

CCP-TP-193

Revision 2

CCP

Data Reviewing, Validating, and Reporting Procedure for the Nondestructive Assay Box Counters

EFFECTIVE DATE: 01/31/2011

Larry Porter

PRINTED NAME

APPROVED FOR USE

RECORD OF REVISION

Revision Number	Date Approved	Description of Revision
0	05/15/2008	Initial issue.
1	08/21/2008	Revised to incorporate Carlsbad Field Office (CBFO) Document Review Record (DRR) comments based on Revision 0 of this document.
2	01/31/2011	Minor revision to correct reference after revision to CCP-PO-002, <i>CCP Transuranic Waste Certification Plan</i> .

TABLE OF CONTENTS

1.0	PURPOSE.....	4
1.1	Scope.....	4
2.0	REQUIREMENTS.....	5
2.1	References	5
2.2	Training Requirements.....	5
2.3	Precautions and Limitations.....	5
2.4	Prerequisite Actions.....	5
2.5	Equipment List.....	6
3.0	RESPONSIBILITIES.....	7
3.1	NDA Operator	7
3.2	NDA Independent Technical Reviewer (ITR).....	7
3.3	NDA Expert Analyst (EA).....	7
3.4	Facility Records Custodian	7
4.0	PROCEDURE.....	8
4.1	NDA EA and NDA Operator Review	8
4.2	NDA ITR Review.....	11
4.3	Facility Records Custodian	12
5.0	RECORDS.....	13

LIST OF ATTACHMENTS

Attachment 1 – NDA Batch Data Report Cover Sheet	14
Attachment 2 – NDA Batch Data Report Table of Contents	15
Attachment 3 – NDA Batch Data Report Narrative Summary	16
Attachment 4 – NDA Independent Technical Reviewer Checklist	17
Attachment 5 – Automated Independent Technical Review List (Example)	19
Attachment 6 – QC Control Chart (Example)	20

1.0 PURPOSE

This procedure describes the methods and techniques used to review, validate, verify, and report data from the Box Segmented Gamma System (BSGS) and Box Neutron Assay System (BNAS).

1.1 Scope

This procedure provides specific instructions for the review, validation, and reporting of measurement data from the BSGS and BNAS's determination of the radionuclide content in contact-handled (CH) transuranic (TRU) waste. Instructions within this procedure are specific to the Canberra NDA2000 software.

2.0 REQUIREMENTS

2.1 References

Baseline Documents

- Canberra Industries, Inc., Publication No. 9231594, *NDA2000 Users Manual* (corresponding to current software version)
- Canberra Industries, Inc., Publication No. 9231595, *NDA2000 Technical Reference Manual* (corresponding to current software version)
- CCP-PO-001, *CCP Transuranic Waste Characterization Quality Assurance Project Plan*

Reference Documents

- CCP-PO-002, *CCP Transuranic Waste Certification Plan*
- CCP-QP-002, *CCP Training and Qualification Plan*
- CCP-QP-005, *CCP TRU Nonconforming Item Reporting and Control*
- CCP-QP-008, *CCP Records Management*
- CCP-TP-189, *CCP Box Segmented Gamma System (BSGS) Operating Procedure*
- CCP-TP-191, *CCP Box Neutron Assay System (BNAS) Operating Procedure*

2.2 Training Requirements

- 2.2.1 Personnel performing this procedure will be trained and qualified in accordance with CCP-QP-002, *CCP Training and Qualification Plan*, prior to performing this procedure.

2.3 Precautions and Limitations

- 2.3.1 None.

2.4 Prerequisite Actions

- 2.4.1 None.

2.5 Equipment List

2.5.1 Software

- [A] NDA2000, Waste Assay
- [B] Genie 2000, Gamma Acquisition and Analysis
- [C] Fixed Energy, Response Function Analysis with Multiple Efficiencies (FRAM)

3.0 RESPONSIBILITIES

NOTE

The Nondestructive Assay (NDA) Independent Technical Reviewer (ITR) is an individual, other than the data generator, who is qualified to perform the initial work.

3.1 NDA Operator

3.1.1 Reviews the Automated Independent Technical Review (AITR) List (see Attachment 5, Automated Independent Technical Review List [Example]) and assembles the Batch Data Report (BDR).

3.2 NDA Independent Technical Reviewer (ITR)

3.2.1 Ensures that proper data reduction has been performed and the documentation is complete and accurate.

3.2.2 Ensures the BDR is paginated.

3.2.3 Ensures Attachment 1, NDA Batch Data Report Cover Sheet, is complete.

3.2.4 Ensures Attachment 2, NDA Batch Data Report Table of Contents, is complete.

3.2.5 Ensures Attachment 3, NDA Batch Data Report Narrative Summary, is complete.

3.2.6 Ensures Attachment 4, NDA Independent Technical Reviewer Checklist, is complete.

3.3 NDA Expert Analyst (EA)

3.3.1 Reviews waste measurement data.

3.3.2 Resolves comments from the AITR List.

3.3.3 Resolves assay issues identified during data review.

3.4 Facility Records Custodian

3.4.1 Receives, processes, and transmits all records generated by this procedure in accordance with CCP-QP-008, *CCP Records Management*.

4.0 PROCEDURE

NOTE

Data from both the Box Segmented Gamma System (BSGS) and the Box Neutron Assay System (BNAS) are integrated by NDA2000 to produce container content results.

The AITR software performs limit checks on the analysis results and flags for review any data that do **NOT** meet the required limits set by the NDA Expert Analyst (EA).

4.1 NDA EA and NDA Operator Review

NDA Operator

4.1.1 Forward the data and the AITR List to the NDA EA for evaluation.

NOTE

All comments on the Automated Independent Technical Review List SHALL be resolved by the NDA EA and documented in the Disposition field.

Certain waste streams will have specified default isotopic distributions derived from Acceptable Knowledge (AK). Other matrices will **NOT** have specified default isotopic distributions; therefore, only measured radionuclides may be reported for these matrices.

Multi Group Analysis (MGA) is the main analytical software tool for isotopic calculation. Isotopic composition may also be determined using FRAM software.

NDA EA

4.1.2 Perform the following:

- [A] Review the spectra and data to determine if self-shielding **OR** other corrections need to be made to the data.
- [B] Resolve any comments flagged on the AITR List, **AND** document them in the corresponding Disposition field(s) of the AITR List.
- [C] Resolve any issues identified during data review and as appropriate, document the resolution in the Miscellaneous Comment section of the AITR List.

- [D] Review the gamma spectra for additional unknown or identified radionuclides, as appropriate.
- [E] **IF** Cs-137 is identified in the Radioassay Data Sheet, **THEN** calculate the Cs-137 and Sr-90 values based upon the information from the AK.
- [F] Ensure that the appropriate use of the default isotopics has been performed for the matrix assayed, when applicable.
- [G] Ensure that only measured radionuclides are reported for waste matrices with **NO** default isotopics.
- [H] Regenerate the Radioassay Data Sheet, if applicable.
- [I] Sign and date the completed AITR List(s).
- [J] Forward the following components of the BDR and any revised data to the NDA Operator:
 - Completed, signed, and dated AITR List(s).
 - Radioassay Data Sheet(s)

NDA Operator

- [K] After the NDA EA has completed the evaluation and returned the data and the AITR List, perform the following:
 - [K.1] Assemble the BDR to include the following as a minimum:
 - Attachment 1, NDA Batch Data Report Cover Sheet
 - Attachment 2, NDA Batch Data Report Table of Contents
 - Attachment 3, NDA Batch Data Report Narrative Summary
 - Attachment 4, NDA Independent Technical Reviewer Checklist

- Copy of Nonconformance Report(s) (NCRs), if applicable
- For each assay:
 - Final Radioassay Data Sheet(s)
 - Final AITR List(s)
- Weekly Interfering Matrix Measurement Control Chart (BSGS and BNAS)
- QA Last Results Reports (from CCP-TP-189, *CCP Box Segmented Gamma System [BSGS] Operating Procedure* and CCP-TP-191, *CCP Box Neutron Assay System [BNAS] Operating Procedure*)
- QC Control Charts

Gamma

- NaI Standardization (PkCntr 1332 keV NaI1 and NaI2 [ch], PkFWHM 1332 keV NaI1 and NaI2 [keV], Pk cps 1332 keV NaI1 and NaI2 [keV], Pulser PkCntr NaI1 and NaI2 [keV], Pulser Pk cps NaI1 and NaI2 [keV])
- QC Check Background (Gamma QC Background SS, Pulser Pk centroid SS [ch], Pulser Pk FWHM SS [keV], Pulser pk cps SS)
- QC Daily Performance Check (PkCntr 81 keV SS [ch], PkFWHM 81 keV SS [keV], PkCntr 662 keV SS [ch], PkFWHM 662 keV SS [keV], Activ Cs137 SS [uCi])

Neutron

- QC Background Check (Reals QC Bkgd [Non-LCV], Totals QC Bkgd [Non-LCV])
- QC Calibration AAS Check (Proposed K Normalization)

- [K.2] Sign and date the Radioassay Data Sheets, as applicable.
- [L] Ensure the blocks labeled Site ID, NDA Batch (Number), NDA Counter ID, Procedure/Rev. Number, NDA Batch Date, Testing Facility, Waste Matrix Code, Count Type, Sequence Number, and Waste Containers on Attachments 1, 2, 3, 4, and 5 are completed, as applicable.
- [M] Paginate the BDR.
- [N] Forward the BDR and CDs (primary and backup) to the NDA ITR.

4.2 NDA ITR Review

NOTE

The NDA ITR is someone, other than the data generator, who is technically qualified to perform the initial work.

The NDA ITR ensures that, at a minimum, the 10 Waste Isolation Pilot Plant (WIPP)-tracked radionuclides (Am-241, Pu-238, Pu-239, Pu-240, Pu-242, U-233, U-234, U-238, Cs-137 and Sr-90), and U-235, for determining FGE, are listed on every Radioassay Data Sheet.

The NDA ITR reviews the Radioassay Data Sheets and QA Last Results Reports from CCP-TP-189 and CCP-TP-191 for completeness.

- 4.2.1 Review the BDRs, **AND** ensure all documentation is complete and accurate as listed in step 4.1.2[K.1].
- 4.2.2 Ensure the BDR is paginated.
- 4.2.3 Ensure Attachment 2 is completed.
- 4.2.4 Complete as necessary, print name, sign, and date the following:
 - [A] Radioassay Data Sheets
 - [B] Attachment 4
 - [C] Attachment 1
 - [D] Attachment 3

- 4.2.5 Generate an NCR in accordance with CCP-QP-005, *CCP TRU Nonconforming Item Reporting and Control*, if applicable (e.g., Fissile Gram Equivalent [FGE] >325 for a Standard Waste Box [SWB]).
- 4.2.6 Submit the BDR and CDs (primary and backup) to the Facility Records Custodian in accordance with CCP-QP-008.
- 4.3 Facility Records Custodian
 - 4.3.1 Receive, process, and transmit all records in accordance with CCP-QP-008.

5.0 RECORDS

5.1 Records generated during the performance of this procedure are maintained as Quality Assurance records in accordance with CCP-QP-008. The records are the following:

5.1.1 QA/Lifetime

[A] BDR to include:

[A.1] Attachment 1, NDA Batch Data Report Cover Sheet

[A.2] Attachment 2, NDA Batch Data Report Table of Contents

[A.3] Attachment 3, NDA Batch Data Report Narrative Summary

[A.4] Attachment 4, NDA Independent Technical Reviewer Checklist

[A.5] Copy of NCRs, if applicable

[A.6] Radioassay Data Sheets (from CCP-TP-189 and CCP-TP-191)

[A.7] Attachment 5, Automated Independent Technical Review List(s)

[A.8] Weekly Interfering Matrix Measurement Control Chart (from CCP-TP-189 and CCP-TP-191)

[A.9] QA Last Results Reports (from CCP-TP-189 and CCP-TP-191)

[A.10] QC Control Charts (Background and Daily QC Checks)

5.1.2 QA/Nonpermanent

[A] Raw data files (primary and backup CDs)

Attachment 1 – NDA Batch Data Report Cover Sheet

Site ID:	NDA Batch #:
NDA Counter ID:	NDA Batch Date:
Waste Containers:	
NDA ITR Printed Name: _____	
Approval Signature and Date:	
_____	_____

Attachment 2 – NDA Batch Data Report Table of Contents

NDA Batch Number: _____

Testing Facility: _____

SECTION	PAGE NUMBER
Attachment 1, NDA Batch Data Report Cover Sheet	
Attachment 2, NDA Batch Data Report Table of Contents	
Attachment 3, NDA Batch Data Report Narrative Summary	
Copy of NCR(s), if applicable	
NDA Independent Technical Reviewer Checklist	
Radioassay Data Sheet(s) <ul style="list-style-type: none">Automated Independent Technical Review List	
QA Last Results Reports (Background and Daily QC Checks)	
Weekly Interfering Matrix Measurement Control Chart	

Attachment 3 – NDA Batch Data Report Narrative Summary

Batch #: _____

Date: _____

Quality Control Summary:

Nonconformance:

ITR Comments:

ITR: _____ Date: _____

CCP-TP-193, Rev. 2
CCP Data Reviewing, Validating, and Reporting
Procedure for Nondestructive Assay Box Counters

Effective Date: 01/31/2011

Page 17 of 20

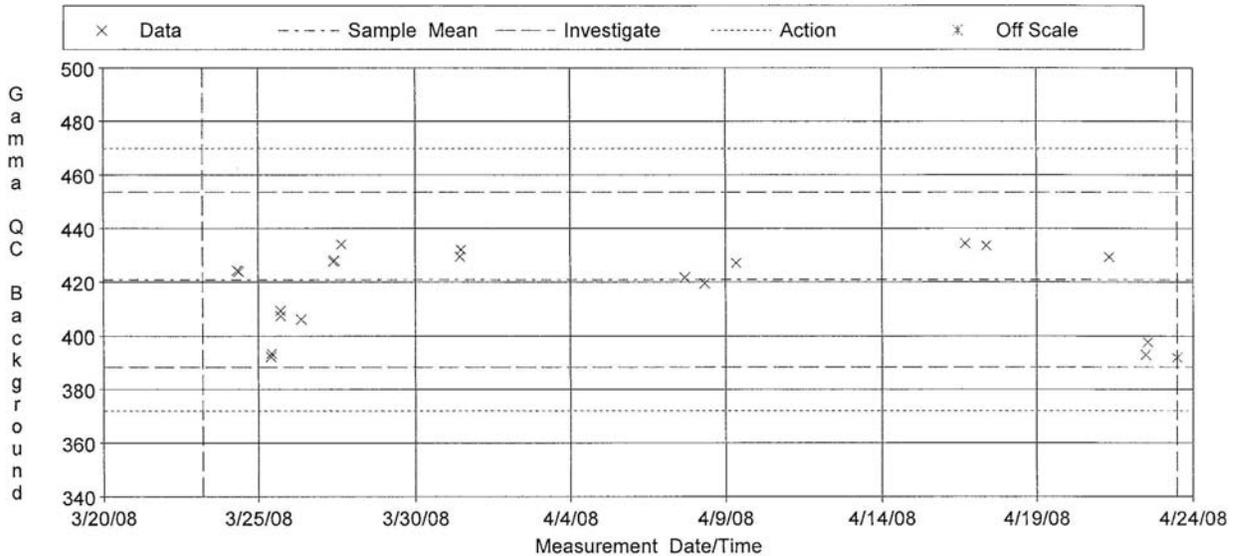
Attachment 4 – NDA Independent Technical Reviewer Checklist

Site ID:	NDA Batch Number:	
Procedure/Rev Number:	NDA Counter ID:	
Description of Criteria Reviewed		Criteria Met Yes/No/NA
NDA Independent Technical Reviewer (ITR) Checklist		
Data generation and reduction were conducted in a technically correct manner in accordance with the standard operating procedures for the NDA methods used, including the following:	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<ul style="list-style-type: none"> • NDA Batch Data Report Cover Sheet • NDA Batch Data Report Table of Contents • NDA Batch Data Report Narrative Summary • NDA Independent Technical Reviewer Checklist • NCR (If applicable) • QA Last Results Reports (Background and Daily QC Checks) • Weekly Interfering Matrix Measurement Control Chart • Radioassay Data Sheet(s) • Automated Independent Technical Review List 		
Data are reported in the proper units.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Calculations have been verified and validated by a software test plan, and/or a 100% check of all hand calculations has been performed.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
QC documentation is complete and includes:		
1. Daily Gamma Background	<input type="checkbox"/> Yes	<input type="checkbox"/> No
2. Daily Gamma QC Check	<input type="checkbox"/> Yes	<input type="checkbox"/> No
3. Daily Neutron Background	<input type="checkbox"/> Yes	<input type="checkbox"/> No
4. Daily Neutron QC Check	<input type="checkbox"/> Yes	<input type="checkbox"/> No

Attachment 4 – NDA Independent Technical Reviewer Checklist (continued)

NDA Independent Technical Reviewer Checklist	
QC measurement results are within established control limits per standard operating procedures (Reference Table A-3, Range of Applicability, CCP-PO-002, <i>CCP Transuranic Waste Certification Plan</i>).	<input type="checkbox"/> Yes <input type="checkbox"/> No
Were QC criteria that were not met documented with an NCR?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Weekly Interfering Matrix Measurements were properly performed and completed on _____ Date	<input type="checkbox"/> Yes <input type="checkbox"/> No
The activities and masses (including Total Measurement Uncertainties [TMU] expressed in one sigma) are reported for the 10 WIPP-tracked radionuclides (i.e., Am-241, Cs-137, Sr-90, Pu-238, Pu-239, Pu-240, Pu-242, U-233, U-234, U-238). Note: Less than Lower Limit of Detection (LLD) or zero values shall be reported in accordance with CCP-PO-002, Sections 3.3.1 and A.3.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Are there any additional radionuclides that contribute to 95 percent of the radioactive hazard in any container?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If YES, are they reported?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Was U-235 detected greater than LLD in any waste container?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If YES, is it reported?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
NDA Independent Technical Reviewer Approval	
NDA Independent Technical Reviewer Printed Name: _____	
Approval Signature and Date: _____	

Attachment 6 – QC Control Chart (Example)



QA Filename : S:\QA\CNTR0001_DCAT0001_PROC00AI_OQAS0003.QAF
Parameter Description : Gamma QC Background (cps)
Selection Dates : 3/23/08 5:00:00 AM - 4/23/08 11:24:23 AM
Sample Mean +/- Std Dev : 420.887 +/-16.296