

United States Government


Department of Energy

memorandum

Carlsbad Field Office
Carlsbad, New Mexico 88221

DATE: March 26, 2002

REPLY TO
ATTN OF: CBFO:QA:MLC:GS:02-1009:UFC 2300.00

SUBJECT: Report of Carlsbad Field Office Audit A-02-16 of Los Alamos National Laboratory New
Nondestructive Assay Equipment

TO: James Nunz, LAAO

The Carlsbad Field Office (CBFO) conducted an audit of new nondestructive assay equipment at the Los Alamos National Laboratory (LANL) on February 25-28, 2002. Attached is the report for this audit.

Two Corrective Action Reports (CAR 02-054 and 02-055) were identified and forwarded via separate correspondence. Three Observations and five Recommendations were presented for management consideration.

If you have any questions or comments concerning this report, please contact me at (505) 234-7423.

/s/ signature on file
Ava L. Holland
Quality Assurance Manager



Attachment

cc w/attachment:

L. Chism, CBFO
K. Watson, CBFO *ED
D. Winters, DNFSB *ED
S. Zappe, NMED *ED
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M. Eagle, EPA *ED
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**U.S. DEPARTMENT OF ENERGY
CARLSBAD FIELD OFFICE**

AUDIT REPORT

OF THE

LOS ALAMOS NATIONAL LABORATORY

LOS ALAMOS, NEW MEXICO

AUDIT NUMBER A-02-16

February 25 - 28, 2002

**TRU WASTE CHARACTERIZATION AND CERTIFICATION
ACTIVITIES**

**Combined Thermal-Epithermal Neutron and Portable Tomographic
Gamma Scanner Nondestructive Assay Systems**



Prepared By: /s/ signature on file

Date: _____

Wayne Ledford, CTAC
Audit Team Leader

Approved By: /s/ signature on file

Date: _____

Ava L. Holland, CBFO
Quality Assurance Manager

1.0 EXECUTIVE SUMMARY

Carlsbad Field Office (CBFO) Audit A-02-16 was conducted to evaluate the adequacy, implementation, and effectiveness of selected technical activities related to the Los Alamos National Laboratory (LANL) transuranic (TRU) waste characterization and certification programs for debris wastes. This audit included the evaluation of two new nondestructive assay (NDA) systems, the Combined Thermal-Epithermal Neutron (CTEN) system and a portable tomographic gamma scanner (P-TGS). The Environmental Protection Agency (EPA) concurrently performed an inspection of the CBFO audit of the new NDA processes and a review of LANL's acceptable knowledge (AK) program and the WIPP Waste Information System (WWIS) interface.

The audit was conducted at the LANL facility during the period of February 25 - 28, 2002. The audit team concluded that the LANL technical processes related to the CTEN system were adequate, satisfactorily implemented, and effective. The technical activities related to the P-TGS were judged to be indeterminate. LANL had not completed the measurements for quality assurance objective (QAO) determinations or the total measurement uncertainty (TMU) analysis for the P-TGS at the time of the audit.

The audit team also concluded that the LANL QA Program continues to be satisfactorily implemented in accordance with the LANL Quality Assurance Management Plan (QAMP) and the LANL implementing procedures in the area of software quality assurance (SQA). The LANL SQA Program was determined to be effective.

The audit team identified two conditions adverse to quality that resulted in the issuance of two Corrective Action Reports (CARs) in the areas of TMU for the CTEN and WWIS data entry. The team identified four isolated deficiencies requiring only remedial corrective actions that were Corrected During the Audit (CDA). Three Observations were identified and five Recommendations were offered for management consideration.

The audit team recommends that upon closure of the CAR related to TMU for the CTEN and receipt of approval from the EPA, the CTEN should be certified for assay of waste with matrix correction factors less than or equal to 1.6 and radionuclide loadings from the minimum detectable concentration up to 177 grams of weapons-grade plutonium.

2.0 SCOPE

The scope of the audit was to evaluate the adequacy, implementation, and effectiveness of selected technical activities related to the LANL TRU waste characterization and certification programs for debris wastes. This audit included the evaluation of two new NDA systems, the CTEN system and a P-TGS. The Environmental Protection Agency (EPA) concurrently performed an inspection of the CBFO audit of the new NDA processes and a review of LANL's acceptable knowledge (AK) program and the WWIS interface.

The following quality assurance (QA) elements were evaluated in accordance with the CBFO Quality Assurance Program Document (QAPD):

- Software Requirements

The following technical elements were evaluated during the audit:

- Nondestructive Assay (NDA) – Portable TGS, CTEN
- Automated Review of High Energy Neutron Counter (HENC) Data

The evaluation of LANL TRU Waste Characterization Program (TWCP) documents was based on the current revisions of the following documents:

CBFO Quality Assurance Program Document, CAO-94-1012

Waste Acceptance Criteria for the Waste Isolation Pilot Plant, DOE/WIPP-069

Related LANL technical and quality assurance implementing procedures

3.0 AUDIT TEAM AND OBSERVERS

AUDITORS/TECHNICAL SPECIALISTS

Wayne Ledford	Audit Team Leader, CTAC
Steve Calvert	Auditor, CTAC
Patrick Kelly	Technical Specialist, CTAC

OBSERVERS

Ed Feltcorn	EPA
Rajani Joglekar	EPA
Connie Walker	EPA Consultant
Dave Stuenkel	EPA Contractor (Trinity Engineering)
Ray Wood	EPA Contractor (Trinity Engineering)

4.0 AUDIT PARTICIPANTS

LANL personnel participating in the audit process are identified in Attachment 1. A pre-audit meeting was held in the TA-50 RAMROD building conference room on February 25, 2002. A daily meeting was held with LANL management and staff to discuss issues and potential deficiencies. The audit was concluded with a post-audit meeting held in the TA-50 RAMROD building conference room on February 28, 2002.

5.0 SUMMARY OF AUDIT RESULTS

5.1 Program Adequacy, Implementation, and Effectiveness

The audit team concluded that the LANL technical processes as applied to the CTEN assay system were adequate, satisfactorily implemented, and effective. The P-TGS was judged to be indeterminate at this time because measurements for QAO determinations on this system had not been completed, nor had the TMU documentation been prepared. At the time of the audit, no batch data reports had been completed for drums assayed on the P-TGS.

The audit team concluded that the defined LANL QA Program continues to be adequate and satisfactorily implemented in accordance with the *LANL Quality Assurance Management Plan* (QAMP) and the LANL implementing procedures for software quality assurance (SQA). The LANL SQA program was determined to be effective.

Audit activities, including the specific objective evidence reviewed, are described below and in the CBFO checklists. The CBFO checklists are maintained as QA records. A list of procedures evaluated during the audit is included as Attachment 2.

5.2 Technical and Quality Assurance Activities

Evaluations of applicable LANL technical and quality assurance activities are summarized below.

5.2.1 Combined Thermal-Epithermal Neutron System

The CTEN system is used to assay 55-gallon (208-liter) drums of TRU waste using active and passive modes. Both modes are routinely performed for each assay, although the analyst may choose to report data from either mode. The active mode calibration range in grams of weapons-grade plutonium (WG Pu) is from the system's minimum detectable concentration (MDC) to approximately 9.6 grams; the passive mode range is 3.2 to 177 grams of WG Pu. Matrix-dependent characteristics are expressed in terms of a matrix correction factor (MCF), the current calibrated range of which is 0 to 1.6, and represents combustibles and metal matrices; glass and sludge matrices have higher MCFs (i.e., 3.5 and 4.6). LANL NDA personnel did not believe the system could accommodate these matrices at the present time, and they were not represented in the documentation reviewed. However, the CTEN did perform successfully on the sludge drum in Cycle 8A of the CBFO-sponsored NDA Performance Demonstration Program. Neutron data from the CTEN are combined with sample-specific isotopic data generated from a passive gamma assay that is performed using the PC FRAM software. PC FRAM has been in use at LANL since 1998 and has been evaluated by CBFO (and EPA) on several occasions. Data from both systems are combined to produce quantitative values for a group of radionuclides, including: Pu-238, 239, 240, 241 and 242¹; U-233, 235 and 238; and Am-241. PC FRAM data are

¹ Pu-242 is determined using correlation techniques for all NDA systems at LANL and other TRU generator sites.

also used to identify other gamma emitting radionuclides (i.e., Np-237, Cs-137 and Am-243).

The LANL procedures related to CTEN were reviewed for adequacy and the following aspects of the CTEN were evaluated during the audit:

- Operability and condition of equipment
- Instrument calibration and qualification, performance testing required by DOE/WIPP-069, Revision 7, and traceability of calibration sources
- Applicability of calibration to waste type (matrix) and radionuclide content of samples
- Implementation and effectiveness of instrument/measurement controls
- Verification that LANL procedures were properly executed
- Completed data packages to ensure data are reported and reviewed as required
- Data storage and retrievability

This evaluation involved interviewing LANL NDA personnel, observing practices, and examining records. The CTEN was acceptable in all respects except for the documentation of total measurement uncertainty (TMU), as described in CBFO CAR-02-054.

Two isolated deficiencies requiring only remedial action were identified in this area during the audit. These deficiencies were corrected before the end of the audit (see CDAs 3 and 4)

The CTEN and associated operations, procedures, and personnel were determined to be adequate, satisfactorily implemented, and effective.

5.2.2 Portable Tomographic Gamma Scanner

The P-TGS is similar in concept to the Mobile TGS that was previously approved for assaying WIPP wastes. However, it is a newer unit and is physically much smaller. As with the CTEN, isotopic data are obtained using PC FRAM. The P-TGS is housed in a trailer currently located in the yard outside the RANT facility at TA-54. The system's operator was interviewed, the instrument was examined and the data generated in support of determining the system's compliance with the QAOs were reviewed. The data looked reasonable, although they were preliminary and had not been compiled in a formal report. As stated previously, P-TGS was judged to be indeterminate at this time because measurements for QAO determinations on this system had not been completed nor had the TMU documentation been prepared. At the time of the audit, no batch data reports for drums assayed on the P-TGS had been completed.

5.2.3 Software Quality Assurance and WWIS

The following selected quality assurance activities related to the LANL TRU waste characterization and certification programs for debris wastes were evaluated for adequacy, implementation, and effectiveness.

- Software Life Cycle Documentation and Development for the Combined Thermal-Epithermal Neutron (CTEN) system

- WWIS data entry and remote data interface, including software used for data preparation and electronic data transfer
- Software Life Cycle Documentation for the Core Application Functions (CAF) module of the Information Management System software program
- Software Life Cycle Documentation for the Records Management System (RMS) module of the Information Management System software program
- Software Life Cycle Documentation for the General Data Review Expert System (GDRXS) software program, including the rules editor and rules definition procedures for automated data verification and validation of data generated by the High Energy Neutron Counter (HENC) NDA equipment

The audit team reviewed software life-cycle documentation for the CTEN NDA equipment, the automated data verification and validation process for HENC NDA data, and the CAF and RMS modules of the Information Management System. The audit team also witnessed operating demonstrations of software programs for WWIS data entry, automated data verification and validation of HENC NDA data, and the CAF and RMS modules of the Information Management System. The LANL software inventory was examined to determine that the software programs listed above were properly identified and configured. The audit team identified a concern related to the designation of the validation document for the SSLIC software that resulted in a CDA that corrected the isolated error in the software list. The audit team determined that the scope and content of life-cycle documentation for all of the software examined was satisfactory. The rules set for automated data verification and validation for HENC NDA data was determined to be defined in accordance with procedure and satisfactorily implemented using software that had been developed under satisfactory software quality assurance. Automated data review for data generated using the HENC NDA equipment was determined to be satisfactory when using the active procedures and the defined rules set. The audit team determined that the life-cycle documentation for the CAF and RMS modules of the information management system was satisfactory. The audit team determined that the area of software quality assurance was adequate, satisfactorily implemented, and effective. The audit team believes that LANL may use the data automation process applied to the HENC to automate the data review for other NDA systems without the need for specific CBFO assessments to approve the use of this process for other systems.

The audit team determined that the method of entering the container weight and use of this weight in the calculation of the nCi/g activity and uncertainty for containers as they are entered into WWIS was not being performed in accordance with procedure. The audit team identified the need to revise the procedure and/or modify the WWIS spreadsheet program to include additional work steps currently being performed by the data entry person. CAR number 02-055 was issued to address this deficiency. The audit team also determined that a Department of Transportation (DOT) form was not being submitted as a record as prescribed by the procedure. The DOT determination reported on this form was being performed and reported on the WWIS spreadsheet. The audit team determined that the use of this form was not a requirement. The procedure was revised and a CDA was issued. With these two exceptions, the area of

WWIS data entry was determined to be adequate, satisfactorily implemented, and effective.

During the audit, EPA performed an inspection of the WWIS data entry process and interface at LANL. EPA identified one concern during their inspection of the WWIS process. This concern was documented as Recommendation 1.

5.2.4 Acceptable Knowledge

During the audit, EPA performed an inspection of the acceptable knowledge processes at LANL. During their inspection, EPA identified seven concerns during their inspection of the AK process. These concerns have been documented as observations or recommendations in this report (see Observations 1, 2, and 3, and Recommendations 2, 3, 4, and 5).

6.0 CORRECTIVE ACTION REPORTS, CORRECTED DURING THE AUDIT, OBSERVATIONS, RECOMMENDATIONS

6.1 Corrective Action Reports (CARs)

The two CARs identified during the audit are described in the subsections below.

6.1.1 CAR 02-054

The total measurement uncertainty (TMU) report for the CTEN assay system (LAUR-02-0854) does not provide adequate documentation that the uncertainty for the active and passive modes has been addressed. Specifically, self-shielding in the active mode and the effects of higher Pu loadings in the passive mode have not been addressed.

6.1.2 CAR 02-055

When radioassay data are entered into the spreadsheet that is used to populate WWIS, the data entry person determines whether the data need to be normalized to the actual weight of the waste in the container to determine the TRU nCi/gram value that is reported to WWIS. The decision process and data entry function for this activity is not addressed in LANL's procedures.

(Background: When a waste container is processed through NDA, a default waste weight of 10000 grams is used if an actual weight cannot be provided at that time. The nCi/gm values and associated uncertainties are then normalized at the time WWIS entry is made. Based on the evidence reviewed during the audit, it appeared that this function was being performed properly. Nevertheless, this process needs to be proceduralized.)

6.2 Corrected During the Audit

The following four deficiencies were corrected during the audit (CDA). They were determined to be isolated in nature and required only remedial action. The audit team verified that the listed corrective actions were completed by LANL.

6.2.1 CDA 1

Errors were identified on the software inventory list:

- a. SSLIC VVP was identified as VP
- b. No bar code numbers for TA55 lifecycle documents were listed

These minor errors on the software inventory list were corrected during the audit.

6.2.2 CDA 2

The WWIS procedures included a sample DOT form (attachment 3) that was not attached as part of the records package.

The procedure was revised to correct this during the audit.

6.2.3 CDA 3

LANL procedure TWCP-1.2-DTP-061, section 6.4, allowed the CTEN operator to perform system performance checks at a frequency less than once per day. DOE/WIPP-069, p. 7, requires performance checks, "...daily on calibrated and operable radioassay systems before use on that day."

The audit team verified that system performance checks had been performed daily, as required, for all waste measurements made on the CTEN system up to the time of the audit. The procedure was revised during the audit to require daily performance checks.

6.2.4 CDA 4

LANL procedure TWCP-DTP-1.2-062, section 6.2, did not provide the specific criteria against which the background and performance checks were evaluated to determine their acceptability. The procedure also did not specify what actions were required when background or performance checks are outside of the acceptable range.

The audit team verified that background and performance checks had been properly evaluated for all waste measurements made up to the time of the audit. The procedure was revised to include the evaluation criteria and specify required actions when measurements were out of specification.

6.3 Observations

The following three Observations were identified by the audit team as areas of concern that were not yet actual deficient conditions, but which raise the probability of future deficiencies, if not corrected.

6.3.1 Observation 1

NDA personnel identify discrepancies between AK and NDA information, but the criteria for such discrepancy identification are not defined in either the AK or NDA documentation. Revision of either the NDA or AK procedures to specifically state the criteria for nonconformance identification (i.e., a quantitative standard or criteria) with respect to AK-NDA is warranted.

6.3.2 Observation 2

AK data traceability assessments indicate that improvements could be made to the current program to better link AK data information sources. For example, generator records are sometimes used when site databases include no information, and these records are maintained not as part of the AK record, but at the generator site. While copying and transferal of these data to the AK record would be onerous, the AK record should include a list of drums and associated records available at generator sites. Additionally, LANL should ensure that the AK Summary and Acceptable Knowledge Information Summary (AKIS) reference appropriate reports and each other.

6.3.3 Observation 3

The AK Summary Report should clearly address the presence (or absence) of Cs 137 and Sr 90 within each of the waste streams. Specifically, the AK Summary Report should clearly state whether either of the isotopes are present and summarize supporting documentation to that end.

6.4 Recommendations

The following five recommendations are provided for management consideration.

6.4.1 Recommendation 1

The WWIS data entry person does a verification (point-for-point) of data from the spreadsheet vs. the WWIS report (one verification done out of ten containers uploaded to WWIS). This data validation is not proceduralized. Recommend that LANL include

this validation in their procedures. A point-for-point validation of WWIS data is not specified by any CBFO requirements documents.

6.4.2 Recommendation 2

The AKIS is a parallel document to the AK Summary and includes not only the waste stream definitions, but individual drum container AK data. LANL should be commended for assembling this AK information; other sites may have these data, but sometimes choose not to use it in a thorough fashion. The document, however, could be improved to better explain the source of individual drum data so that the reader can quickly determine where AK information included in the AKIS database was obtained. It is suggested that the AKIS be revised to specifically state the source of drum-specific information, including prioritization of data use, how determination is made of the specific source of AK information in the drum data base, etc. LANL should include, as part of this discussion, a brief discussion of each data source (i.e., TA-54, TA-55, generator records) with respect to prioritization of use. Addition of AK data source information is important, because generator records sometimes do not correspond exactly to information in the AKIS as the AKIS personnel used an intermediary database (e.g., TA-54) in which original generator information was assessed and sometimes modified. Additionally, identification of both material type and subsequent isotopics in the AKIS database would be useful, since the AK Accuracy Report is based on material type, and isotopic data are often referenced by material type.

6.4.3 Recommendation 3

The document TWCP-689 is the source of AK isotopic distribution information for many AK information sources. This document is a short memo and table presenting the isotopic distribution by material type, and appears to be a key source of isotopic information. but the AK record does not include references used to generate this memorandum. Recommend that LANL include as much background information as possible with regard to the information in this memo, particularly information that defines such things as material types and isotopic distributions.

6.4.4 Recommendation 4

Documentation of discrepancy resolution was identified as an issue by CBFO at their last LANL audit. It appears that the site is modifying the primary AK document, TWCP-DTP-1.2-21, Revision 4, to address this issue. However, the interim version of the procedure reviewed by EPA was somewhat confusing with respect to how discrepancy resolution was being addressed with respect to the various data sources. AK personnel indicated that database/data discrepancies on a drum basis that are encountered during AKIS assembly are handled following the path of Figure 2 in the subject procedures, and changes are documented in the AKIS data fields and associated appendices. AK data discrepancies between AK data sources associated with generation of the AK Summary are presented in data discrepancy forms and are included in the AK record. Both approaches appear adequate, but procedure TWCP-DTP-1.2-21 should clearly define the data discrepancy resolution pathways, since they appear to differ for the two main AK documents.

6.4.5 Recommendation 5

The primary AK procedure, TWCP-DTP -1.2-21, Revision 4, has been revised to address CBFO CARs that required better integration of all AK documents and data discrepancy resolution processes. The procedure, while much improved over the previous version, should be further revised to clarify the process and to better reflect required AK data assembly and compilation requirements. The following recommendations are offered:

- Section 4.2.7 - This section states that the waste stream waste matrix code (WMC) has to be assigned at the highest level possessed by any container in the waste stream, but Section 6.3.13.4 states that the “most detailed” WMC should be assigned to the waste stream. It is unclear whether the highest level refers to the more detailed or less detailed WMC
- Section 4.2.9 - Ensure that the definition of waste stream is congruent with regulatory requirements
- Include a role separate from the SPM to perform AK reconciliation
- Section 6.0 is intended to present the AK data assembly and compilation process for major AK documents. At LANL, AK information is contained in two *living* documents, the AKIS and AK Summary, while it is EPA’s understanding that the Process AK Reports are specific support documents to TA-55. Therefore, if it best explains the two documents, section 6.0 should be revised to include two separate sections – a section for the AKIS and section for AK Summary.
- Section 6.1 should be renamed (or section title moved) to indicate that this discussion addresses AKIS data assembly, compilation, and discrepancy resolution specific to the AKIS. Revise the title of Figure 1 to specify that this applies to waste stream identification as presented in the AKIS. Revise Figure 2 to specifically indicate that this applies to discrepancy resolution associated with the AKIS; also, consider adding footnotes or other explanatory text defining “external AK,” and other text boxes. Copy the prioritization presented in section 6.3.11 to this section.
- Section 6.2 should be renamed to indicate that this section addresses AK Summary data assembly, compilation and discrepancy resolution specific to the AK Summary. Section 6.2.1, for example, could be titled to address data assembly; also, information in section 6.3.2 needs to be assembled/compiled, and could be combined with section 6.2.1. Also, site personnel indicate that the Process AK Summaries are static documents; therefore, there is no need to include assembly requirements for these documents and the Process AK Reports could be considered an AK reference. Associated notes and references could then be removed.
- Section 6.2.3 should be revised to indicate that assembly of supplemental information is not an option, but the specific supplemental information that should be

examined cannot be mandated.

- It is assumed that section 6.3 is intended to present AK data compilation requirements (i.e., how to prepare the AK report once the appropriate data are assembled). If the specific requirement to assemble information in 6.3.2 is moved to 6.2.1, this section (6.3.2) could state that information in section 6.2.1 must be presented in the AK Summary.
- LANL should include a requirement that each element of section 6.3 must reference appropriate supplemental references; EPA has observed that many sites do not adequately reference supporting information, and inclusion of this element in the procedure could remedy this situation. Also note that the resulting AK Summary Report should be examined, when updated in the future, to ensure that references to supplemental and other supporting information are sufficiently detailed to support the traceability analysis.

7.0 LIST OF ATTACHMENTS

Attachment 1: Personnel Contacted During the Audit

Attachment 2: List of Procedures Audited

PERSONNEL CONTACTED DURING AUDIT A-02-16

NAME	ORG/TITLE	PREAUDIT MEETING	CONTACTED DURING AUDIT	POST AUDIT MEETING
Baker, Michael	NDA/NDA Section Leader	X	X	X
Baker, Shannon	RMDC	X		
Baros, Ricky	E-ET/Technician		X	
Bayhurst, Greg	E/TSM	X	X	
Betts, Stephen	LANL/NDA Staff		X	X
Canfield, Tom	E-ET/Software Specialist	X	X	
Clark, Vicky	LANL/SQA	X	X	X
Enter, Janie	E-ET/TSM		X	
Fernandez, Ruby Ann	E-ET/Training Specialist	X	X	X
Gavett, Marji	E-ET/SPQAO	X	X	X
Gibson, Yvonne	E-ET/QA Specialist		X	X
Humphrey, Betty	E-ET/WCO		X	
Leonard, Pat	E-ET/QA Specialist		X	X
Lin, Mavis	E-ET/TSM	X	X	X
Lindahl, Peter	E-ET/TSM	X	X	X
Makaruk, Hanna	E-ET/TSM		X	
Medina, Pat	BUS/Budgets	X		X
Miko, David	E-ET/TSM		X	
Palomares, Jose	E-ET/Technician		X	
Pickrell, Mark	E-ET/Group Leader	X		X
Polley, Mark	E-ET/TCO	X	X	
Pothes, Harald	E-ET/TSM		X	

NAME	ORG/TITLE	PREAUDIT MEETING	CONTACTED DURING AUDIT	POST AUDIT MEETING
Robbins, Scott	E-ET/Training Coordinator	X	X	X
Rogers, Pam	E-ET/SPM	X	X	X
Saunders, Lori	E-ET/QA	X	X	
Schneider, Constance	E-ET/TSM		X	
Souza, Larry	TWCP/QA	X	X	X
Spitzmiller, Ted	E-ET/SCMC	X		X
Trujillo, Barbara	E-ET/WWIS		X	
Veilleux, John	E-ET/TSM		X	X
Wander, Sandy	E-ET/AK Investigator	X	X	
Zoltai, John	E-ET/Info System Manager	X		X

LIST OF PROCEDURES AUDITED (A-02-16)

NUMBER	PROCEDURE NUMBER	REVISION	TITLE
1.	DTP-1.2-061	R.0	Waste Assay System Using the Combined Thermal-Epithermal Neutron (CTEN) System
2.	DTP-1.2-062	R.0	Calibrating the Combined Thermal-Epithermal Neutron (CTEN) System
3.	DTP-1.2-068	R.0	Waste Assay Using the Portable Tomographic Gamma Scanner
4.	DTP-1.2-016	R.3	Calibrating the Tomographic Gamma Scanning System