

CCP-TP-048

Revision 14

CCP

Mobile IQ3 System Data Reviewing, Validating, and Reporting Procedure

EFFECTIVE DATE: 03/08/2010

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PRINTED NAME

APPROVED FOR USE

RECORD OF REVISION

Revision Number	Date Approved	Description of Revision
0	02/05/2003	Initial Revision.
1	03/21/2003	Changes in response to CBFO comments.
2	04/25/2003	Revised Appendix 1. Revised Section 5.0 and made other minor editorial changes.
3	09/03/2003	Revised NOTE before 4.3.1, as part of PDP Corrective Action Plan for IQ3. Incorporated CBFO comments.
4	12/04/2003	Revised to address CARs CAR-SRS-0005-03 and CAR-SRS-0008-03. Updated Sections 2.0, 3.0, 4.0 and 5.0. Incorporated minor changes to Attachments 4 and 7 and other minor editorial changes.
5	06/08/2004	Added an item to Attachment 3. Added step 3.6.2 and other editorial changes.
6	10/18/2004	Revised in response to CAR #SRS-002-04; deleted requirement to close Nonconformance Reports (NCRs) prior to Batch Data Report (BDR) completion.
7	03/14/2005	Added new step 4.1.2[H], to support SRS authorization basis requirements.
8	09/21/2005	Revised responsibility of Facility Records Custodian. Revised Attachment 3, NDA Generation Level Data Review, Validation and Verification Checklist.
9	11/03/2005	Revised to add an additional step (4.1.2 [B]), during CCP SRS Recertification Audit A-06-02.
10	11/16/2006	Revised to make the responsibilities of user consistent with those outlined by the Waste Isolation Pilot Plant Hazardous Waste Facility Permit requirements resulting from the Section 311/RH PMR and to incorporate procedure consistency changes. Addressed Carlsbad Field Office (CBFO) Document Review Record (DRR) comments.
11	02/19/2008	Revised to direct the Nondestructive Assay (NDA) Expert Analyst (EA) to detect and correct an occasional error encountered in the Gamma Waste Assay Software (GWAS).
12	09/09/2009	Revised to remove Appendix 1, update the document for use at Oak Ridge National Laboratory (ORNL), and to make other minor editorial changes.
13	10/12/2009	Revised to remove references to control charts in Batch Data Report (BDR) assembly.

RECORD OF REVISION (Continued)

Revision Number	Date Approved	Description of Revision
14	03/08/2010	Revised to update and clarify Attachment 3, Independent Technical Reviewer Checklist, and minor editorial changes. Also revised non-conformance reports to be initiated at the Operator level and to clarify the review and resolution process between the operator and Expert Analyst (EA).

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1.0 PURPOSE

This procedure describes the methods and techniques to review, validate, verify, and report data from the Mobile IQ3 system.

1.1 Scope

This procedure contains instructions to review, validate, and verify the Nondestructive Assay (NDA) data to ensure compliance with the requirements for CCP-PO-002, *CCP Transuranic Waste Certification Plan*, in order to ship to the Waste Isolation Pilot Plant (WIPP) for disposal. This procedure also provides the instructions for completing Batch Data Reports (BDRs).

2.0 REQUIREMENTS

2.1 References

Baseline Documents

- CCP-PO-003, *CCP Transuranic Authorized Methods for Payload Control (CCP CH-TRAMPAC)*
- MCS-IQ3-CALIB-2009, *Calibration Report for the MCS IQ3*
- MCS-IQ3-TMU-2009, *Total Measurement Uncertainty for the MCS IQ3*
- *Methods and Algorithms used in MGA*, by Ray Gunnink, April 1999

Referenced 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-047, *CCP Mobile IQ3 Gamma Scanner Operation*
- Canberra Software Design Document for the Auto ITR and Gamma TMU Software

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 Equipment List

2.3.1 NDA Analysis Computer System and ancillary equipment.

2.4 Software

2.4.1 Gamma Waste Assay Software (GWAS).

2.4.2 Operating System.

2.4.3 Radionuclide Libraries.

2.5 Precautions and Limitations

2.5.1 None.

2.6 Prerequisite Actions

2.6.1 None.

2.7 Definitions

2.7.1 None.

3.0 RESPONSIBILITIES

3.1 NDA Operator

3.1.1 Ensures the NDA system is performing within quality control limits.

3.1.2 Generates, reviews, processes, reduces, and reports raw data as described in CCP-PO-002 and Central Characterization Project (CCP) procedures.

3.2 NDA Independent Technical Reviewer (ITR)

NOTE

The NDA ITR is an individual other than the NDA Operator who is qualified to perform the initial work.

3.2.1 Ensures that proper data reduction and documentation is complete and accurate.

3.2.2 Ensures the, NDA BDR, is completed and the BDR is paginated.

3.3 NDA Expert Analyst (EA)

3.3.1 Performs technical analysis of assays.

3.3.2 Resolves any problem assay results of drums.

3.4 Facility Records Custodian

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

4.0 PROCEDURE

4.1 Batch Data Report (BDR) Preparation

NOTE

The Automatic Independent Technical Review (AITR) Checklist (see Attachment 4, Automatic Independent Technical Review Checklist, for an example) is a computer generated checklist. The AITR software performs limit checks on the analysis results, and via a generated report, flags for REVIEW any data that DO **NOT** meet the required limits set by the NDA EA.

NOTE

Attachment 4, Section 2, Container Density Review, uses the unit of g/cubic centimeter (cc). This unit is equivalent to g/cm³.

NDA Operator

4.1.1 Forward the data to the NDA EA for resolution.

NOTE

In order to detect and correct an occasional error encountered with the GWAS software, the NDA EA considers the following during his analysis of the collected assay data:

- For each assay of weapons grade plutonium with >10.0 g Pu-239, the NDA EA compares the *Summed Spectrum* and the *Sum of Segments* results to determine if the Pu-239 and Am-241 results agree to within a factor of 5. If the results DO **NOT** agree, the NDA EA refits the Pu-239 and Am-241 peaks, reanalyzes the measurement, and retests the results.
 - For each assay of heat source materials containing >1.0 g of Pu-238, the NDA EA compares the *Summed Spectrum* and the *Sum of Segments* results to determine if the Pu-238 results agree to within a factor of 5. If the results DO **NOT** agree, the NDA EA refits the Pu-238 peak, reanalyzes the measurement, and retests the results.
-

NDA EA

4.1.2 Perform the following (as applicable):

- [A] Review the spectra, as appropriate, to determine if self-shielding or other corrections need to be made to the data.
- [B] **IF** measured isotopics were **NOT** obtained, **THEN** use default isotopics from the appropriate NDA/Acceptable Knowledge (AK) memorandum, if available.
- [C] Resolve problems flagged by the AITR, and document resolution on the Automated Independent Technical Review Checklist (see Attachment 1, Automated Independent Technical Review Checklist, for an example).
- [D] Review the Multi-Group Analysis (MGA) and/or summed spectrum for additional unknown or identified radionuclides, if applicable.
- [E] Regenerate the data.

NOTE

Any additional radionuclides determined by the EA to contribute to 95 percent of the radiological hazard will be included in the summary values on the Radioassay Data Sheet.

- [F] Complete, print name, sign, and date Attachment 7, Additional Radionuclides Identified, if applicable.
- [G] Complete, print name, sign and date the Automated Independent Technical Review Checklist.
- [H] Forward the Automated Independent Technical Review Checklist, Attachment 7(s), if applicable, and the final Radioassay Data Sheet(s) to the NDA Operator.

NDA Operator

4.1.3 Assemble the BDR as follows:

- [A] Attachment 5, NDA Batch Data Report Cover Sheet
- [B] Attachment 2, NDA Batch Data Report Table of Contents
- [C] Attachment 6, NDA Batch Data Report Narrative Summary
- [D] Copy of Nonconformance Report(s) (NCR) (if applicable)
- [E] Attachment 3, Independent Technical Reviewer Checklist
- [F] Final Radioassay Data Sheet(s)
- [G] Attachment 7, Additional Radionuclides Identified sheet(s) (if applicable)
- [H] Automated Independent Technical Review Checklist(s) (see Attachment 4, Automated Independent Technical Review Checklist, for an example)
- [I] Automated Independent Technical Review Checklist (Attachment 1)
- [J] Weekly Interfering Matrix Measurement
- [K] Background check – Last Results Report

[L] Transmission check – Last Results Report

[M] Instrument Performance Check – Last Results Report

4.1.4 Review the Final Radioassay Data Sheet(s) and Attachment 7(s), if applicable.

4.1.5 Resolve any issues with the Final Radioassay Data Sheet(s) and/or Attachment 7(s), if applicable, with the EA.

4.1.6 Initiate a Nonconformance Report (NCR) in accordance with CCP-QP-005, *CCP TRU Nonconforming Item Reporting and Control* as needed if any of, but not limited to, the following conditions apply:

[A] The TRU alpha activity concentration is less than or equal to 100 nCi/g.

[B] The Plutonium equivalent activity (PE-Ci) is greater than 80 PE-Ci.

[C] The Plutonium-239 Fissile Gram Equivalent (FGE) plus two times the associated TMU is greater than 200 FGE.

[D] The assay is rejected by the EA.

4.1.7 Print name, sign, and date Final Radioassay Data Sheet(s) and Attachment 7(s), if applicable.

4.1.8 Forward assembled BDR to the ITR.

4.2 Independent Technical Review of the BDR

ITR

4.2.1 Review the BDR in accordance with the requirements in Attachment 3.

4.2.2 Print name, sign, and date the Radioassay Data Sheet(s), and Attachment 7(s), if applicable.

4.2.3 Complete, print name, sign, and date Attachment 3.

4.2.4 Complete, print name, sign, and date Attachment 5.

NOTE

The NDA ITR may designate pagination of the BDR and completion of the Attachment 2 to a designee.

4.2.5 Paginate the BDR.

4.2.6 Complete Attachment 2.

4.2.7 Complete, print name, sign, and date the Attachment 6.

4.2.8 Copy electronic data to CD and backup CD.

4.2.9 Label CD including the following:

- Originating Organization
- File Name
- File Directory
- Last Entry Date
- Retention Period
- Original Software used
- Version of Software used

4.2.10 Submit the completed BDR, CD, and backup CD to the Facility Records Custodian.

Facility Records Custodian

4.2.11 Receive, process, and transmit 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 (QA) records in accordance with CCP-QP-008. The records are the following:

5.1.1 QA/Lifetime

[A] BDR, including:

[A.1] Attachment 5, NDA Batch Data Report Cover Sheet

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

[A.3] Attachment 6, NDA Batch Data Report Narrative Summary

[A.4] Attachment 3, Independent Technical Reviewer Checklist

[A.5] Copy of NCRs (if applicable)

[A.6] Instrument Performance Check – Last Results Report (generated in CCP-TP-047, *CCP Mobile IQ3 Gamma Scanner Operation*)

[A.7] Weekly Interfering Matrix Measurement

[A.8] Background Check – Last Results Report (generated in CCP-TP-047)

[A.9] Transmission Check – Last Results Report (generated in CCP-TP-047)

[A.10] Final Radioassay Data Sheet(s)

[A.11] Attachment 7, Additional Radionuclides Identified Sheet(s), if applicable

[A.12] Automated Independent Technical Review Checklist(s) (Attachment 4, as an example)

[A.13] Automated Independent Technical Review Checklist (Attachment 1, as an example)

[B] QA/Nonpermanent

[B.1] Raw Data (Original and Backup CD)

Attachment 1 – Automated Independent Technical Review Checklist (Example)

AUTOMATED INDEPENDENT TECHNICAL REVIEW CHECKLIST

Counter Number: IQ3 _____

Data Review for Container: _____

Waste Matrix Code: _____ Count Type: _____

Sequence Number: _____ Assay Date: _____

AITR Version 1.1

Comments	Disposition
SECTION 2 - CONTAINER DENSITY	
SECTION 3 - SELF-ABSORPTION	
SECTION 4 – PULSER	
SECTION 5 – TRANSMISSION	
SECTION 6 - REDUCED CHI SQUARED FIT	

Attachment 1 – Automated Independent Technical Review Checklist (Example)
(Continued)

SECTION 7 - FGE MASS REVIEW	
SECTION 8 - PERCENT FULL REVIEW	
SECTION 9 - IDC COUNT TYPE REVIEW	
SECTION 10 - ²⁴¹ Am & ²³⁷ Np INTERFERENCE TEST	
SECTION 11 - ²³⁹ Pu CALIBRATION RANGE REVIEW	
SECTION 12 - ¹³⁷ Cs INTERFERENCE TEST	

Expert Analyst: _____ Date: _____

Attachment 2 – NDA Batch Data Report Table of Contents

NDA BATCH NUMBER: _____

TESTING FACILITY: _____

SECTION	PAGE NUMBER
NDA Batch Data Report Cover Sheet	
NDA Batch Data Report Table of Contents	
NDA Batch Data Report Narrative Summary	
QC Measurement Sheets	
Copy of NCR(s), if applicable	
Radioassay Data	
Independent Technical Reviewer Checklist	

Attachment 3 – Independent Technical Reviewer Checklist

Site ID:	NDA Batch Number:	
Procedure and Rev. No.:	NDA Counter ID:	
Description of Criteria Reviewed		Criteria Met
Correct waste drum weight(s) were entered and used in the radioassay process and calculations. Drum weight used for NDA calculations have been checked (e.g., RTR reported weight).		<input type="checkbox"/> Yes <input type="checkbox"/> No
Data generation and reduction were conducted in a technically correct manner in accordance with the standard operating procedures for the NDA methods used.		<input type="checkbox"/> Yes <input type="checkbox"/> No
Data are reported in the proper units.		<input type="checkbox"/> Yes <input type="checkbox"/> No
Calculations have been validated by a valid calculation program, a spot check of verified calculation programs, and/or 100 percent check of all hand calculations.		<input type="checkbox"/> Yes <input type="checkbox"/> No
The testing QA documentation is complete (as defined in Section 4.0) and includes raw data, calculation records, calibration records, and QC sample results.		<input type="checkbox"/> Yes <input type="checkbox"/> No
QC measurements were made at the beginning of the counting session(s) for the following: <ul style="list-style-type: none"> • Background Count Rate • Peak Centroid 3600 • Peak Full Width Half Maximum (FWHM) 3600 • Peak Counts Per Second 3600 • Peak Centroid 81 keV • Peak Centroid 356 keV • Peak FWHM 81 keV • Peak FWHM 356 keV • Peak Counts Per Second 356 keV • Cs-137 Activity 		<input type="checkbox"/> Yes <input type="checkbox"/> No

Attachment 3 –Independent Technical Reviewer Checklist (Continued)

Description of Criteria Reviewed	Criteria Met
QC measurement results are within established control limits per standard operating procedures and out of tolerance flags are resolved. (Reference Table A-4.2 Range of Applicability, CCP-PO-002).	<input type="checkbox"/> Yes <input type="checkbox"/> No
Weekly Interfering Matrix Measurement is properly performed and has been used to assess the long-term stability of the NDA instrument's matrix correction.	<input type="checkbox"/> Yes <input type="checkbox"/> No
The activities and masses (including TMU expressed in one sigma) are reported for the 10 WIPP-reportable radionuclides. NOTE: < Lower Limit of Detection (LLD) or zero shall be reported in accordance with the CCP-PO-002.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Are there any additional radionuclides that contribute to 95 percent of the radioactive hazard in any drum? IF YES , are they reported?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
²³⁵ U detected in any waste drum? IF YES , is it reported?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
<p>NDA Independent Technical Reviewer's Printed Name: _____</p> <p>Approval Signature and Date: _____ / _____</p>	

Attachment 4 – Automated Independent Technical Review Checklist (Example)

NOTE

The ranges for assessing the ITR Checklist data acceptability are located in Canberra Software Design Document for the AITR and Gamma TMU Software.

Automated Independent Technical Review

Software Version: GWAS 2.3dGEN
Counter Number: IQ3 with MGA
Data Review for Container: OR123456
Item Description Code: N/A \Count Type: debris
Sequence Number: 275
Assayed on: 3/5/2003 9:01:54 AM
Report Generated: 03/06/03 10:46:37
AITR Version 1.1

Section 2 - CONTAINER DENSITY REVIEW

Container density <0.186> g/cubic centimeter (cc) is within UPPER and LOWER limits

Section 3 - SELF-ABSORPTION REVIEW

Review Pu-239A WTMEAN-0 Self Absorption Ratio Not Calculated

Attachment 4 – Automated Independent Technical Review Checklist (Continued)
(Example)

Section 4 - PULSER REVIEW

DEAD TIME percentage <0.60> is acceptable in Segment 1
Pulser value <1.04> is within range in Segment 1
DEAD TIME percentage <0.69> is acceptable in Segment 2
Pulser value <1.04> is within range in Segment 2
DEAD TIME percentage <0.62> is acceptable in Segment 3
Pulser value <1.04> is within range in Segment 3

Section 5 - TRANSMISSION REVIEW

Transmission results are acceptable in Segment 1
Transmission results are acceptable in Segment 2
Transmission results are acceptable in Segment 3

Section 6 - REDUCED CHI SQUARED FIT REVIEW

All energy Peaks within <3.00e+00> RCHISQ limit

Section 7 - FGE MASS REVIEW

FGE Mass <0.00> is within limits

Section 8 - PERCENT FULL REVIEW

Percent Full <30.0> is above lower limit <30.0>

Section 9 - IDC COUNT TYPE REVIEW

IDC N/A <matrix type>

Section 10 – Am-241 & Np-237 INTERFERENCE REVIEW

Review Am-241 ratio <0.00> is below lower limit <200.00>
Review Np-237 <0.00> is below lower limit <125.00>

Section 11 – Pu-239 CALIBRATION RANGE REVIEW

Review Pu-239 <0.00> is below lower limit <0.10>

Section 12 – Cs-137 INTERFERENCE REVIEW

Review Am-241D is <0.0>, Am-241 A <0.40> is greater than zero

Attachment 6 – NDA Batch Data Report Narrative Summary

NDA Batch Number: _____

Date: _____

Quality Control Summary:

Nonconformances:

NDA Independent Technical Reviewer Comments:

Printed Name: _____

Signature and Date: _____ / _____

