with the energy calibration check as described in CCP-TP-097. Background control charts are included in BDRs.
Procedures require that system performance checks be performed at least once per operational day.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.4.2	Performance checks have been performed at least once per operational day.	Y	Calibration/performance checks are performed daily in accordance with CCP-TP-097. These include centroid and FWMH checks for the ^{109}Cd and ^{75}Se sources, and a $^{239}Pu0_2$ Daily Working Standard (DWS). Control charts are included in the TGS BDRs.
System performance checks must include, as applicable, efficiency, matrix correction checks, and for spectrometry systems peak position and resolution.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.4.2	Performance checks include, as applicable, efficiency, matrix correction checks, and for spectrometry systems peak position and resolution.	Y	Calibration/performance checks are performed daily. These include centroid and FWMH checks for the ^{109}Cd and ^{75}Se sources, and the

Attachment A.5: Nondestructive Assay (NDA) Checklist
Tomographic Gamma Scanner – TGS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
					$^{239}Pu0_2$ DWS. Control charts are included in the TGS BDRs.
Procedures require that at least once per operational week an interfering matrix is used to assess the long term stability of the NDA instrument and its matrix corrections.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.4.2	An interfering matrix is used to assess the long term stability of the NDA instrument and its matrix corrections at least once per operational week.	Y	Weekly Interfering Matrix checks are performed, tracked and evaluated as required. Control charts for this parameter are included in the TGS BDRs.
Procedures require that interfering surrogate waste matrices be constructed in a way that the matrix characteristics do not change over time.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.4.2	Interfering surrogate waste matrices have been constructed in a way that the matrix characteristics do not change over time.	Y	Interview with CCP and MCS personnel.
Procedures require that sources used for performance checks either be long-lived or decay-corrected.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.4.2	Sources used for performance checks either are long-lived or decay-corrected.	Y	Plutonium sources used for performance checks are long-lived. Short-lived sources (^{109}Cd) are decay corrected.
Procedures require that performance checks be quantitative and based on 2 and 3 sigma limits.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.4.2	Performance checks are quantitative and based on 2 and 3 sigma limits.	Y	Limits are based on Student t-test for 95% and 99% confidence intervals.
Data Management					
Procedures require that all radioassay data be reviewed and approved by qualified personnel before being reported to WWIS.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.5.1	All radioassay data has been reviewed and approved by qualified personnel before being reported to WWIS.	Y	Reviewed BDRs INNDAT050001 through INNDAT050004.
Procedures require that radioassay testing batch reports consist of the following: • Testing facility name, testing batch number, container numbers, and signature of the Site Project Officer (SPO) or designee(s)	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.5.2	Radioassay testing batch reports consist of the following: • Testing facility name, testing batch number, container numbers, and signature of the Site Project Officer (SPO) or designee(s) • Table of Contents	Y	Reviewed BDRs INNDAT050001, INNDAT050002, NNDAT050003 and INNDAT050004. BDRs included RDSs for each container.

Attachment A.5: Nondestructive Assay (NDA) Checklist
Tomographic Gamma Scanner – TGS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
• Table of Contents • Background and performance check data or control charts for the relevant time period. • Data validation per the QAPD and site procedures • Separate testing report sheets for each container.			• Background and performance check data or control charts for the relevant time period. • Data validation per the QAPD and site procedures • Separate testing report sheets for each container.		
Procedures require that testing report sheets include: • Title "Radioassay Data Sheet" • Method/procedure used • Date of radioassay • Activities and associated TMU for individual radionuclides • TRU alpha concentration and its associated TMU • Operator signature • Reviewer signature	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 12, Section A.4.5.2	Testing report sheets include: • Title "Radioassay Data Sheet" • Method/procedure used • Date of radioassay • Activities and associated TMU for individual radionuclides • TRU alpha concentration and its associated TMU • Operator signature • Reviewer signature	Y	Reviewed RDSs for the following two (2) containers: ARP00076 & ARP00227
Procedures require that the following nonpermanent records be maintained at the radioassay-testing facility or forwarded to the site project office: • Testing batch reports • All raw data, including instrument readouts, calculation records, and	Y	CCP-PO-002, Revision 6, Section A.4.5.3	The following nonpermanent records be maintained at the radioassay-testing facility or forwarded to the site project office: • Testing batch reports • All raw data, including instrument readouts, calculation records, and	Y	TGS Operators back-up data to compact discs daily. Raw data are included on compact discs in records sent to site office

Attachment A.5: Nondestructive Assay (NDA) Checklist
Tomographic Gamma Scanner – TGS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
radioassay QC results • All applicable instrument calibration reports			radioassay QC results • All applicable instrument calibration reports		

Attachment A.6: Nondestructive Assay (NDA) Checklist
Waste Assay Gamma Spectrometer - WAGS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/Comment
General Reporting Requirements					
Procedures require assay systems to report quantitative values and uncertainties for ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{241}Am, ^{233}U, ^{234}U, ^{238}U, ^{90}Sr, and ^{137}Cs.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Quantitative values and uncertainties for ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{241}Am, ^{233}U, ^{234}U, ^{238}U, ^{90}Sr, and ^{137}Cs are reported.	Y	Reviewed RDSs in BDRs: INNDAW050001 – IDRFOP4703170 INNDAW050002 – IDRFRD1214748 INNDAW050006 – ARP00052 INNDAS050007 – ARP00242
Procedures require that each container disposed of at WIPP contains TRU waste.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Containers to be disposed of at WIPP meet the definition of TRU waste.	Y	Only payload containers with 100 nCi/g or more of TRU radionuclides are eligible for disposal at WIPP.
NDA instruments and procedures are appropriate for the waste streams and/or waste content codes being assayed.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	NDA instruments and procedures are appropriate for the waste streams and/or waste content codes being assayed.	Y	The WAGS and its associated procedures are appropriate for S3000 homogenous solids, S4000 soils/gravel and S5000 debris waste.
NDA instruments and procedures result in unbiased values for the cumulative activity of the WIPP radionuclide inventory.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	NDA instruments and procedures result in unbiased values for the cumulative activity of the WIPP radionuclide inventory.	Y	Reviewed calibration of the SGRS documented in CCP-INL-WAGS-001, Revision 0.
Acceptable Knowledge (AK)					
Isotopic ratios for use in qualifying radionuclides are performed by direct measurement or, when AK is used, are qualified by confirmatory testing.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Isotopic ratios for use in quantifying radionuclides are performed by direct measurement or, when AK is used, are qualified by confirmatory testing.	Y	Isotopic ratios are measured with Multi-Group Analysis (MGA) or MGA-U. Isotopics based on AK are documented.
Lower Level of Detection					
Procedures require that the LLD for each NDA system is determined.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	The LLD for each NDA system has been determined.	Y	The LLD is technically acceptable and is documented in CCP-INL-WAGS-001, Revision 0, Section 6.0.
Procedures require that site-specific environmental backgrounds and container specific interferences must be	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Site-specific environmental backgrounds and container specific interferences are accounted for in	Y	An assay-event specific LLD for each radionuclide is provided by the NDA2000

Attachment A.6: Nondestructive Assay (NDA) Checklist
Waste Assay Gamma Spectrometer - WAGS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/Comment
accounted for in LLD determinations.			LLD determinations.		software.
NDA instruments performing TRU/non-TRU waste discrimination measurements are required to have a LLD no greater than 100 nCi/g.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	NDA instruments performing TRU/low-level waste discrimination measurements are required to have a LLD no greater than 100 nCi/g.	Y	Only assay values above the LLD will be reported.
The method used to calculate the total measurement uncertainty (TMU) for all required quantities must be documented and technically justified.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Révision 9, Section A.3	The method used to calculate the total measurement uncertainty (TMU) for all required quantities are documented and technically justified.	Y	The TMU for this system is documented in CCP-INL-WAGS-002, *Total Measurement Uncertainty for the WAGS System* dated 4-20-05. This document addresses all pertinent aspects of the system's TMU.
Methods to determine TMU must be reviewed and approved by CBFO for each NDA instrument.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Révision 9, Section A.3	Methods to determine TMU have been reviewed and approved by CBFO for each NDA instrument.	Y	The CTAC Technical Specialist (J. Oliver) reviewed and approved the system's TMU document during the inspection.
Calibration					
Procedures require that each NDA instrument is calibrated before its initial use.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	The NDA instrument has been calibrated before its initial use.	Y	The CCP WAGS energy and efficiency calibrations were approved on March 31, 2005.
Site procedures must specify the range of applicability of system calibrations.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	The range of applicability of system calibrations has been specified.	Y	The gamma energy and efficiency calibrations have the same range, from 59 to 1408 keV. This system was calibrated for two modes: Transmission-Corrected Analysis and Multi-Curve Efficiency. This is not a mass calibration in the strict sense and this system has no true upper mass limit, i.e., almost any mass value is measurable

Attachment A.6: Nondestructive Assay (NDA) Checklist
Waste Assay Gamma Spectrometer - WAGS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/Comment
					for energies within the range provided performance criteria for FWHM, dead time, etc. are met the are met. The system's operating range is stated as ~10 mg to 200 g Total Pu. Matrices are mainly materials with Z<15, assays with Z>15 and beyond ρ range require expert review as described in CCP-TP-019, Section 3.3.
Procedures require that any matrix/source surrogate waste combinations are representative of the activity ranges and relevant waste matrix characteristics (i.e. densities, effective atomic number, neutron absorber and moderator content) planned for measurement by the system.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Matrix/source surrogate waste combinations used are representative of the activity ranges and relevant waste matrix characteristics planned for measurement by the system.	Y	Gamma calibration included a PDP-style drum and surrogate matrices with densities of 0.02, 0.44, 0.66, and 1.62 g/cm^3. The Matrices included foam, Soft Board, Particle Board and sand. Moderator & absorber properties are NA for gamma systems.
Procedures require the use of consensus standards, when such standards exist. If consensus standards do not exist, the calibration technique must be approved by CBFO.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Consensus standards have been used, when such standards exist. If consensus standards do not exist, the calibration technique has been approved by CBFO.	Y	For energy and efficiency calibrations, six (6) ^{241}Am/^{152}Eu line sources used. A pulser at ~1800 keV was used for a reference peak.
Procedures require that primary standards be obtained from suppliers maintaining a nationally accredited measurement program.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Primary standards have been obtained from suppliers maintaining a nationally accredited measurement program	Y	Copies of source certificates for ^{241}Am/^{152}Eu line sources are included in Appendix 1 of the calibration report.
Calibration Verification					
Procedures require that verification of	Y	*CCP Transuranic Waste*	Verification of an NDA instrument's	Y	This was the initial calibration

Attachment A.6: Nondestructive Assay (NDA) Checklist
Waste Assay Gamma Spectrometer - WAGS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/Comment
an NDA instrument's calibration is performed after any of the following occurrences: major system repairs and/or modifications, replacement of the system's components, significant changes to the system's software, and relocation of the system.		*Plan*, CCP-PO-002, Revision 16, Section A.3	calibration has been performed when required.		of the system for use by INL-CCP. Calibration verification is NA at this time.
Procedures require recalibration of the system if the calibration verification demonstrates that the system's response has significantly changed.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Recalibration of the system has been performed if the calibration verification demonstrates that the system's response has significantly changed.	Y	This was the initial calibration of the system for use by INL-CCP. Calibration verification is NA at this time.
Calibration Confirmation					
Procedures require confirmation of the calibration of a system by performing replicate measurements of a non-interfering matrix.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	The calibration of a system has been confirmed by performing replicate measurements of a non-interfering matrix.	Y	Gamma calibrations have been confirmed by making six (6) replicate measurements for of a combustibles and zero-matrix drum, respectively for each of three different plutonium loadings.
Procedures require that replicate measurements be performed with containers of the same nominal size as those used for actual waste assays.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Replicate measurements have been performed with containers of the same nominal size as those used for actual waste assays.	Y	Replicate measurements were made using 55-gallon drums, like those normally assayed.
Procedures require that replicate measurements be performed according to the same procedures used for actual waste assays.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Replicate measurements have been performed according to the same procedures used for actual waste assays.	Y	CCP-TP-019, *CCP Waste Assay Gamma Spectrometer (WAGS) Operating Procedure* was used for replicate measurements.
Procedures require that replicate measurements be performed using nationally recognized standards or	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Replicate measurements have been performed using nationally recognized standards or standards	Y	Sources totaling three different gram loadings of WG plutonium were used for

Attachment A.6: Nondestructive Assay (NDA) Checklist
Waste Assay Gamma Spectrometer - WAGS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/Comment
standards derived from nationally recognized standards that span the range of use of the instrument.		(Pages 101-102)	derived from nationally recognized standards that span the range of use of the instrument.		calibration confirmation: 41.738, 106.732 and 167.91 g
Procedures require that the standards used for calibration confirmation are not the same sources for the most recent calibration.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	The standards used for calibration confirmation are not the same sources for the most recent calibration.	Y	$^{241}Am/^{152}Eu$ line sources used for gamma calibrations were not used for calibration confirmation.
Requirements for accuracy, expressed as %R, and precision, expressed as %RSD, must be met.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Requirements for accuracy and precision have been met.	Y	Requirements for accuracy (70% < %R < 130%) and precision (%RSD < 14%) have been met for each of the three drums assayed.
General Quality Control					
Procedures require that all radioassay and data validation be performed by appropriately trained and qualified personnel.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.1	All radioassay and data validation have been performed by appropriately trained and qualified personnel.	Y	Operators and data reviewers demonstrated the experience and expertise necessary.
Procedures require that requalification of personnel be based on evidence of continued satisfactory performance and is performed at least every two years.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.1	Requalification of personnel is based on evidence of continued satisfactory performance and has been performed at least every two years.	Y	Interview with CCP personnel.
Procedures require that all computer programs, including spreadsheets used for data reduction or analysis, meet the applicable requirements in the QAPD.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.1	All computer programs, including spreadsheets used for data reduction or analysis, meet the applicable requirements in the QAPD.	Y	Software used for data acquisition and analysis includes NDA 2000, Genie 2000, Multi-Group Analysis (MGA) and Multi-Group Analysis-Uranium (MGA-U)
Procedures require that site participate in any relevant measurement comparison programs sponsored or approved by CBFO, including the Performance Demonstration Program	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.1	The site has participated in relevant measurement comparison programs sponsored or approved by CBFO.	Y	The WAGS has participated in the NDA PDP by assaying a zero matrix, metals, sludge and combustible drums. Results were due following the

Attachment A.6: Nondestructive Assay (NDA) Checklist
Waste Assay Gamma Spectrometer - WAGS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/Comment
(PDP).					completion of this inspection.
Background and Performance Checks					
Procedures require daily background measurements, unless otherwise approved by CBFO. Contributions to backgrounds from nearby radiation sources must be carefully controlled, or more frequent backgrounds must be measured.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	Daily background measurements have been taken, unless otherwise approved by CBFO. Contributions to backgrounds from nearby radiation sources have been carefully controlled.	Y	Background checks are performed daily in accordance with Section 4.3 of CCP-TP-107, *Operating the CCP High Efficiency Neutron Counter Using NDA 2000*. Control charts are include in BDRs.
Procedures require that system performance checks be performed at least once per operational day.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	Performance checks have been performed at least once per operational day.	Y	Quality Control (QC) calibration checks are performed daily in accordance with Section 4.4 of CCP-TP-107, *Operating the CCP High Efficiency Neutron Counter Using NDA 2000*. Control charts are include in BDRs.
System performance checks must include, as applicable, efficiency, matrix correction checks, and for spectrometry systems peak position and resolution.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	Performance checks include, as applicable, efficiency, matrix correction checks, and for spectrometry systems peak position and resolution.	Y	For absolute gamma modality, performance checks include the centroid of the 414 keV peak, the full width half-maximum (FWHM) of the 414 keV peak, and ^{239}Pu mass of a 10 g WGPu source. For passive neutron modality, performance checks include ^{240}Pu effective of 10 g WGPu source.
Procedures require that at least once per operational week an interfering matrix is used to assess the long term stability of the NDA instrument and its matrix corrections.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	An interfering matrix is used to assess the long term stability of the NDA instrument and its matrix corrections at least once per operational week.	Y	Weekly Interfering Matrix checks are performed daily in accordance with Section 4.5 of CCP-TP-107, *Operating the CCP High Efficiency Neutron Counter Using NDA 2000*.

Attachment A.6: Nondestructive Assay (NDA) Checklist
Waste Assay Gamma Spectrometer - WAGS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/Comment
Procedures require that interfering surrogate waste matrices be constructed in a way that the matrix characteristics do not change over time.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	Interfering surrogate waste matrices have been constructed in a way that the matrix characteristics do not change over time.	Y	Interview with CCP personnel.
Procedures require that sources used for performance checks either be long-lived or decay-corrected.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	Sources used for performance checks either are long-lived or decay-corrected.	Y	Plutonium sources used for performance checks are long-lived.
Procedures require that performance checks be quantitative and based on 2 and 3 sigma limits.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2 (Page 106)	Performance checks are quantitative and based on 2 and 3 sigma limits.	Y	Limits are based on Student t-test for 95% and 99% confidence intervals.
Data Management					
Procedures require that all radioassay data be reviewed and approved by qualified personnel before being reported to WWIS.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.5.1 (Page 109)	All radioassay data has been reviewed and approved by qualified personnel before being reported to WWIS.	Y	Reviewed BDRs INNDAW050001, INNDAW050002, INNDAW050006 and INNDAS050007.
Procedures require that radioassay testing batch reports consist of the following: • Testing facility name, testing batch number, container numbers, and signature of the Site Project Officer (SPO) or designee(s) • Table of Contents • Background and performance check data or control charts for the relevant time period. • Data validation per the QAPD and site procedures	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.5.2 (Page 110)	Radioassay testing batch reports consist of the following: • Testing facility name, testing batch number, container numbers, and signature of the Site Project Officer (SPO) or designee(s) • Table of Contents • Background and performance check data or control charts for the relevant time period. • Data validation per the QAPD and site procedures • Separate testing report sheets for	Y	Reviewed BDRs INNDAW050001, INNDAW050002, INNDAW050006 and INNDAS050007. BDRs included RDSs for each container.

Attachment A.6: Nondestructive Assay (NDA) Checklist
Waste Assay Gamma Spectrometer - WAGS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/Comment
• Separate testing report sheets for each container.			each container.		
Procedures require that testing report sheets include: • Title "Radioassay Data Sheet" • Method/procedure used • Date of radioassay • Activities and associated TMU for individual radionuclides • TRU alpha concentration and its associated TMU • Operator signature • Reviewer signature	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.5.2 (Pages 110-111)	Testing report sheets include: • Title "Radioassay Data Sheet" • Method/procedure used • Date of radioassay • Activities and associated TMU for individual radionuclides • TRU alpha concentration and its associated TMU • Operator signature • Reviewer signature	Y	Reviewed RDSs for the following containers in the following NDA batch data reports:
Procedures require that the following nonpermanent records be maintained at the radioassay-testing facility or forwarded to the site project office: • Testing batch reports • All raw data, including instrument readouts, calculation records, and radioassay QC results • All applicable instrument calibration reports	Y	CCP-PO-002, Revision 6, Section A.4.5.3 (Page 111)	The following nonpermanent records be maintained at the radioassay-testing facility or forwarded to the site project office: • Testing batch reports • All raw data, including instrument readouts, calculation records, and radioassay QC results • All applicable instrument calibration reports	Y	NDA operators back-up data to compact discs daily. Raw data are included on compact discs in records sent to site office

Attachment A.7: Nondestructive Assay Checklist
SWEPP Gamma-Ray Spectrometer - SGRS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
General Reporting Requirements					
Procedures require assay systems to report quantitative values and uncertainties for ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{241}Am, ^{233}U, ^{234}U, ^{238}U, ^{90}Sr, and ^{137}Cs.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Quantitative values and uncertainties for ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{242}Pu, ^{241}Am, ^{233}U, ^{234}U, ^{238}U, ^{90}Sr, and ^{137}Cs are reported.	Y	Reviewed Radioassay Data Sheets (RDS) in Batch Data Reports BDRs: INNDAS050003 – DRF0011209287 INNDAS050004 – 10010514 INNDAS050005 – 10010345 INNDAS050010 – ARP00031
Procedures require that each container disposed of at WIPP contains TRU waste.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Containers to be disposed of at WIPP meet the definition of TRU waste.	Y	Only payload containers with 100 nCi/g or more of TRU radionuclides are eligible for disposal at WIPP.
NDA instruments and procedures are appropriate for the waste streams and/or waste content codes being assayed.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	NDA instruments and procedures are appropriate for the waste streams and/or waste content codes being assayed.	Y	The SGRS and its associated procedures are appropriate for S3000 homogenous solids, S4000 soils/gravel and S5000 debris waste.
NDA instruments and procedures result in unbiased values for the cumulative activity of the WIPP radionuclide inventory.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	NDA instruments and procedures result in unbiased values for the cumulative activity of the WIPP radionuclide inventory.	Y	Reviewed calibration of the SGRS documented in CCP-INL-SGRS-001, Revision 0.
Acceptable Knowledge (AK)					
Isotopic ratios for use in qualifying radionuclides are performed by direct measurement or, when AK is used, are qualified by confirmatory testing.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Isotopic ratios for use in quantifying radionuclides are performed by direct measurement or, when AK is used, are qualified by confirmatory testing.	Y	Isotopic ratios are measured with Multi-Group Analysis (MGA) or MGA-U. Isotopics based on AK are documented.
Lower Level of Detection					
Procedures require that the LLD for each NDA system is determined.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	The LLD for each NDA system has been determined.	Y	The LLD is technically acceptable and is documented in CCP-INL-SGRS-002 dated 4-21-05.
Procedures require that site-specific environmental backgrounds and	Y	*CCP Transuranic Waste Plan*, CCP-PO-002,	Site-specific environmental backgrounds and container specific	Y	An assay-event specific LLD for each radionuclide is

Attachment A.7: Nondestructive Assay Checklist
SWEPP Gamma-Ray Spectrometer - SGRS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
container specific interferences must be accounted for in LLD determinations.		Revision 16, Section A.3	interferences are accounted for in LLD determinations.		provided by the NDA2000 software.
NDA instruments performing TRU/non-TRUl waste discrimination measurements are required to have a LLD no greater than 100 nCi/g.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	NDA instruments performing TRU/low-level waste discrimination measurements are required to have a LLD no greater than 100 nCi/g.	Y	Only assay values above the LLD will be reported.
The method used to calculate the total measurement uncertainty (TMU) for all required quantities must be documented and technically justified.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	The method used to calculate the total measurement uncertainty (TMU) for all required quantities are documented and technically justified.	Y	The TMU for this system is documented in CCP-INL-SGRS-002, *Total Measurement Uncertainty for the SGRS Assay System* dated 4-21-05. This document addresses all pertinent aspects of the system's TMU.
Methods to determine TMU must be reviewed and approved by CBFO for each NDA instrument.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Methods to determine TMU have been reviewed and approved by CBFO for each NDA instrument.	Y	The CTAC Technical Specialist (J. Oliver) reviewed and approved the system's TMU document during the inspection.
Calibration					
Procedures require that each NDA instrument is calibrated before its initial use.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	The NDA instrument has been calibrated before its initial use.	Y	The CCP SGRS calibration was performed at INL and approved on March 31, 2005.
Site procedures must specify the range of applicability of system calibrations.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	The range of applicability of system calibrations has been specified.	Y	The gamma energy and efficiency calibrations have the same range, from 59 to 1408 keV. This is a multi-curve efficiency calibration and all detectors have cadmium filters. Because this is not a mass calibration in the strict sense the system has no true upper mass limit, i.e., almost any mass value is measurable for energies

Attachment A.7: Nondestructive Assay Checklist
SWEPP Gamma-Ray Spectrometer - SGRS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
					within the range provided performance criteria for FWHM, dead time, etc. are met the are met. The system's operating range is stated as ~10 mg to 200 g Total Pu. Matrices are mainly materials with Z<15, assays with Z>15 and beyond ρ range require expert review as described in CCP-TP-115, Section 3.3.
Procedures require that any matrix/source surrogate waste combinations are representative of the activity ranges and relevant waste matrix characteristics (i.e. densities, effective atomic number, neutron absorber and moderator content) planned for measurement by the system.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Matrix/source surrogate waste combinations used are representative of the activity ranges and relevant waste matrix characteristics planned for measurement by the system.	Y	Gamma calibration included a PDP-style drum and surrogate matrices with densities of 0.02, 0.44, 0.66, and 1.62 g/cm^3. The Matrices included foam, Soft Board, Particle Board and sand. Moderator & absorber properties are NA for gamma systems.
Procedures require the use of consensus standards, when such standards exist. If consensus standards do not exist, the calibration technique must be approved by CBFO.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Consensus standards have been used, when such standards exist. If consensus standards do not exist, the calibration technique has been approved by CBFO.	Y	For energy and efficiency calibrations, six (6) ^{241}Am/^{152}Eu line sources used. A pulser at ~1450 keV was used for a reference peak.
Procedures require that primary standards be obtained from suppliers maintaining a nationally accredited measurement program.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Primary standards have been obtained from suppliers maintaining a nationally accredited measurement program	Y	Copies of source certificates for ^{241}Am/^{152}Eu line sources were reviewed.
Calibration Verification					
Procedures require that verification of an NDA instrument's calibration is	Y	*CCP Transuranic Waste Plan*, CCP-PO-002,	Verification of an NDA instrument's calibration has been performed when	Y	This was the initial calibration of the system for use by INL-

Attachment A.7: Nondestructive Assay Checklist
SWEPP Gamma-Ray Spectrometer - SGRS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
performed after any of the following occurrences: major system repairs and/or modifications, replacement of the system's components, significant changes to the system's software, and relocation of the system.		Revision 16, Section A.3	required.		CCP. Calibration verification is NA at this time.
Procedures require recalibration of the system if the calibration verification demonstrates that the system's response has significantly changed.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Recalibration of the system has been performed if the calibration verification demonstrates that the system's response has significantly changed.	Y	This was the initial calibration of the system for use by INL-CCP. Calibration verification was not required at this time.
Calibration Confirmation					
Procedures require confirmation of the calibration of a system by performing replicate measurements of a non-interfering matrix.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	The calibration of a system has been confirmed by performing replicate measurements of a non-interfering matrix.	Y	Calibrations confirmation has been performed by making six (6) replicate measurements for of a combustibles/ zero-matrix drum, respectively for each of three different gram loadings of WG plutonium.
Procedures require that replicate measurements be performed with containers of the same nominal size as those used for actual waste assays.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Replicate measurements have been performed with containers of the same nominal size as those used for actual waste assays.	Y	Replicate measurements were made using 55-gallon drums, like those normally assayed.
Procedures require that replicate measurements be performed according to the same procedures used for actual waste assays.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Replicate measurements have been performed according to the same procedures used for actual waste assays.	Y	CCP-TP-115, *CCP SWEPP Gamma-Ray Spectrometer (SGRS) Operating Procedure, Revision 1* was used for replicate measurements.
Procedures require that replicate measurements be performed using nationally recognized standards or standards derived from nationally	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Replicate measurements have been performed using nationally recognized standards or standards derived from nationally recognized	Y	Sources totaling three different gram loadings of WG Pu were used for calibration confirmation: 41.738, 106.732

Attachment A.7: Nondestructive Assay Checklist
SWEPP Gamma-Ray Spectrometer - SGRS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
recognized standards that span the range of use of the instrument.			standards that span the range of use of the instrument.		and 167.91 g
Procedures require that the standards used for calibration confirmation are not the same sources for the most recent calibration.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	The standards used for calibration confirmation are not the same sources for the most recent calibration.	Y	$^{241}Am/^{152}Eu$ line sources used for gamma calibration were not used for calibration confirmation.
Requirements for accuracy, expressed as %R, and precision, expressed as %RSD, must be met.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.3	Requirements for accuracy and precision have been met.	Y	Requirements for accuracy (70% < %R < 130%) and precision (%RSD < 14%) have been met for each of the three drums assayed.
General Quality Control					
Procedures require that all radioassay and data validation be performed by appropriately trained and qualified personnel.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.1	All radioassay and data validation have been performed by appropriately trained and qualified personnel.	Y	Operators and data reviewers demonstrated the experience and expertise necessary.
Procedures require that requalification of personnel be based on evidence of continued satisfactory performance and is performed at least every two years.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.1	Requalification of personnel is based on evidence of continued satisfactory performance and has been performed at least every two years.	Y	Interview with CCP personnel.
Procedures require that all computer programs, including spreadsheets used for data reduction or analysis, meet the applicable requirements in the QAPD.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.1	All computer programs, including spreadsheets used for data reduction or analysis, meet the applicable requirements in the QAPD.	Y	Software used for data acquisition and analysis includes NDA 2000, Multi-Group Analysis (MGA) and Multi-Group Analysis-Uranium (MGA-U).
Procedures require that site participate in any relevant measurement comparison programs sponsored or approved by CBFO, including the Performance Demonstration Program (PDP).	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.1	The site has participated in relevant measurement comparison programs sponsored or approved by CBFO.	Y	The SGRS has participated in the NDA PDP by assaying a zero matrix, metals, combustibles and sludge drums. Results were due following the completion of this inspection.

Attachment A.7: Nondestructive Assay Checklist
SWEPP Gamma-Ray Spectrometer - SGRS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
Background and Performance Checks					
Procedures require daily background measurements, unless otherwise approved by CBFO. Contributions to backgrounds from nearby radiation sources must be carefully controlled, or more frequent backgrounds must be measured.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	Daily background measurements have been taken, unless otherwise approved by CBFO. Contributions to backgrounds from nearby radiation sources have been carefully controlled.	Y	Background checks are performed daily in accordance with Section 4.4 of CCP-TP-115, *CCP SWEPP Gamma-Ray Spectrometer (SGRS) Operating Procedure, Revision 1.* Control charts are include in BDRs.
Procedures require that system performance checks be performed at least once per operational day.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	Performance checks have been performed at least once per operational day.	Y	Quality Control (QC) calibration checks are performed daily in accordance with Section 4.5 of CCP-TP-115, *CCP SWEPP Gamma-Ray Spectrometer (SGRS) Operating Procedure, Revision 1.* Control charts are include in BDRs.
System performance checks must include, as applicable, efficiency, matrix correction checks, and for spectrometry systems peak position and resolution.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	Performance checks include, as applicable, efficiency, matrix correction checks, and for spectrometry systems peak position and resolution.	Y	Performance checks include the centroid of the 414 keV peak, the full width half-maximum (FWHM) of the 414 keV peak and ^{239}Pu mass of a ~10 g WG Pu source.
Procedures require that at least once per operational week an interfering matrix is used to assess the long term stability of the NDA instrument and its matrix corrections.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	An interfering matrix is used to assess the long term stability of the NDA instrument and its matrix corrections at least once per operational week.	Y	Weekly Interfering Matrix checks are performed in accordance with Section 4.6 of CCP-TP-115, *CCP SWEPP Gamma-Ray Spectrometer (SGRS) Operating Procedure, Revision 1.*

Attachment A.7: Nondestructive Assay Checklist
SWEPP Gamma-Ray Spectrometer - SGRS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
Procedures require that interfering surrogate waste matrices be constructed in a way that the matrix characteristics do not change over time.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	Interfering surrogate waste matrices have been constructed in a way that the matrix characteristics do not change over time.	Y	Interview with CCP personnel.
Procedures require that sources used for performance checks either be long-lived or decay-corrected.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	Sources used for performance checks either are long-lived or decay-corrected.	Y	Plutonium sources used for performance checks are long-lived.
Procedures require that performance checks be quantitative and based on 2 and 3 sigma limits.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.2	Performance checks are quantitative and based on 2 and 3 sigma limits.	Y	Limits are based on Student t-test for 95% and 99% confidence intervals.
Data Management					
Procedures require that all radioassay data be reviewed and approved by qualified personnel before being reported to WWIS.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.5.1	All radioassay data has been reviewed and approved by qualified personnel before being reported to WWIS.	Y	Reviewed BDRs INNDAS050003 - 050005 and INNDAS05-0010
Procedures require that radioassay testing batch reports consist of the following: • Testing facility name, testing batch number, container numbers, and signature of the Site Project Officer (SPO) or designee(s) • Table of Contents • Background and performance check data or control charts for the relevant time period. • Data validation per the QAPD and site procedures • Separate testing report sheets for each container.	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.5.2	Radioassay testing batch reports consist of the following: • Testing facility name, testing batch number, container numbers, and signature of the Site Project Officer (SPO) or designee(s) • Table of Contents • Background and performance check data or control charts for the relevant time period. • Data validation per the QAPD and site procedures • Separate testing report sheets for each container.	Y	Reviewed BDRs INNDAS050003 - 050005 and INNDAS05-0010. BDRs included Radioassay Data Sheets (RDS) for each container.

Attachment A.7: Nondestructive Assay Checklist
SWEPP Gamma-Ray Spectrometer - SGRS

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures or Verification of Activity	Y/N	Objective Evidence/ Comment
Procedures require that testing report sheets include: • Title "Radioassay Data Sheet" • Method/procedure used • Date of radioassay • Activities and associated TMU for individual radionuclides • TRU alpha concentration and its associated TMU • Operator signature • Reviewer signature	Y	*CCP Transuranic Waste Plan*, CCP-PO-002, Revision 16, Section A.4.5.2	Testing report sheets include: • Title "Radioassay Data Sheet" • Method/procedure used • Date of radioassay • Activities and associated TMU for individual radionuclides • TRU alpha concentration and its associated TMU • Operator signature • Reviewer signature	Y	Reviewed RDSs for the following containers in the following NDA batch data reports: INNDAS050003, INNDAS050004, INNDAS050005 and INNDAS05-0010
Procedures require that the following nonpermanent records be maintained at the radioassay-testing facility or forwarded to the site project office: • Testing batch reports • All raw data, including instrument readouts, calculation records, and radioassay QC results • All applicable instrument calibration reports	Y	CCP-PO-002, Revision 6, Section A.4.5.3	The following nonpermanent records be maintained at the radioassay-testing facility or forwarded to the site project office: • Testing batch reports • All raw data, including instrument readouts, calculation records, and radioassay QC results • All applicable instrument calibration reports	Y	NDA operators back-up data to compact discs daily. Raw data are included on compact discs in records sent to site office

Attachment A.8: WIPP Waste Information System Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comments
Procedures require WWIS and data expert/staff to be trained to assess data and properly enter transfer data in the WWIS	Y	CCP-QP-002, Revision 16; CCP-TP-030, Revision 15	• Employees' explanation of job duties was consistent with applicable procedures	Y	At the time of the inspection, CCP did not have approved WSPFs for the INL waste streams and could not, therefore, submit container data for certification. Characterization data is submitted to the WWIS so that the WSPF can be reviewed and approved by the WWIS group. The CCP procedure, practices, and personnel who will process container data will be the same as those used at other approved sites. The CCP SPM will submit to CBFO the data used for approval of the WSPF. The WWIS data administrator will enter these data into the WWIS for verification by CCP. After approval, the WSP will be entered into the WSP reference data list, which documents approved waste streams. CCP anticipates that both retrievably stored debris (S5000) and sludge (S3000) waste will be processed for AMW. Additionally, newly generated S3000, S4000, and S5000 waste will be processed for the Pit 4 project. WCO J.R. Stroble demonstrated the process by which CCP will verify and submit characterization data into the WWIS for container certification, using data for drum IDRFRD1214748. The data entry was made into the characterization test module of the WWIS because this was an initial certification inspection of the site and WSPFs had not been approved. Characterization data must be approved by the WWIS before the drum can be processed for certification. The WCO and/or WDEP build a file that contains all characterization data for each container to be entered into the WWIS. The WCO is able to access BDR information for each container from the PTS and uses

Attachment A.8: WIPP Waste Information System Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comments
					this administrative system to identify characterization data. All NCRs must be closed prior to data entry. Dean Mooney verifies NCR closure and informs the WCO of containers that can be entered into the WWIS for certification. Training records for WCOs and WDEP were reviewed during the inspection. Objective evidence reviewed: (1) CCP-TP-030, Revision 15 (2) Qualification card for WCOs J.R. Stroble, Jeff Winkel, Roy White and Court Fesmire (3) Qualification cards for WDEP Lisa Campos-Hernandez, Creta Kirkes, Amy Fiero, Jack Hayes, Connie Hernandez, and Roger Whiteaker (4) Instructions for WDEP for CCP at INL (sludge, graphite debris, and Pit 4 waste streams) (5) E-mail, dated May 4, 2005, from Dean Mooney with regard to NCR/CAR dispositions for drum 10010514, IDRFD201268B, and IDRFD12134748 (6) Draft WSPFs for ID-RF-S3121-374 (sludge) and ID-RF-S5126 (debris) (7) Waste stream profile reference data
	Y	CCP-QP-002, Revision 16; CCP-TP-030, Revision 15, Section 2.2.1	• WWIS and data expert/staff are trained to assess data and properly enter and transfer all data in the WWIS • WDEP and data reviewers/verifiers are trained on the WWIS	Y	CCP at INL will use the WWIS Data Entry Summary—Characterization and Certification Excel spreadsheet for characterization data compilation. At present, the spreadsheet is filled manually with the appropriate data from completed BDRs. CCP plans to implement automatic data transfer sometime during 2005 (possibly by August). WDEP will complete this process in Carlsbad. After completion, the spreadsheet is printed and reviewed. By signing this summary, the WCO

Attachment A.8: WIPP Waste Information System Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comments
			system using the WWIS User's Manual and the appropriate site procedures?		accepts the data for submission to the WWIS. After the spreadsheet data have been approved by the WCO, ASCII, tab-delimited text files are generated and then submitted to the WWIS. The Excel spreadsheet is controlled by software QA. Qualification cards for the WCOs and WDEP were reviewed. The WWIS User's Manual is required training for personnel. Objective evidence reviewed: (1) WWIS Data Entry Summary—Characterization and Certification spreadsheet for drums IDRFD201268B (debris) and 10010514 (sludge) (2) Qualification card for WCOs J.R. Stroble, Jeff Winkel, Roy White and Court Fesmire (3) Qualification cards for WDEP Lisa Campos-Hernandez, Creta Kirkes, Amy Fiero, Jack Hayes, Connie Hernandez and Roger Whiteaker (4) Instructions for WDEP for CCP at INL (sludge, graphite debris, and Pit 4 waste streams) (5) List of approved users for the WWIS at INL (site C8) (6) Software Installation and Checkout Form for INL Template 1.xls
	Y	CCP-QP-002, Revision 16; CCP-TP-030, Revision 15, Section 4.0	• WWIS and data expert/staff adequately explained how data are assessed, input, and transferred into the WWIS?	Y	Following the population of the Excel spreadsheet, the WCO prints out a WWIS Data Entry Summary—Characterization and Certification sheet, which is then reviewed. An independent review is performed by a person with qualifications equal to those of the original data entry person. By signing this summary, the WCO accepts the data for submission to the WWIS. After signature by the WCO, the data are uploaded into the WWIS.

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Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comments
					If the data are not accepted by the WWIS, the WCO is responsible for resolution of the discrepancies identified. Objective evidence reviewed: (1) WWIS Data Entry Summary—Characterization and Certification spreadsheet for drums IDRFD201268B (debris) and 10010514 (sludge) (2) WWIS waste container report for demonstration drum IDRFRD1214748 (3) AK documentation, container list for waste streams ID-RF-S3121-374 and ID-RF-S5126
	Y	CCP-QP-002, Revision 16; CCP-TP-030, Revision 15, Section 4.0	• For those sites entering data into the WWIS using electronic methods, WDEP and data reviewers/verifiers are trained on the site's data system using appropriate site procedures	Y	Qualification cards for the WCOs and WDEPs were reviewed during the inspection. The WWIS User's Manual is required training for personnel. WDEP received training specific to the waste stream data they will be processing. Objective evidence reviewed: (1) Qualification cards for WCOs J.R. Stroble, Jeff Winkel, Roy White, and Court Fesmire (2) Qualification cards for WDEP Lisa Campos-Hernandez, Creta Kirkes, Amy Fiero, Jack Hayes, Connie Hernandez and Roger Whiteaker (3) Instructions for WDEP for CCP at INL (sludge, graphite debris, and Pit 4 waste streams) (4) List of approved users for the WWIS at INL (site C8)
	Y	CCP-TP-030, Revision 15	• Generation-level data review checklists and reports are complete and have been verified by SPO and SQAO review for each waste container	Y	The WWIS Data Entry Summary—Certification and Characterization Excel spreadsheet is filled with appropriate data. This summary is printed and reviewed. The BDRs containing the review checklists are not accessed by the WCO, but the BDR summary sheets and data result sheets form part of the file built to facilitate WWIS data entry.

Attachment A.8: WIPP Waste Information System Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comments
					As part of the inspection, BDRs for RTR and VE were reviewed. These BDRs contained completed generation-level review checklists. Objective evidence reviewed: (1) WWIS Data Entry Summary—Characterization and Certification spreadsheet for drums IDRFD201268B (debris) and 10010514 (sludge) (2) WWIS waste container report for demonstration drum IDRFRD1214748 (3) BDRs (RTR): ID05-NDE02-0006, ID05-NDE02-0003, ID05-NDE02-0001, ID05-NDE02-0004, ID05-NDE02-0005, ID05-NDE02-0002 (4) BDRs (VE): IN-ARP-VE-000117, IN-ARP-VE-000026, IN-ARP-VE-000032, IN-ARP-VE-000119
	Y	CCP-TP-030, Revision 15	• Generation-level data packages contain the following information: – Sampling, testing, and batch analytical data reports – Data review checklists • Reviews and verification of generation-level data packages are complete	Y	The WWIS Data Entry Summary—Certification and Characterization Excel spreadsheet is filled with appropriate data. This spreadsheet does contain some data checks, similar to those in the WWIS, so that potential problems with a particular drum's certification can be identified prior to WWIS submission. The summary is printed and reviewed. The BDRs containing the review checklists are not accessed by the WCO, but the BDR summary sheets and data result sheets form part of the file built to facilitate WWIS data entry. As part of the inspection, BDRs for RTR and VE were reviewed. These BDRs contained sampling, testing, and batch data reports and completed-generation level review checklists. Objective evidence reviewed: (1) WWIS Data Entry Summary—Characterization and Certification spreadsheet for drums

Attachment A.8: WIPP Waste Information System Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comments
					IDRFD201268B (debris) and 10010514 (sludge) (2) WWIS waste container report for demonstration drum IDRFRD1214748 (3) BDRs (RTR): ID05-NDE02-0006, ID05-NDE02-0003, ID05-NDE02-0001, ID05-NDE02-0004, ID05-NDE02-0005, ID05-NDE02-0002 (4) BDRs (VE): IN-ARP-VE-000117, IN-ARP-VE-000026, IN-ARP-VE-000032, IN-ARP-VE-000119
	Y	CCP-TP-030, Revision 15	• Project-level data packages contain the following information for each waste container: – Data validation summary – Analytical results • Reviews of project-level data packages are complete	Y	WDEP cannot process containers unless they are part of a lot evaluation, and containers can only be part of a lot evaluation if the characterization BDRs have been through project-level validation. The WWIS Data Entry Summary—Certification and Characterization Excel spreadsheet is filled with appropriate data. This spreadsheet does contain some data checks, similar to those in the WWIS, so that potential problems with a particular drum's certification can be identified prior to WWIS submission. The summary is printed and reviewed. The BDRs containing the review checklists are not accessed by the WCO, but the BDR summary sheets and data result sheets form part of the file built to facilitate WWIS data entry. Only completed BDRs are contained in the BDR summary. As part of the inspection, BDRs for RTR and VE were reviewed. These BDRs contained data validation summaries, analytical results, and completed project-level review checklists. The inspector also reviewed the NDE project-level review package for container IDRFD1214748. Objective evidence reviewed: (1) WWIS Data Entry Summary—Characterization

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Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comments
					and Certification spreadsheet for drums IDRFD201268B (debris) and 10010514 (sludge) (2) WWIS waste container report for demonstration drum, IDRFRD1214748 (3) BDRs (RTR): ID05-NDE02-0006, ID05-NDE02-0003, ID05-NDE02-0001, ID05-NDE02-0004, ID05-NDE02-0005, ID05-NDE02-0002 (4) BDRs (VE): IN-ARP-VE-000117, IN-ARP-VE-000026, IN-ARP-VE-000032, IN-ARP-VE-000119
There are adequate procedures for treatment of nonconforming data	Y	CCP-TP-030, Revision 15	• Procedures for nonconforming data are adequately implemented	Y	No drums have been submitted to the WWIS to date because there are no approved WSPFs since this was an initial certification inspection. The procedure and process that CCP will use at INL will be the same as that used at other approved sites. Dean Mooney is responsible for determining the NCR/CAR status of candidate drums. If a problem is identified, a request is sent to the WWIS data administrator to reject the subject drum until the NCR/CAR issue is resolved. If nonconforming data are identified after WWIS data entry, these data can be pulled out of the WWIS. These data changes can be processed only by the WWIS administrator. The WWIS Administrator can either reject the subject data or return it to the presubmittal status. The site is informed of any actions by e-mail. <u>Objective evidence reviewed</u>: (1) CAR/NCR status e-mails, dated May 4, 2005, from Dean Mooney with regard to NCR/CAR dispositions for drums
Security measures for ensuring data integrity and accessing the WWIS	Y	CCP-TP-030,		Y	All personnel requiring access to the system must be granted access by the WWIS data administrator.

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Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comments
are sufficient: • System access • Access log review		Revision 15, Sections 4.1, 4.8			Because CCP operates at several sites, access is requested on a site basis (INL is site C8). The completed forms are maintained in Carlsbad, and copies were not available at the site. User IDs and passwords for WWIS access are assigned by the WWIS data administrator. Objective evidence reviewed: (1) List of CCP users for site C8 (INL)
There are adequate procedures for entering data into the WWIS	Y	CCP-TP-030, Revision 15	• Procedures for entering data into the WWIS are adequately implemented	Y	At the time of the inspection, CCP did not have approved WSPFs for the INL waste streams and could not, therefore, submit container data for certification. The CCP procedure and personnel who will process containers will be the same as those used at other approved sites. WCO J.R. Stroble demonstrated the process by which CCP will verify and submit characterization data into the WWIS for container certification using data for drum IDRFRD1214748. The data entry was made into the characterization test module of the WWIS. Characterization data must be approved by the WWIS before the drum can be processed for certification. The WCO/WDEP build a file that contains all characterization data for each container to be entered into the WWIS. The WCO is able to access a list of BDR information, found in the PTS, for each container and uses this list to identify characterization data. All NCRs must be closed prior to data entry. Dean Mooney verifies NCR closure and informs the WCO of containers that can be entered into the WWIS for certification. Objective evidence reviewed: (1) CCP-TP-030, Revision 15

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Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comments
					(2) Qualification card for WCOs J.R. Stroble, Jeff Winkel, Roy White and Court Fesmire (3) Qualification cards for WDEP Lisa Campos-Hernandez, Creta Kirkes, Amy Fiero, Jack Hayes, Connie Hernandez and Roger Whiteaker (4) Instructions for WDEP for CCP at INL (sludge, graphite debris, and Pit 4 waste streams) (5) E-mail, dated May 4, 2005, from Dean Mooney with regard to NCR/CAR dispositions for drums 10010514, IDRFD201268B, and IDRFD12134748 (6) Draft WSPFs for ID-RF-S3121-374 (sludge) and ID-RF-S5126 (debris) (7) WWIS Data Entry Summary—Characterization and Certification spreadsheet for drums IDRFD201268B (debris) and 10010514 (sludge) (8) WWIS waste container report for demonstration drum IDRFRD1214748
	Y	CCP-TP-030, Revision 15	• Data entered into the WWIS consistent with WIPP requirements (i.e., data fields are populated); see Attachment 1 for list of required data fields	Y	At the time of the inspection, CCP did not have approved WSPFs for the INL waste streams and could not, therefore, submit container data for certification. The CCP procedure and personnel who will process containers will be the same as those used at other approved sites. WCO J.R. Stroble demonstrated the process by which CCP will verify and submit characterization data into the WWIS for container certification using data for drum IDRFRD1214748. The data entry was made into the characterization test module of the WWIS. Characterization data must be approved by the WWIS before the drum can be processed for certification. All items, except for those associated with transportation, were present in the WWIS Data Entry Summary—Characterization and Certification for

Attachment A.8: WIPP Waste Information System Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comments
					drums IDRFD201268B (debris) and 10010514 (sludge). Objective evidence reviewed: (1) WWIS Data Entry Summary—Characterization and Certification spreadsheet for drums IDRFD201268B (debris) and 10010514 (sludge)
The edit/limit checks contained in the WWIS system are appropriate for the site • Approved radioassay methods • Approved characterization methods • Approved analyte detection methods	Y	CCP-TP-030, Revision 15, Section 4.0	• The edit limit checks are appropriate	Y	The WWIS Data Entry Summary—Certification and Characterization Excel spreadsheet contains some of the same limit checks as the WWIS. For example, during the demonstration of the WWIS, the WWIS Data Entry Summary—Characterization and Certification spreadsheet reported excess decay heat for drum IDRFD1214748. The Excel spreadsheet is reviewed by a WCO to ensure that only approved methods are used to generate characterization data. Objective evidence reviewed: (1) WWIS Data Entry Summary—Characterization and Certification spreadsheet for drums IDRFD201268B (debris) and 10010514 (sludge) (2) WWIS waste container report for demonstration drum IDRFRD1214748
	Y	CCP-TP-030, Revision 15, Section 4.0	• The site adequately demonstrated its ability to transmit waste container characterization data to the WIPP using the WWIS	Y	At the time of the inspection, CCP did not have approved WSPFs for the INL waste streams and could not, therefore, submit container data for certification. The CCP procedure and personnel who will process containers will be the same as those used at other approved sites. WCO J.R. Stroble demonstrated the process by which CCP will verify and submit characterization data into the WWIS for container certification using data for drum IDRFRD1214748. The data entry was made into the characterization test module of the WWIS. Characterization data must be approved by the WWIS before the drum can be processed for certification.

Attachment A.8: WIPP Waste Information System Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comments
					Objective evidence reviewed: (1) WWIS Data Entry Summary—Characterization and Certification spreadsheet for drums IDRFD201268B (debris) and 10010514 (sludge) (2) WWIS waste container report for demonstration drum IDRFRD1214748
	Y		• The site adequately demonstrated its ability to receive information from the WIPP via the WWIS, including e-mail notifications	Y	At the time of the inspection, CCP did not have approved WSPFs for the INL waste streams and could not, therefore, submit container data for certification. The system used for container characterization and certification in the WWIS will be the same as that used at other CCP sites where many drums have been successfully shipped to the WIPP. Objective evidence reviewed: (1) Qualification card for WCOs J.R. Stroble, Jeff Winkel, Roy White and Court Fesmire (2) Qualification cards for WDEP Lisa Campos-Hernandez, Creta Kirkes, Amy Fiero, Jack Hayes, Connie Hernandez, and Roger Whiteaker (3) Instructions for WDEP for CCP at INL (sludge, graphite debris, and Pit 4 waste streams) (4) WWIS Data Entry Summary—Characterization and Certification spreadsheet for drums IDRFD201268B (debris) and 10010514 (sludge) (5) WWIS waste container report for demonstration drum IDRFRD1214748
	Y		• The site adequately demonstrated its ability to print the appropriate waste container characterization data reports for data submitted to the WIPP using the WWIS	Y	At the time of the inspection, CCP did not have an approved WSPF for the INL waste streams and could not, therefore, submit container data for certification. The system used for container characterization and certification in the WWIS will be the same as that used at other CCP sites where many drums have been successfully shipped to the WIPP. Objective evidence reviewed:

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Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comments
					(1) WWIS Data Entry Summary—Characterization and Certification spreadsheet for drums IDRFD201268B (debris) and 10010514 (sludge) (2) WWIS waste container report for demonstration drum IDRFRD1214748
The site has adequate procedures that require verification of the accuracy of waste container characterization data submitted to and received by the WIPP using the WWIS Waste container data reports are required to be reconciled with site data	Y		• Waste container characterization data submitted to and received by the WIPP are verified • Waste container data reports are reconciled with site data	Y	At the time of the inspection, CCP did not have an approved WSPF for the INL waste streams and could not, therefore, submit container data for certification. The system used for container characterization and certification in the WWIS will be the same as that used at other CCP sites where many drums have been successfully shipped to the WIPP. Objective evidence reviewed: (1) WWIS Data Entry Summary—Characterization and Certification spreadsheet for drums IDRFD201268B (debris) and 10010514 (sludge) (2) WWIS waste container report for demonstration drum IDRFRD1214748
Procedures for waste container characterization data submitted to the WIPP using the WWIS require that the following records be kept: • WWIS access requests • WWIS access logs • Waste container data input reports • WWIS waste container data reports	Y		The following records are kept: • WWIS access requests • WWIS access logs • Waste container data input reports • WWIS waste container data reports	Y	WWIS access requests and access logs are maintained in Carlsbad, and no copies are kept at the site. Access to the WWIS is granted by the WWIS data administrator, and only approved users can access the WWIS. Characterization data contained in BDRs will be maintained by CCP as records. Objective evidence reviewed: (1) WWIS waste container report for demonstration drum IDRFRD1214748 (2) AK documentation, container list for waste streams ID-RF-S3121-374 and ID-RF-S5126 (3) List of approved users for WWIS at INL (site C8) (4) BDRs (RTR):

Attachment A.8: WIPP Waste Information System Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comments
					ID05-NDE02-0006, ID05-NDE02-0003, ID05-NDE02-0001, ID05-NDE02-0004, ID05-NDE02-0005, ID05-NDE02-0002 (5) BDRs (VE): IN-ARP-VE-000117, IN-ARP-VE-000026, IN-ARP-VE-000032, IN-ARP-VE-000119
Payload management procedures and practices meet the requirements contained in Appendix E of the CH-WAC (DOE/WIPP-02-3122)	Y	CCP-TP-030, Revision 15, Sections 4.7–4.13; CCP-TP-086, Revision 7; CCP-PO-002, Revision 12, Attachment 8		Y	The certification plan (Attachment 8) and procedure CCP-TP-030 contain the same requirements for payload management as those found in Appendix E of the CH-WAC. CCP-TP-030 and CCP-TP-086, containing CCP's payload management practices and procedures, are approved procedures. At the time of the inspection, no drums had been certified; hence, no containers were identified as candidates for payload management. CCP has, however, successfully implemented payload management at other sites. The procedures and practices used for payload management at INL will be the same as those used at other CCP sites. EPA was informed of CCP's intention to use payload management at INL in the audit (A-05-12) notification letter. The SPM will assess drums for load management, ensuring that all candidate drums are from the same waste stream. As part of the demonstration, the WCO attempted to enter a drum from a different waste stream into the demonstration payload but was not allowed to do so by the WWIS. The AK tracking sheet is used to verify that each drum has been assigned to a waste stream. For the purpose of demonstration, WCO J.R. Stroble used data from SRS (site C1) drums, entered into the WWIS test module, to show how the WWIS

Attachment A.8: WIPP Waste Information System Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comments
					recalculates average TRU activity as new drums are added to the payload. The container type used to overpack the containers was an SWB-Overpack. The first drum used in the demonstration was FBL00005, then container FBL00007, and finally container FBL00013 was added to the payload. The waste container data reports for the SWB document the recalculation of average TRU activity as each container was added. The WWIS also recalculates other criteria that must be met for shipping (CH-TRAMPAC requirements). The weight used to calculate the alpha activity of the drums in the payload includes the drums, waste, and liners. CCP at INL will use approved TCOPs or SWBs as payload containers. The TCO will use the WWIS transportation module to ensure that the payloads assembled are WIPP compliant, as demonstrated by the WCO. Containers are not available to the TCO for shipment until they have been certified by the WWIS. Only containers from the same approved waste stream can be entered into the WWIS for the same payload. For payload management, the WWIS checks that each drum contains at least one TRU radionuclide greater than the LLD to qualify as TRU waste. It is anticipated that AMW will ship waste that has been characterized by CCP, although CCP may supplement shipping if the number of containers warrants this. <u>Objective evidence reviewed</u>: (1) Audit plan for audit A-05-12, dated March 17, 2005 (2) AK tracking sheet, container list for waste streams ID-RF-S3121-374 and ID-RF-S5126 (3) Waste container data reports for container 14-

Attachment A.8: WIPP Waste Information System Checklist

Establishment of Required Technical Elements in Procedures	Y/N	Location	Execution of Procedures	Y/N	Objective Evidence/Comments
					SWB-OVERPACK (4) Waste container data report for container IDRFRD1214748

EPA Inspection Issue Tracking Form
Attachment A.9: WWIS Data Requirements

Container number—present	Radionuclide name—present
Site ID—present	Radionuclide activity—present
Waste stream profile number—present	Radionuclide activity uncertainty—present
Matrix code—present	Radionuclide mass—present
Trucon Code—present	Radionuclide mass uncertainty—present
Decay heat—present	WMP weight—present
Decay heat uncertainty—present	Radioassay method—present
Shipment number—NA (transportation)	Assay date—present
Packaging number—NA (transportation)	Characterization method—present
Assembly ID—NA (transportation)	Characterization method date—present
TRU alpha activity—present	Packaging layers—present
TRU alpha activity uncertainty—present	Alpha surface concentration—present
TRU alpha activity concentration—present	Dose rate—present
TRU alpha activity concentration uncertainty—present	Sample ID—present
Pu 239 equivalent activity—present	Sample type—present
Pu 239 fissile gram equivalent—present	Sample date—present
Pu 239 FGE uncertainty—present	Analyte—present
Handling code—present	Analyte concentration—present
Waste type code—present	Analyte detection method—present

EPA Inspection Issue Tracking Form

Attachments B.1 through B.14

EPA Inspection Issue Tracking Form
Attachment B.1 Replicate Testing TGS Data for Container IDRF001210739

Instrument: TGS
Container: IDRF001210739

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
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{233}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{234}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{235}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{237}Np Activity (Ci)	0.00E+00	N/A	38.8%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{238}Pu Activity (Ci)	5.46E-02	2.52E-02	46.2%	4.84E-02	2.25E-02	46.5%	3.05E-02	1.55E-02	50.8%
^{238}U Activity (Ci)	0.00E+00	0.00E+00	0.0%	0.00E+00	0.00E+00	0.0%	0.00E+00	0.00E+00	0.0%
^{239}Pu Activity (Ci)	1.04E+00	7.99E-02	7.7%	9.71E-01	7.48E-02	7.7%	9.94E-01	7.65E-02	7.7%
^{240}Pu Activity (Ci)	2.68E-01	5.55E-02	20.7%	2.33E-01	5.16E-02	22.1%	2.21E-01	5.88E-02	26.6%
^{241}Am Activity (Ci)	1.63E-01	1.57E-02	9.6%	1.27E-01	1.33E-02	10.5%	1.92E-01	5.54E-02	28.8%
^{241}Pu Activity (Ci)	2.03E+00	1.70E-01	8.4%	1.88E+00	1.57E-01	8.4%	3.02E+00	5.31E-01	17.6%
^{242}Pu Activity (Ci)	1.99E-05	5.20E-06	26.2%	1.51E-05	3.96E-06	26.2%	2.87E-05	7.64E-06	26.6%
TRU Alpha Conc. (nCi/g)	25240	1561	6.2%	22875	1561	6.8%	23845	1707	7.2%

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
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{233}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{234}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{235}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{237}Np Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{238}Pu Activity (Ci)	5.52E-02	2.61E-02	47.3%	7.06E-02	2.66E-02	37.7%	3.06E-02	1.56E-02	50.8%
^{238}U Activity (Ci)	0.00E+00	0.00E+00	0.0%	0.00E+00	0.00E+00	0.0%	0.00E+00	0.00E+00	0.0%
^{239}Pu Activity (Ci)	9.49E-01	7.31E-02	7.7%	1.07E+00	8.23E-02	7.7%	9.98E-01	7.68E-02	7.7%
^{240}Pu Activity (Ci)	1.87E-01	5.68E-02	30.3%	1.44E-01	5.91E-02	41.0%	2.22E-01	5.91E-02	26.6%
^{241}Am Activity (Ci)	1.13E-01	1.22E-02	10.8%	1.30E-01	1.39E-02	10.6%	1.93E-01	3.40E-02	17.6%
^{241}Pu Activity (Ci)	1.95E+00	1.65E-01	8.5%	2.03E+00	1.71E-01	8.4%	3.03E+00	5.34E-01	17.6%
^{242}Pu Activity (Ci)	1.15E-05	3.02E-06	26.2%	8.62E-06	2.26E-06	26.2%	2.88E-05	7.67E-06	26.6%
TRU Alpha Conc. (nCi/g)	21653	1599	7.4%	23498	1745	7.4%	23946	1715	7.2%

EPA Inspection Issue Tracking Form

Attachment B.2 Replicate Testing TGS Results for Container IDRF001210739

Instrument: TGS
Container: IDRF001210739

Quantity of Interest	Original Measurement		Sample Mean	Sample Standard Deviation	Relative Standard Deviation	c^2	Pr($x < \|c^2\|$)	t	Pr($x < \|t\|$)
	Reported Value	Absolute Uncertainty							
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{233}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{234}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{235}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{237}Np Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{238}Pu Activity (Ci)	5.46E-02	2.52E-02	4.71E-02	1.71E-02	36.3%	1.830	0.767	0.404	0.707
^{238}U Activity (Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	N/A	N/A	N/A	N/A	N/A
^{239}Pu Activity (Ci)	1.04E+00	7.99E-02	9.96E-01	4.51E-02	4.5%	1.278	0.865	0.828	0.454
^{240}Pu Activity (Ci)	2.68E-01	5.55E-02	2.01E-01	3.63E-02	18.0%	1.710	0.789	1.672	0.170
^{241}Am Activity (Ci)	1.63E-01	1.57E-02	1.51E-01	3.85E-02	25.5%	24.098	0.000	0.277	0.795
^{241}Pu Activity (Ci)	2.03E+00	1.70E-01	2.38E+00	5.92E-01	24.9%	48.382	0.000	-0.546	0.614
^{242}Pu Activity (Ci)	1.99E-05	5.20E-06	1.85E-05	9.58E-06	51.7%	13.575	0.009	0.125	0.907
TRU Alpha Conc. (nCi/g)	25,240	1,561	23,163	943	4.1%	1.458	0.834	1.799	0.146

Quantity of Interest	c^2 Test	t Test
^{90}Sr Activity (Ci)	#VALUE!	Not Applicable
^{137}Cs Activity (Ci)	#VALUE!	Not Applicable
^{233}U Activity (Ci)	#VALUE!	Not Applicable
^{234}U Activity (Ci)	#VALUE!	Not Applicable
^{235}U Activity (Ci)	#VALUE!	Not Applicable
^{237}Np Activity (Ci)	#VALUE!	Not Applicable
^{238}Pu Activity (Ci)	Not Significant	Not Significant
^{238}U Activity (Ci)	Not Applicable	Not Applicable
^{239}Pu Activity (Ci)	Not Significant	Not Significant
^{240}Pu Activity (Ci)	Not Significant	Not Significant
^{241}Am Activity (Ci)	Highly Significant	Not Significant
^{241}Pu Activity (Ci)	Highly Significant	Not Significant
^{242}Pu Activity (Ci)	Highly Significant	Not Significant
TRU Alpha Conc. (nCi/g)	Not Significant	Not Significant

EPA Inspection Issue Tracking Form
Attachment B.3 Replicate Testing TGS Data for Container ARP00227

Instrument: TGS CCP
Container: APR00227

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
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{233}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{234}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{235}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{237}Np Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{238}Pu Activity (Ci)	4.09E-03	2.18E-03	53.3%	3.70E-03	1.97E-03	53.3%	3.70E-03	1.97E-03	53.3%
^{238}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{239}Pu Activity (Ci)	1.33E-01	2.37E-02	17.8%	1.21E-01	2.15E-02	17.8%	1.21E-01	2.15E-02	17.8%
^{240}Pu Activity (Ci)	2.96E-02	9.21E-03	31.1%	2.68E-02	8.34E-03	31.1%	2.68E-02	8.34E-03	31.1%
^{241}Am Activity (Ci)	2.58E-02	6.14E-03	23.8%	2.33E-02	5.56E-03	23.8%	2.33E-02	5.56E-03	23.8%
^{241}Pu Activity (Ci)	4.05E-01	9.65E-02	23.8%	3.67E-01	8.74E-02	23.8%	3.67E-01	8.73E-02	23.8%
^{242}Pu Activity (Ci)	3.84E-06	1.20E-06	31.1%	3.48E-06	1.08E-06	31.1%	3.48E-06	1.08E-06	31.1%
TRU Alpha Conc. (nCi/g)	2472	337	13.6%	2237	305	13.6%	2237	305	13.6%

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
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{233}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{234}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{235}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{237}Np Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{238}Pu Activity (Ci)	3.06E-03	1.63E-03	53.3%	3.60E-03	1.92E-03	53.3%	3.66E-03	1.95E-03	53.3%
^{238}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{239}Pu Activity (Ci)	9.96E-02	1.77E-02	17.8%	1.17E-01	2.08E-02	17.8%	1.19E-01	2.12E-02	17.8%
^{240}Pu Activity (Ci)	2.22E-02	6.89E-03	31.1%	2.60E-02	8.10E-03	31.1%	2.65E-02	8.23E-03	31.1%
^{241}Am Activity (Ci)	1.93E-02	4.59E-03	23.8%	2.27E-02	5.40E-03	23.8%	2.30E-02	5.49E-03	23.8%
^{241}Pu Activity (Ci)	3.03E-01	7.21E-02	23.8%	3.56E-01	8.48E-02	23.8%	3.62E-01	8.62E-02	23.8%
^{242}Pu Activity (Ci)	2.87E-06	8.94E-07	31.1%	3.38E-06	1.05E-06	31.1%	3.44E-06	1.07E-06	31.1%
TRU Alpha Conc. (nCi/g)	1849	252	13.6%	2173	296	13.6%	2209	301	13.6%

EPA Inspection Issue Tracking Form
Attachment B.4 Replicate Testing TGS Results for Container ARP00227

Instrument: TGS CCP
Container: APR00227

Quantity of Interest	Original Measurement		Sample Mean	Sample Standard Deviation	Relative Standard Deviation	c^2	Pr($x < \|c^2\|$)	t	Pr($x < \|t\|$)
	Reported Value	Absolute Uncertainty							
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{233}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{234}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{235}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{237}Np Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{238}Pu Activity (Ci)	4.09E-03	2.18E-03	3.54E-03	2.74E-04	7.7%	0.063	1.000	1.823	0.142
^{238}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{239}Pu Activity (Ci)	1.33E-01	2.37E-02	1.15E-01	8.93E-03	7.7%	0.567	0.967	1.823	0.142
^{240}Pu Activity (Ci)	2.96E-02	9.21E-03	2.57E-02	1.98E-03	7.7%	0.186	0.996	1.823	0.142
^{241}Am Activity (Ci)	2.58E-02	6.14E-03	2.23E-02	1.73E-03	7.7%	0.317	0.989	1.823	0.142
^{241}Pu Activity (Ci)	4.05E-01	9.65E-02	3.51E-01	2.71E-02	7.7%	0.317	0.989	1.823	0.142
^{242}Pu Activity (Ci)	3.84E-06	1.20E-06	3.33E-06	2.58E-07	7.7%	0.186	0.996	1.823	0.142
TRU Alpha Conc. (nCi/g)	2,472	337	2,141	166	7.7%	0.965	0.915	1.631	0.178

Quantity of Interest	c^2 Test	t Test
^{90}Sr Activity (Ci)	#VALUE!	Not Applicable
^{137}Cs Activity (Ci)	#VALUE!	Not Applicable
^{233}U Activity (Ci)	#VALUE!	Not Applicable
^{234}U Activity (Ci)	#VALUE!	Not Applicable
^{235}U Activity (Ci)	#VALUE!	Not Applicable
^{237}Np Activity (Ci)	#VALUE!	Not Applicable
^{238}Pu Activity (Ci)	Not Significant	Not Significant
^{238}U Activity (Ci)	#VALUE!	Not Applicable
^{239}Pu Activity (Ci)	Not Significant	Not Significant
^{240}Pu Activity (Ci)	Not Significant	Not Significant
^{241}Am Activity (Ci)	Not Significant	Not Significant
^{241}Pu Activity (Ci)	Not Significant	Not Significant
^{242}Pu Activity (Ci)	Not Significant	Not Significant
TRU Alpha Conc. (nCi/g)	Not Significant	Not Significant

EPA Inspection Issue Tracking Form

Attachment B.5 Replicate Testing TGS Data for Container ARP00230

Instrument: TGS CCP
Container: APR00230

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
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{233}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{234}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{235}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{237}Np Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{238}Pu Activity (Ci)	1.50E-03	8.01E-04	53.3%	1.60E-03	8.53E-04	53.3%	1.38E-03	7.35E-04	53.3%
^{238}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{239}Pu Activity (Ci)	4.89E-02	8.71E-03	17.8%	5.21E-02	9.28E-03	17.8%	4.49E-02	7.99E-03	17.8%
^{240}Pu Activity (Ci)	1.09E-02	3.38E-03	31.1%	1.16E-02	3.61E-03	31.1%	9.99E-03	3.11E-03	31.1%
^{241}Am Activity (Ci)	9.47E-03	2.26E-03	23.8%	1.01E-02	2.40E-03	23.8%	8.69E-03	2.07E-03	23.8%
^{241}Pu Activity (Ci)	1.49E-01	3.54E-02	23.8%	1.59E-01	3.78E-02	23.8%	1.37E-01	3.25E-02	23.8%
^{242}Pu Activity (Ci)	1.41E-06	4.39E-07	31.1%	1.50E-06	4.68E-07	31.1%	1.30E-06	4.03E-07	31.1%
TRU Alpha Conc. (nCi/g)	534	73	13.6%	569	78	13.6%	490	67	13.6%

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
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{233}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{234}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{235}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{237}Np Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{238}Pu Activity (Ci)	1.64E-03	8.73E-04	53.3%	1.52E-03	8.11E-04	53.3%	1.10E-03	5.87E-04	53.3%
^{238}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{239}Pu Activity (Ci)	5.33E-02	9.49E-03	17.8%	4.96E-02	8.82E-03	17.8%	3.59E-02	6.38E-03	17.8%
^{240}Pu Activity (Ci)	1.19E-02	3.69E-03	31.1%	1.10E-02	3.43E-03	31.1%	7.97E-03	2.48E-03	31.1%
^{241}Am Activity (Ci)	1.03E-02	2.46E-03	23.8%	9.59E-03	2.28E-03	23.8%	6.94E-03	1.65E-03	23.8%
^{241}Pu Activity (Ci)	1.62E-01	3.86E-02	23.8%	1.51E-01	1.45E-03	1.0%	1.09E-01	2.60E-02	23.8%
^{242}Pu Activity (Ci)	1.54E-06	4.79E-07	31.1%	1.43E-06	4.45E-07	31.1%	1.03E-06	3.22E-07	31.1%
TRU Alpha Conc. (nCi/g)	582	79	13.6%	541	74	13.6%	391	53	13.6%

EPA Inspection Issue Tracking Form
Attachment B.6 Replicate Testing TGS Results for Container ARP00230

Instrument: TGS CCP
Container: APR00230

Quantity of Interest	Original Measurement		Sample Mean	Sample Standard Deviation	Relative Standard Deviation	c^2	Pr($x < \|c^2\|$)	t	Pr($x < \|t\|$)
	Reported Value	Absolute Uncertainty							
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{233}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{234}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{235}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{237}Np Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{238}Pu Activity (Ci)	1.50E-03	8.01E-04	1.45E-03	2.18E-04	15.1%	0.296	0.990	0.228	0.831
^{238}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{239}Pu Activity (Ci)	4.89E-02	8.71E-03	4.72E-02	7.10E-03	15.1%	2.658	0.617	0.228	0.831
^{240}Pu Activity (Ci)	1.09E-02	3.38E-03	1.05E-02	1.58E-03	15.1%	0.871	0.929	0.228	0.831
^{241}Am Activity (Ci)	9.47E-03	2.26E-03	9.13E-03	1.37E-03	15.1%	1.486	0.829	0.228	0.831
^{241}Pu Activity (Ci)	1.49E-01	3.54E-02	1.43E-01	2.16E-02	15.1%	1.486	0.829	0.228	0.831
^{242}Pu Activity (Ci)	1.41E-06	4.39E-07	1.36E-06	2.05E-07	15.1%	0.871	0.929	0.228	0.831
TRU Alpha Conc. (nCi/g)	534	73	514	77	15.1%	4.528	0.339	0.204	0.848

Quantity of Interest	c^2 Test	t Test
^{90}Sr Activity (Ci)	#VALUE!	Not Applicable
^{137}Cs Activity (Ci)	#VALUE!	Not Applicable
^{233}U Activity (Ci)	#VALUE!	Not Applicable
^{234}U Activity (Ci)	#VALUE!	Not Applicable
^{235}U Activity (Ci)	#VALUE!	Not Applicable
^{237}Np Activity (Ci)	#VALUE!	Not Applicable
^{238}Pu Activity (Ci)	Not Significant	Not Significant
^{238}U Activity (Ci)	#VALUE!	Not Applicable
^{239}Pu Activity (Ci)	Not Significant	Not Significant
^{240}Pu Activity (Ci)	Not Significant	Not Significant
^{241}Am Activity (Ci)	Not Significant	Not Significant
^{241}Pu Activity (Ci)	Not Significant	Not Significant
^{242}Pu Activity (Ci)	Not Significant	Not Significant
TRU Alpha Conc. (nCi/g)	Not Significant	Not Significant

EPA Inspection Issue Tracking Form

Attachment B.7 Replicate Testing SGRS Data for Container ARP00243

Instrument: SGRS
Container: ARP00243

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
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.0%	3.54E-08	4.14E-08	117.0%	0.00E+00	N/A	0.0%
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.0%	3.22E-08	1.28E-08	39.8%	0.00E+00	N/A	0.0%
^{233}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{234}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{235}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{237}Np Activity (Ci)	3.12E-07	8.86E-08	28.4%	3.53E-07	9.92E-08	28.1%	3.17E-07	9.07E-08	28.6%
^{238}Pu Activity (Ci)	1.97E-03	9.20E-04	46.7%	2.81E-03	1.02E-03	36.3%	3.17E-03	1.06E-03	33.4%
^{238}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{239}Pu Activity (Ci)	6.23E-02	1.56E-02	25.0%	6.27E-02	1.57E-02	25.0%	6.04E-02	1.51E-02	25.0%
^{240}Pu Activity (Ci)	1.50E-02	3.86E-03	25.7%	1.47E-02	3.76E-03	25.6%	1.24E-02	3.19E-03	25.7%
^{241}Am Activity (Ci)	1.74E-02	4.44E-03	25.5%	1.82E-02	4.73E-03	26.0%	1.87E-02	4.77E-03	25.5%
^{241}Pu Activity (Ci)	7.60E-02	2.04E-02	26.8%	8.84E-02	2.33E-02	26.4%	8.36E-02	2.19E-02	26.2%
^{242}Pu Activity (Ci)	1.45E-06	4.02E-07	27.7%	1.36E-06	3.78E-07	27.8%	1.19E-06	3.30E-07	27.7%
TRU Alpha Conc. (nCi/g)	1,460	252	17.3%	1,490	255	17.1%	1,430	245	17.1%

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
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{233}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{234}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{235}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{237}Np Activity (Ci)	3.45E-07	9.69E-08	28.1%	3.34E-07	9.39E-08	28.1%	3.54E-07	1.01E-07	28.5%
^{238}Pu Activity (Ci)	1.84E-03	8.52E-04	46.3%	2.14E-03	9.10E-04	42.5%	2.91E-03	1.09E-03	37.5%
^{238}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{239}Pu Activity (Ci)	6.14E-02	1.54E-02	25.1%	6.22E-02	1.56E-02	25.1%	6.34E-02	1.59E-02	25.1%
^{240}Pu Activity (Ci)	1.45E-02	3.71E-03	25.6%	1.33E-02	3.42E-03	25.7%	1.53E-02	3.92E-03	25.6%
^{241}Am Activity (Ci)	2.01E-02	5.09E-03	25.3%	1.85E-02	4.72E-03	25.5%	1.71E-02	4.36E-03	25.5%
^{241}Pu Activity (Ci)	7.26E-02	1.95E-02	26.9%	8.11E-02	2.16E-02	26.6%	9.04E-02	2.52E-02	27.9%
^{242}Pu Activity (Ci)	1.33E-06	3.68E-07	27.7%	1.23E-06	3.43E-07	27.9%	1.47E-06	4.07E-07	27.7%
TRU Alpha Conc. (nCi/g)	1,480	251	17.0%	1,450	252	17.4%	1,490	256	17.2%

EPA Inspection Issue Tracking Form

Attachment B.8 Replicate Testing SGRS Results for Container ARP00243

Instrument: SGRS
Container: ARP00243

Quantity of Interest	Original Measurement		Sample Mean	Sample Standard Deviation	Relative Standard Deviation	c^2	Pr($x < \|c^2\|$)	t	Pr($x < \|t\|$)
	Reported Value	Absolute Uncertainty							
^{90}Sr Activity (Ci)	0.00E+00	N/A	7.08E-09	1.58E-08	223.6%	#VALUE!	#VALUE!	-0.408	0.704
^{137}Cs Activity (Ci)	0.00E+00	N/A	6.44E-09	1.44E-08	223.6%	#VALUE!	#VALUE!	-0.408	0.704
^{233}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{234}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{235}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{237}Np Activity (Ci)	3.12E-07	8.86E-08	3.41E-07	1.54E-08	4.5%	0.121	0.998	-1.691	0.166
^{238}Pu Activity (Ci)	1.97E-03	9.20E-04	2.57E-03	5.59E-04	21.7%	1.478	0.831	-0.986	0.380
^{238}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{239}Pu Activity (Ci)	6.23E-02	1.56E-02	6.20E-02	1.16E-03	1.9%	0.022	1.000	0.220	0.837
^{240}Pu Activity (Ci)	1.50E-02	3.86E-03	1.40E-02	1.17E-03	8.3%	0.368	0.985	0.749	0.495
^{241}Am Activity (Ci)	1.74E-02	4.44E-03	1.85E-02	1.08E-03	5.8%	0.236	0.994	-0.948	0.397
^{241}Pu Activity (Ci)	7.60E-02	2.04E-02	8.32E-02	7.00E-03	8.4%	0.472	0.976	-0.942	0.400
^{242}Pu Activity (Ci)	1.45E-06	4.02E-07	1.32E-06	1.11E-07	8.4%	0.304	0.990	1.104	0.332
TRU Alpha Conc. (nCi/g)	1,460	252	1,468	27	1.8%	0.045	1.000	-0.243	0.820

Quantity of Interest	c^2 Test	t Test
^{90}Sr Activity (Ci)	#VALUE!	Not Significant
^{137}Cs Activity (Ci)	#VALUE!	Not Significant
^{233}U Activity (Ci)	#VALUE!	Not Applicable
^{234}U Activity (Ci)	#VALUE!	Not Applicable
^{235}U Activity (Ci)	#VALUE!	Not Applicable
^{237}Np Activity (Ci)	Not Significant	Not Significant
^{238}Pu Activity (Ci)	Not Significant	Not Significant
^{238}U Activity (Ci)	#VALUE!	Not Applicable
^{239}Pu Activity (Ci)	Not Significant	Not Significant
^{240}Pu Activity (Ci)	Not Significant	Not Significant
^{241}Am Activity (Ci)	Not Significant	Not Significant
^{241}Pu Activity (Ci)	Not Significant	Not Significant
^{242}Pu Activity (Ci)	Not Significant	Not Significant
TRU Alpha Conc. (nCi/g)	Not Significant	Not Significant

EPA Inspection Issue Tracking Form

Attachment B.9 Replicate Testing SGRS Data for Container ARP00031

Instrument: SGRS
Container: ARP00031

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
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{233}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{234}U Activity (Ci)	2.33E-05	1.40E-05	60.1%	2.57E-05	1.54E-05	59.9%	2.98E-05	1.79E-05	60.1%
^{235}U Activity (Ci)	7.34E-07	2.48E-07	33.8%	8.11E-07	2.93E-07	36.1%	9.42E-07	3.43E-07	36.4%
^{237}Np Activity (Ci)	5.17E-06	1.74E-06	33.7%	6.04E-06	2.02E-06	33.4%	5.32E-06	1.79E-06	33.6%
^{238}Pu Activity (Ci)	1.07E-02	5.05E-03	47.2%	1.47E-02	6.14E-03	41.8%	7.30E-03	3.41E-03	46.7%
^{238}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{239}Pu Activity (Ci)	2.17E-01	7.25E-02	33.4%	2.05E-01	6.83E-02	33.3%	2.14E-01	7.13E-02	33.3%
^{240}Pu Activity (Ci)	5.37E-02	1.83E-02	34.1%	4.49E-02	1.53E-02	34.1%	4.74E-02	1.60E-02	33.8%
^{241}Am Activity (Ci)	3.52E-01	1.17E-01	33.2%	3.52E-01	1.17E-01	33.2%	3.43E-01	1.14E-01	33.2%
^{241}Pu Activity (Ci)	3.57E-01	1.25E-01	35.0%	5.16E-01	1.76E-01	34.1%	3.08E-01	1.05E-01	34.1%
^{242}Pu Activity (Ci)	1.29E-05	4.52E-06	35.0%	1.18E-05	4.12E-06	34.9%	1.17E-05	4.07E-06	34.8%
TRU Alpha Conc. (nCi/g)	3,890	854	22.0%	3,780	837	22.1%	3,750	832	22.2%

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
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{233}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{234}U Activity (Ci)	2.78E-05	1.67E-05	60.1%	2.73E-05	1.64E-05	60.1%	2.89E-05	1.74E-05	60.2%
^{235}U Activity (Ci)	8.79E-07	3.28E-07	37.3%	8.63E-07	3.10E-07	35.9%	9.13E-07	3.38E-07	37.0%
^{237}Np Activity (Ci)	5.06E-06	1.69E-06	33.4%	5.42E-06	1.82E-06	33.6%	6.16E-06	2.07E-06	33.6%
^{238}Pu Activity (Ci)	1.44E-02	5.53E-03	38.4%	2.79E-03	2.58E-03	92.5%	1.20E-02	5.18E-03	43.2%
^{238}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{239}Pu Activity (Ci)	2.05E-01	6.81E-02	33.2%	2.13E-01	7.09E-02	33.3%	2.26E-01	7.57E-02	33.5%
^{240}Pu Activity (Ci)	5.12E-02	1.72E-02	33.6%	4.78E-02	1.61E-02	33.7%	5.39E-02	1.83E-02	34.0%
^{241}Am Activity (Ci)	3.46E-01	1.15E-01	33.2%	3.44E-01	1.14E-01	33.1%	3.74E-01	1.24E-01	33.2%
^{241}Pu Activity (Ci)	3.18E-01	1.09E-01	34.3%	3.07E-01	1.05E-01	34.2%	8.14E-01	2.76E-01	33.9%
^{242}Pu Activity (Ci)	1.19E-05	4.13E-06	34.7%	1.20E-05	4.18E-06	34.8%	1.43E-05	4.99E-06	34.9%
TRU Alpha Conc. (nCi/g)	3,780	828	21.9%	3,720	831	22.3%	4,090	900	22.0%

EPA Inspection Issue Tracking Form

Attachment B.10 Replicate Testing SGRS Results for Container ARP00031

Instrument: SGRS
Container: ARP00031

Quantity of Interest	Original Measurement		Sample Mean	SAMPLE Standard Deviation	Relative Standard Deviation	c^2	Pr($x < \|c^2\|$)	t	Pr($x < \|t\|$)
	Reported Value	Absolute Uncertainty							
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{233}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{234}U Activity (Ci)	2.33E-05	1.40E-05	2.79E-05	1.57E-06	5.6%	0.050	1.000	-2.680	0.055
^{235}U Activity (Ci)	7.34E-07	2.48E-07	8.82E-07	4.99E-08	5.7%	0.162	0.997	-2.699	0.054
^{237}Np Activity (Ci)	5.17E-06	1.74E-06	5.60E-06	4.77E-07	8.5%	0.300	0.990	-0.823	0.457
^{238}Pu Activity (Ci)	1.07E-02	5.05E-03	1.02E-02	5.11E-03	49.9%	4.095	0.393	0.083	0.938
^{238}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{239}Pu Activity (Ci)	2.17E-01	7.25E-02	2.13E-01	8.62E-03	4.1%	0.057	1.000	0.466	0.665
^{240}Pu Activity (Ci)	5.37E-02	1.83E-02	4.90E-02	3.52E-03	7.2%	0.148	0.997	1.207	0.294
^{241}Am Activity (Ci)	3.52E-01	1.17E-01	3.52E-01	1.29E-02	3.7%	0.049	1.000	0.014	0.989
^{241}Pu Activity (Ci)	3.57E-01	1.25E-01	4.53E-01	2.21E-01	48.7%	12.481	0.014	-0.397	0.712
^{242}Pu Activity (Ci)	1.29E-05	4.52E-06	1.23E-05	1.10E-06	8.9%	0.238	0.993	0.464	0.667
TRU Alpha Conc. (nCi/g)	3,890	854	3,824	151	3.9%	0.125	0.998	0.357	0.739

Quantity of Interest	c^2 Test	t Test
^{90}Sr Activity (Ci)	#VALUE!	Not Applicable
^{137}Cs Activity (Ci)	#VALUE!	Not Applicable
^{233}U Activity (Ci)	#VALUE!	Not Applicable
^{234}U Activity (Ci)	Not Significant	Not Significant
^{235}U Activity (Ci)	Not Significant	Not Significant
^{237}Np Activity (Ci)	Not Significant	Not Significant
^{238}Pu Activity (Ci)	Not Significant	Not Significant
^{238}U Activity (Ci)	#VALUE!	Not Applicable
^{239}Pu Activity (Ci)	Not Significant	Not Significant
^{240}Pu Activity (Ci)	Not Significant	Not Significant
^{241}Am Activity (Ci)	Not Significant	Not Significant
^{241}Pu Activity (Ci)	Significant	Not Significant
^{242}Pu Activity (Ci)	Not Significant	Not Significant
TRU Alpha Conc. (nCi/g)	Not Significant	Not Significant

EPA Inspection Issue Tracking Form

Attachment B.11 Replicate Testing WAGS Data for Container ARP00043

Instrument: WAGS
Container: ARP00043

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
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{233}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{234}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{235}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{237}Np Activity (Ci)	2.60E-08	1.01E-08	38.8%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{238}Pu Activity (Ci)	2.16E-05	1.04E-05	48.1%	2.45E-05	1.18E-05	48.2%	3.16E-05	1.70E-05	53.8%
^{238}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{239}Pu Activity (Ci)	7.34E-04	2.15E-04	29.3%	8.35E-04	2.44E-04	29.2%	1.08E-03	4.07E-04	37.7%
^{240}Pu Activity (Ci)	1.63E-04	4.96E-05	30.4%	1.85E-04	5.62E-05	30.4%	2.39E-04	9.27E-05	38.8%
^{241}Am Activity (Ci)	1.57E-03	1.92E-01	12229.2%	1.55E-03	1.90E-01	12258.1%	1.42E-03	5.06E-04	35.6%
^{241}Pu Activity (Ci)	1.70E-03	5.87E-04	34.5%	1.92E-03	6.64E-04	34.6%	2.48E-03	1.05E-03	42.3%
^{242}Pu Activity (Ci)	2.12E-08	1.25E-08	59.0%	2.41E-08	1.42E-08	58.9%	3.11E-08	1.98E-08	63.7%
TRU Alpha Conc. (nCi/g)	32	2,440	7625.0%	33	2,410	7303.0%	35	8	22.9%

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
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{233}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{234}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{235}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{237}Np Activity (Ci)	0.00E+00	N/A	0.0%	2.47E-08	9.63E-09	39.0%	0.00E+00	N/A	0.0%
^{238}Pu Activity (Ci)	2.55E-05	1.22E-05	47.8%	3.12E-05	1.65E-05	52.9%	2.10E-05	1.01E-05	48.1%
^{238}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{239}Pu Activity (Ci)	8.68E-04	2.50E-04	28.8%	1.06E-03	3.91E-04	36.9%	7.17E-04	2.07E-04	28.9%
^{240}Pu Activity (Ci)	1.93E-04	5.77E-05	29.9%	2.36E-04	8.92E-05	37.8%	1.59E-04	4.79E-05	30.1%
^{241}Am Activity (Ci)	1.48E-03	1.81E-01	12229.7%	1.46E-03	1.79E-01	12260.2%	1.27E-03	1.56E-01	12283.5%
^{241}Pu Activity (Ci)	2.00E-03	6.84E-04	34.2%	2.45E-03	1.01E-03	41.2%	1.65E-03	5.68E-04	34.4%
^{242}Pu Activity (Ci)	2.50E-08	1.47E-08	58.8%	3.06E-08	1.93E-08	63.1%	2.07E-08	1.21E-08	58.5%
TRU Alpha Conc. (nCi/g)	33	2,300	6969.7%	35	2,270	6485.7%	28	1,970	7035.7%

EPA Inspection Issue Tracking Form
Attachment B.12 Replicate Testing WAGS Results for Container ARP00043

Instrument: WAGS
Container: ARP00043

Quantity of Interest	Original Measurement		Sample Mean	Sample Standard Deviation	Relative Standard Deviation	c^2	Pr($x < \|c^2\|$)	t	Pr($x < \|t\|$)
	Reported Value	Absolute Uncertainty							
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{233}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{234}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{235}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{237}Np Activity (Ci)	2.60E-08	1.01E-08	4.94E-09	1.10E-08	223.6%	4.796	0.309	1.740	0.157
^{238}Pu Activity (Ci)	2.16E-05	1.04E-05	2.68E-05	4.56E-06	17.0%	0.769	0.943	-1.034	0.360
^{238}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{239}Pu Activity (Ci)	7.34E-04	2.15E-04	9.12E-04	1.55E-04	17.0%	2.076	0.722	-1.049	0.353
^{240}Pu Activity (Ci)	1.63E-04	4.96E-05	2.02E-04	3.44E-05	17.0%	1.932	0.748	-1.044	0.355
^{241}Am Activity (Ci)	1.57E-03	1.92E-01	1.44E-03	1.04E-04	7.2%	0.000	1.000	1.175	0.305
^{241}Pu Activity (Ci)	1.70E-03	5.87E-04	2.10E-03	3.58E-04	17.0%	1.488	0.829	-1.021	0.365
^{242}Pu Activity (Ci)	2.12E-08	1.25E-08	2.63E-08	4.46E-09	16.9%	0.508	0.973	-1.045	0.355
TRU Alpha Conc. (nCi/g)	32	2,440	33	3	9.7%	0.000	1.000	-0.304	0.776

Quantity of Interest	c^2 Test	t Test
^{90}Sr Activity (Ci)	#VALUE!	Not Applicable
^{137}Cs Activity (Ci)	#VALUE!	Not Applicable
^{233}U Activity (Ci)	#VALUE!	Not Applicable
^{234}U Activity (Ci)	#VALUE!	Not Applicable
^{235}U Activity (Ci)	#VALUE!	Not Applicable
^{237}Np Activity (Ci)	Not Significant	Not Significant
^{238}Pu Activity (Ci)	Not Significant	Not Significant
^{238}U Activity (Ci)	#VALUE!	Not Applicable
^{239}Pu Activity (Ci)	Not Significant	Not Significant
^{240}Pu Activity (Ci)	Not Significant	Not Significant
^{241}Am Activity (Ci)	Not Significant	Not Significant
^{241}Pu Activity (Ci)	Not Significant	Not Significant
^{242}Pu Activity (Ci)	Not Significant	Not Significant
TRU Alpha Conc. (nCi/g)	Not Significant	Not Significant

EPA Inspection Issue Tracking Form

Attachment B.13 Replicate Testing WAGS Data for Container IDRFVE1200851

Instrument: WAGS
Container: IDRFVE1200851

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
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	1.74E-08	2.40E-08	138.1%
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	1.58E-08	6.19E-09	39.2%
^{233}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{234}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{235}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{237}Np Activity (Ci)	5.52E-07	2.87E-07	52.0%	1.99E-07	6.91E-08	34.7%	1.81E-07	6.62E-08	36.6%
^{238}Pu Activity (Ci)	5.40E-03	1.94E-03	35.9%	3.34E-03	1.01E-03	30.2%	4.72E-03	1.31E-03	27.8%
^{238}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{239}Pu Activity (Ci)	1.65E-01	5.21E-02	31.6%	1.27E-01	3.12E-02	24.6%	1.30E-01	3.19E-02	24.5%
^{240}Pu Activity (Ci)	3.72E-02	1.18E-02	31.7%	2.88E-02	7.11E-03	24.7%	2.94E-02	7.26E-03	24.7%
^{241}Am Activity (Ci)	3.06E-02	9.76E-03	31.9%	2.13E-02	5.30E-03	24.9%	2.22E-02	5.53E-03	24.9%
^{241}Pu Activity (Ci)	2.49E-01	7.94E-02	31.9%	1.97E-01	4.87E-02	24.7%	1.99E-01	4.94E-02	24.8%
^{242}Pu Activity (Ci)	2.96E-06	9.95E-07	33.6%	2.27E-06	6.11E-07	26.9%	2.34E-06	6.29E-07	26.9%
TRU Alpha Conc. (nCi/g)	3,170	725	22.9%	2,290	412	18.0%	2,360	421	17.8%

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
^{90}Sr Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{137}Cs Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{233}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{234}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{235}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{237}Np Activity (Ci)	1.87E-07	6.64E-08	35.5%	1.74E-07	6.40E-08	36.8%	1.66E-07	6.32E-08	38.1%
^{238}Pu Activity (Ci)	5.09E-03	1.39E-03	27.3%	2.93E-03	9.35E-04	31.9%	3.81E-03	1.10E-03	28.9%
^{238}U Activity (Ci)	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%	0.00E+00	N/A	0.0%
^{239}Pu Activity (Ci)	1.27E-01	3.12E-02	24.6%	1.28E-01	3.16E-02	24.7%	1.26E-01	3.09E-02	24.5%
^{240}Pu Activity (Ci)	2.92E-02	7.21E-03	24.7%	2.90E-02	7.16E-03	24.7%	3.02E-02	7.46E-03	24.7%
^{241}Am Activity (Ci)	2.18E-02	5.43E-03	24.9%	2.21E-02	5.53E-03	25.0%	2.22E-02	5.51E-03	24.8%
^{241}Pu Activity (Ci)	1.94E-01	4.79E-02	24.7%	1.88E-01	4.68E-02	24.9%	2.07E-01	5.13E-02	24.8%
^{242}Pu Activity (Ci)	2.32E-06	6.26E-07	27.0%	2.28E-06	6.13E-07	26.9%	2.40E-06	6.48E-07	27.0%
TRU Alpha Conc. (nCi/g)	2,320	412	17.8%	2,310	416	18.0%	2,300	409	17.8%

EPA Inspection Issue Tracking Form

Attachment B.14 Replicate Testing WAGS Results for Container IDRFVE1200851

Instrument: WAGS
Container: IDRFVE1200851

Quantity of Interest	Original Measurement		Sample Mean	Sample Standard Deviation	Relative Standard Deviation	c^2	Pr($x < \|c^2\|$)	t	Pr($x < \|t\|$)
	Reported Value	Absolute Uncertainty							
^{90}Sr Activity (Ci)	0.00E+00	N/A	3.48E-09	7.78E-09	223.6%	#VALUE!	#VALUE!	-0.408	0.704
^{137}Cs Activity (Ci)	0.00E+00	N/A	3.16E-09	7.07E-09	223.6%	#VALUE!	#VALUE!	-0.408	0.704
^{233}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{234}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{235}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{237}Np Activity (Ci)	5.52E-07	2.87E-07	1.81E-07	1.26E-08	6.9%	0.008	1.000	26.889	0.000
^{238}Pu Activity (Ci)	5.40E-03	1.94E-03	3.98E-03	9.11E-04	22.9%	0.884	0.927	1.425	0.227
^{238}U Activity (Ci)	0.00E+00	N/A	0.00E+00	0.00E+00	N/A	#VALUE!	#VALUE!	N/A	N/A
^{239}Pu Activity (Ci)	1.65E-01	5.21E-02	1.28E-01	1.52E-03	1.2%	0.003	1.000	22.512	0.000
^{240}Pu Activity (Ci)	3.72E-02	1.18E-02	2.93E-02	5.40E-04	1.8%	0.008	1.000	13.312	0.000
^{241}Am Activity (Ci)	3.06E-02	9.76E-03	2.19E-02	3.83E-04	1.7%	0.006	1.000	20.667	0.000
^{241}Pu Activity (Ci)	2.49E-01	7.94E-02	1.97E-01	6.96E-03	3.5%	0.031	1.000	6.816	0.002
^{242}Pu Activity (Ci)	2.96E-06	9.95E-07	2.32E-06	5.22E-08	2.2%	0.011	1.000	11.167	0.000
TRU Alpha Conc. (nCi/g)	3,170	725	2,316	27	1.2%	0.006	1.000	25.808	0.000

Quantity of Interest	c^2 Test	t Test
^{90}Sr Activity (Ci)	#VALUE!	Not Significant
^{137}Cs Activity (Ci)	#VALUE!	Not Significant
^{233}U Activity (Ci)	#VALUE!	Not Applicable
^{234}U Activity (Ci)	#VALUE!	Not Applicable
^{235}U Activity (Ci)	#VALUE!	Not Applicable
^{237}Np Activity (Ci)	Not Significant	Highly Significant
^{238}Pu Activity (Ci)	Not Significant	Not Significant
^{238}U Activity (Ci)	#VALUE!	Not Applicable
^{239}Pu Activity (Ci)	Not Significant	Highly Significant
^{240}Pu Activity (Ci)	Not Significant	Highly Significant
^{241}Am Activity (Ci)	Not Significant	Highly Significant
^{241}Pu Activity (Ci)	Not Significant	Highly Significant
^{242}Pu Activity (Ci)	Not Significant	Highly Significant
TRU Alpha Conc. (nCi/g)	Not Significant	Highly Significant

Attachments C.1 through C.2

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

Inspection No. INL-CCP-05.05.08	Issue Number: INL-CCP-NDA-05-001CR Date: 5/5/05
Inspector: P. Kelly/E. Feltcorn Attachments? ☐ YES ☒ NO	Sample Size: 100% of available BDRs for TGS data Population size (if known): NA

A. Description of Issue: The individual assigned to perform expert analysis (EA) of TGS data was not appropriately trained to the requirements of DOE/WIPP-02-3122, Section 3.3.1.

B. Regulatory Reference: 40 CFR 194.24(c)

C. Site requirement(s): DOE/WIPP-02-3122 as reflected in the CCP Site Certification Plan and CCP-TP-112

D. Discussed with:

Site Personnel: Doug Walraven - ANTECH
DOE/CTAC Personnel: Jim Oliver, Jeff May
Other Personnel: Joe Harvill (CCP)

E. Additional Comments: There were typographical errors in the statement on this form that led us to discover this issue. INL personnel stated that they are aware of the errors and they will fix them. CTAC identified CAR No. 7 that addressed this same issue.

F. Site Response Information:

Site Response Required? ☒ YES ☐ NO
Site Response Due Date: 5/20/05

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

Inspection No. INL-CCP-05.05.08	Issue Number: INL-CCP-VE-05-004CR Date: 5/5/05
Inspector: Dorothy E. Gill Attachments? ☐ YES ☒ NO	Sample Size: Procedure CCP-TP-006, Revision 4, section 4.2.4 Population size (if known): NA

A. Description of Issue:

The procedure does not describe actual practice with regard to weighing of items during the VE process. Weights for heavy items, such are graphite moulds, are determined by difference between the full and empty drum weights (minus any items actually weighed).

B. Regulatory Reference:
40 CFR 194.24(c)

C. Site requirement(s):
CCP-TP-006, Revision 4, section 4.2.4

D. Discussed with:

Site Personnel: Abraham Romo
DOE/CTAC Personnel: Wayne Ledford
Other Personnel: David Haar (CCP)

E. Additional Comments:

F. Site Response Information:

Site Response Required? ☒ YES ☐ NO
Site Response Due Date: 5/20/05

Attachment D

EPA's Response to Public Comment

The Environmental Protection Agency (EPA) received one set of public comments in response to the September 9, 2005, *Federal Register* notice that proposed EPA's decision to approve various components of the CH TRU waste characterization program implemented by CCP at INL.

Below, we provide EPA's response to each of the comments. The comments are grouped according to the sections of this report. The inspection report has been revised to reflect EPA's response, where appropriate.

A. Personnel Training and Qualifications (Section 7.1)

Comment No. 1**:** Page 9, second paragraph. The CBFO agrees with the EPA concerning the importance placed upon the assurance that waste characterization (WC) personnel receive appropriate training and that the qualification process be well documented and auditable. The CBFO requires that as changes in key WC personnel occur, the applicable contractor organization will provide the necessary training and that the proper documentation will be maintained. The CBFO audits and certifies the processes for training and documentation to provide assurance of the effectiveness of these controls. The EPA has the authority to review training documentation at any time under 40 CFR 194. The CBFO believes that requiring T2 notification of changes in key personnel is unnecessary. The CBFO requests that this be revised to require that changes to the training and qualification program be reported to the EPA as a T2 change.

> *EPA Response: EPA removed the Tier 2 requirement to report changes in key waste characterization personnel every three months. EPA believes that DOE has established adequate training and qualification requirements for key waste characterization personnel. As with other CBFO program documents, EPA will review any significant changes to these requirements. EPA believes that the quality of WC personnel is a key to the proper implementation of an EPA-approved TRU waste characterization program at every generator site, therefore, at anytime, EPA may review the training and qualifications of any key waste characterization personnel. EPA may also conduct interviews with key waste characterization personnel.*

Comment No. 2: The CBFO is also very concerned about the implications of the following language from this referenced paragraph: *"EPA may request qualification and training records of the key WC personnel for review. EPA will review these records* ***and may interview them via a conference call to determine their abilities to produce quality data****."* The CBFO believes that to attempt to verify technical competence through a telephone conference call is inappropriate. The CBFO encourages the EPA to seek a formal review of this proposal by their legal staff.

> *EPA Response: As stated in the above response EPA is not requiring notification of the changes to the key WC personnel. EPA at any time, however, can request qualification and training records of the key WC personnel for review. When necessary, EPA will conduct follow-up interviews with key waste characterization personnel. These follow-ups may occur on site or by video or conference call.*

B. AK and Load Management (Section 7.2)

Comment No. 3: On page 2, in the last paragraph, EPA notes that they did not complete the acceptable knowledge (AK) portion of the inspection for the Pit 4 waste. The documentation necessary for the EPA to assess AK for Pit 4 waste is complete; in fact, this information was reviewed by the EPA during inspection EPA-INL-CCP-05.05-8. CBFO would urge that EPA complete their evaluation of the AK for Pit 4 waste at the earliest opportunity.

EPA Response: Note that EPA did not complete its evaluation of AK and Load Management processes for CH TRU newly-generated debris, solid, and soil/gravel wastes from ICP Pit 4 during the baseline inspection. Prior to the inspection, EPA had informed CBFO that we may not be able to evaluate all waste stream categories included in the scope within the allotted inspection schedule as the scope of the inspection was excessively large. During the inspection, INL CCP did provide EPA inspectors with AK information for ICP Pit 4 wastes. At the time of the inspection, EPA also indicated that EPA inspectors were not able to review the INL CCP AK documentation during the allotted inspection time. EPA is currently evaluating the AK for ICP Pit 4 wastes. Upon completion of the evaluation, EPA will issue a decision regarding the ICP Pit 4 wastes as a T1 change.

Comment No. 4: There are several places in the inspection report where the EPA references hazardous waste documentation reviewed or hazardous waste issues identified during the inspection. These references, listed below, should be deleted as they are not within the purview of the EPA. Hazardous waste management for WIPP is regulated by the New Mexico Environment Department under the State of New Mexico's EPA-authorized program.

1. Page 11, delete the last bullet referencing Attachment 5, a hazardous waste document.
2. Page 12, delete the 6th bullet referencing Attachment 5, a hazardous waste document.
3. Page 13, delete the 2nd bullet referencing D001, a hazardous waste AK source document.
4. Page 14, delete the 1st bullet referencing P205, a hazardous waste AK source document.
5. Page 14, delete the 17th bullet referencing U060, a hazardous waste AK source document.
6. Page 19, paragraph 1, delete the phrase "or EPA hazardous waste code reassignment," in 4th sentence.
7. Page AK-4, delete the reference to Attachment 5, a hazardous waste document, from the list of objective evidence.
8. Page RTR-5, delete the term "hazardous waste codes" from the last checklist item.

EPA Response: EPA has not deleted references to the items listed above in the inspection report because they were requested and reviewed by the EPA inspectors. Even if the document title has the "hazardous waste constituent or a RCRA code" phrase in the title, it does not mean that it would not have radiological or physical characteristics information relevant to the EPA review.

Comment No. 5: Page 3, first paragraph. The CBFO would like to assure that no confusion remains regarding the roles of CCP and the Advanced Mixed Waste Treatment Project (AMWTP) contractor with respect to waste characterization. The CCP will characterize

homogeneous solids and direct-shipped debris currently being retrieved from storage. The AMWTP contractor will perform the same functions. The CBFO is uncertain as to the EPA concern regarding commingling. Clearly, waste streams and containers within those streams are uniquely identified and tracked through the entire characterization and certification process. Each program will characterize and certify only the drums within that program. Waste containers characterized by either contractor could be "commingled" during storage at any step in the characterization process at the Idaho National Laboratory (INL) and could be shipped in the same TRUPACT-II container if the TRUPACT-II Authorized Methods for Payload Control (TRAMPAC) requirements are met.

Comment No. 6**:** Page 17, Section 7.2 (2) should be revised. As explained during the inspection, it was not intended that two programs would work on the same waste stream at the same time. While this is entirely possible, and in fact has been done in the past (e.g., Savannah River Site (SRS) and CCP), AMWTP and CCP did not intend to add this complexity to the INL program, as sufficient drums are available for each program to process different waste streams. The 20 drums noted in the report were provided to CCP when AMWTP was planning to give the entire waste stream to CCP for processing. When this did not come to pass for other reasons, CCP returned these drums to AMWTP for processing and shipment under the AMWTP program. In addition, the differences between AK information were examined during the inspection, and the reasons for the differences were presented to EPA.

> *EPA Response: If the waste containers from these two sources are combined into a one payload container such as TDOP or SWB, the site loses the ability to track waste components to its appropriate AK documentation. For this reason, EPA is requiring that individual containers with AK pedigree be tracked, or new AK that applies to the entire payload assembly must be provided. Note that EPA has not approved the load management procedures of INL CCP for any waste other than AMWTP-supplied debris and homogeneous solids. The EPA commingling restriction does not apply to onsite storage and shipment in TRUPACT-II authorized under TRAMPAC requirements.*

Comment No. 7: Page 16. The CBFO requests that the sentence in the second paragraph be changed to read: "The EPA will also examine each new waste stream within an approved waste category as a Tier 2 analysis…." to be consistent with the remainder of the document.

> *EPA Response: EPA agrees with the comment and has made the appropriate changes to the inspection report.*

C. NDA (Section 7.3)

Comment No. 8: Page 3, second paragraph. The Central Characterization Project (CCP) completed the replicate analysis on the high efficiency neutron counter (HENC), and submitted the results to the EPA on September 16, 2005. Assuming the EPA is satisfied with the results, the EPA should incorporate the HENC approval in the final report of this baseline assessment.

> *EPA Response: EPA was unable to evaluate the HENC replicate test data at the time of the inspection because the site could not analyze the EPA-selected containers due to*

problems with the equipment. EPA did, however, evaluate and find adequate all other aspects of the HENC during inspection. In September 2005, INL-CCP provided the HENC replicate test data. EPA is currently evaluating this data. EPA will notify DOE when the evaluation is complete.

Comment No. 9: Section 7.3.3, Page 32, first paragraph. "^{237}Np" is repeated in the radionuclide list; EPA should delete the repeat.

EPA Response: EPA agrees with the comment.

Comment No. 10: Page 32, Section 7.3.4 (1). The Stored Waste Examination Pilot Plant (SWEPP) Gamma-Ray Spectrometer (SGRS) has only four BeGe detectors and no ^{133}Ba transmission sources. The discussion of the "two groups of three detectors," etc., beginning with "The six gamma detectors…" and ending with "…to the north bank" should be deleted. Replace it with "*The four BeGe detectors are arranged in a vertical offset pattern to look at four vertical segments of the drum. Spectra are acquired simultaneously for all segments.*"

*EPA Response: EPA agrees with the comment***.**

Comment No. 11: Page 34, Section 7.3.4 (5). This should state SGRS, not Tomographic Gamma Scanner (TGS). The fourth paragraph incorrectly references Waste Assay Gamma Spectrometer (WAGS) in two locations. The second total measurement uncertainty (TMU) reference should be CCP-INL-SGRS-002 and the last sentence should state "…observed in the SGRS BDRs…." The sixth paragraph also incorrectly cites WAGS when the reference should be to the SGRS. Under the sixth paragraph, the replicate drum number ARP000313 is incorrect. The correct number is ARP00031. This incorrect drum number is used twice in this section.

EPA Response: EPA agrees with the comment.

Comment No. 12: The last sentence on page 37 stating, "…only upon receiving the EPA approval can INL-CCP continue to use the equipment affected by the change" should be changed to read, "only upon receiving the EPA approval may INL/CCP dispose of waste assayed on the equipment as affected by the T1 change." This would allow INL/CCP to generate the data the EPA would need to approve the change. This would also allow INL/CCP to assay containers "at risk" with the understanding that the containers could not be disposed of at WIPP without EPA approval.

EPA Response: EPA agrees with the comment.

D. Visual Examination (Section 7.4)

Comment No. 13: Page 44, Section 7.5.2. The discussion of visual examination (VE) as a quality check on real-time radiography (RTR) only addresses the VE performed at the Materials and Fuels Complex (MFC). As explained during the inspection, it is a common practice for CCP to use the data-generation level services of other CBFO-certified transuranic waste disposal programs, and then perform the project office activities under the CCP program. This process is described in the CCP/INL Interface Document (CCP-PO-024). At the INL, CCP is currently

using both the MFC and AMWTP facilities to conduct VE as a QC check on RTR. The following should be added to this section of the inspection report as a second paragraph: "*The INL/CCP also plans to use the VE as a QC check of RTR performed by the AMWTP. The AMWTP will perform the VE and provide INL/CCP the testing batch data reports completed through the data generator review level. The INL/CCP will then perform the project level data reviews and use the data to calculate their RTR miscertification rates. The AMWTP process for VE as a QC check on RTR for S3000 waste was previously approved by the EPA in inspection reports EPA-INEEL-AMWTP-8-03.08 and EPA-INEEL-AMWTP-10-03.24. The AMWTP process for VE as a QA check on RTR for S5000 waste was previously approved by EPA in inspection report EPA-INL-AMWTP-03.05-8.*"

EPA Response: *As noted in the comment, the AMWTP process for VE as a QC check of RTR was previously approved by EPA. However, the AMWTP process for VE as a QC check of RTR was not part of the INL-CCP baseline inspection. If INL-CCP intends to use AMWTP to perform VE as a QC check of RTR, a separate EPA approval is necessary under the tiering process established by this report.*

As a result of this comment, EPA found that the proposed INL-CCP baseline approval did not address the addition of new VE vendors. Therefore, EPA has added a Tier 1 element that requires EPA approval prior to the addition of new vendors or other entities, not previously approved under this program.

E. Tiering (Table in Section 1)

Comment No. 14: The following comments concern the table on page 3:

1. Recommend that EPA use the term "Summary Category Group" instead of "waste category." This would make the report consistent with the terms used in the Waste Analysis Plan (WAP) and the Contact-Handled Waste Acceptance Criteria (CH-WAC).

2. Any changes to the WIPP Waste Information System (WWIS) algorithms specific to load management require changes to Section 3.3.3 of the CH-WAC. As such, it would appear that any change to the load management provisions of the CH-WAC should be a T1 change, and the corresponding change to the WWIS algorithms should be categorized as a T2 change.

3. It should be clarified in the table or the text of the report that only physical changes that could affect the actual nondestructive assay (NDA) results are T1 changes. For instance, the addition of handrails or fire protection equipment to an NDA unit should not be considered a T1 change.

EPA Response: EPA agrees with the above comments.

4. The CBFO believes the calibration procedures for NDA equipment, which were reviewed by EPA during the Baseline Inspection, constitute the approved system of controls for NDA calibration. Therefore, a change to the approved calibration range for NDA equipment should be a T2 change.

   EPA Response: The documentation that best describes the operational envelope is the calibration, verification, and TMU reports for the system in question. The NDA system examined during the inspection represents the actual system for which an approval was proposed. Changes in the system's range with respect to disintegration rate (activity) and/or the waste's physical characteristics (matrix) are changes to the system that were not approved and as such, potentially represent a different system than what was evaluated for approval. Accordingly, these are T1 changes.

Comment No. 15: The requirement that INL/CCP report T2 changes every three months appears several times in the inspection report. The CBFO believes that this imposes an administrative burden that was not anticipated by the rulemaking that revised 40 CFR 194.8. The CBFO believes that this requirement should be revised to allow T2 changes to be reported to EPA either at the time the changes are approved by INL/CCP or CBFO, or in the annual change report required by 40 CFR 194.4. The CBFO intends to provide notification to EPA of T2 changes by adding EPA to the distribution on approval letters (e.g., approval letters for new/revised waste stream profile forms (WSPFs), procedure changes, NDA operating range changes, and additional radiography equipment). Requiring these changes to also be reported in a three-month change report is unnecessary. Some changes may be more amenable to annual reporting (e.g., NDA software changes).

EPA Response: Initially, EPA expects the submission of the T2 changes listed above every three months. If EPA determines that the submission frequency is excessive, EPA will discuss the issue with CBFO to agree upon a different schedule for reporting of the T2 changes.

F. Other Comments

Comment No. 16: Page 10, first paragraph. The CBFO is not aware of significant shortfalls in the training requirements for WC personnel. Knowledge of relevant criteria from the CH-WAC is clearly applicable. As changes are made to this document, such as the addition of Appendix E, the CBFO expects that the contractor organizations will incorporate them as appropriate. The CBFO would receive and consider any comments that the EPA wishes to provide regarding the EPA's perception of the need for expanding the training requirements. However, the CBFO takes exception to the following language in this paragraph: "*Over the next few months, the EPA will evaluate the CBFO TRU WC program documents for WC personnel qualification and training requirements for adequacy.* ***Upon completion of EPA's evaluation, CBFO will revise the requirements to address any EPA issues, as needed.***" The CBFO believes that such an action goes beyond the scope of the current regulations and would be viewed as a rulemaking activity.

EPA Response: This language was removed from the final inspection report. However, EPA can and does review CBFO program documents when necessary. EPA is currently re-evaluating the quality assurance program document (QAPD), DOE/CBFO-94-1012, Rev 7, July 2005). EPA expects DOE to seriously consider comments provided by EPA on these documents.