

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date

08/14/2017

2. Review No.

3. Project No.

Page 1 of 1

<p>5. Document Number(s)/Title(s) VSR17-010</p>	<p>6. Program/Project/Building Number</p>	<p>7. Reviewer Scot Fitzgerald</p>	<p>8. Organization/Group Sample Management and Reporting</p>	<p>9. Location/Phone MO277/373-7495</p>		
<p>10. Agreement With Indicated Comment Disposition(s) 11. CLOSED</p>						
<p>17. Comment Submittal Approval</p> <p style="text-align: center;">  Scot Fitzgerald Organization Manager (optional) (print and sign) </p> <p>Date <u>08/14/2017</u></p>	<p>Date _____</p> <p style="text-align: center;"> Reviewer/Point of Contact (print and sign) </p> <p style="text-align: center;"> Scot Fitzgerald Author/Originator (print and sign) </p>	<p>Date <u>08/14/2017</u></p> <p style="text-align: center;"> Reviewer/Point of Contact (print and sign) </p> <p style="text-align: center;">  Scot Fitzgerald Author/Originator (print and sign) </p>				
<p>12. Item</p> <p>1 No Issues noted</p>	<p>13a. Comments</p>	<p>13b. Basis</p>	<p>13c. Recommendation</p>	<p>14. Reviewer Concurrence Required (Y or N)</p>	<p>15. Disposition (provide justification if NOT accepted)</p>	<p>16. Status</p>



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Data Validation Report for CH2M Hill Plateau Remediation Company

VSR17-010
Project 618-10_618-11

Radiochemical Validation - Level C

Validation Performed By:

A handwritten signature in black ink that reads 'Linda Thal'.

Linda Thal

Date: 08-09-2017

Technical Review By:

A handwritten signature in black ink that reads 'Ellen McEntee'.

Ellen McEntee

Date: 08-09-2017

Quality Review By:

A handwritten signature in black ink that reads 'Mary A. Donovan'.

Mary Donovan
Quality Assurance Manager

Date: 08-15-2017

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Date: 8 August 2017
 To: CH2M Hill (technical representative)
 From: Analytical Quality Associates, Inc.
 Project: 618-10_618-11
 Subject: Radiochemical - Sample Data Group (SDG) W07884 and 428902

INTRODUCTION

This memorandum presents the results of data validation for SDGs W07884 and 428902 prepared by TestAmerica Laboratories, Inc. and GEL Laboratories LLC. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B3BXX2	07/25/17	Soil	C	Gamma spec (Co-60) and Tritium
B3BXX3	07/25/17	Soil	C	Gamma spec (Co-60) and Tritium
B3BXX4	07/25/17	Soil	C	Gamma spec (Co-60) and Tritium
B3BXX5	07/25/17	Soil	C	Gamma spec (Co-60) and Tritium
B3BXX6	07/25/17	Soil	C	Gamma spec (Co-60) and Tritium
B3BXX7	07/25/17	Soil	C	Gamma spec (Co-60) and Tritium

Data validation was conducted in accordance with the CHPRC validation statement of work and the 300 Area Remedial Action Sampling and Analysis Plan (DOE/RL-2001-48). Appendices 1 through 4 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Data Validation Supporting Documentation
- Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 180 days.

The samples were analyzed within the prescribed holding time and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

No equipment blanks were submitted for validation.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and chemical recovery factors. Chemical recovery factors are determined through use of a carrier or tracer and provide assessment of the chemical separation process that is affected by the laboratory procedure, sample matrix, and/or interference. Chemical recovery factors are used to correct sample concentration, uncertainty, and MDC results. According to the SAP, the matrix spike sample accuracy limits are 70% to 130% and the laboratory control sample accuracy limits are 70% to 130% which are specified by the DV procedure.

Matrix Spike (MS) Samples

All MS recoveries were acceptable.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

Carrier/Tracer Recovery Factors

All carrier/tracer recovery factors were acceptable.

- **Precision**

Precision is evaluated by reviewing laboratory duplicate, field duplicate, and field split sample results. These QC results provide information on the laboratory reproducibility and whether

sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are $\leq 30\%$ which is specified by the DV procedure.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable.

Field Duplicate Samples

No field duplicates were submitted for validation.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDCs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDCs with associated non-detected sample results were below the CRDLs with the following exceptions.

The MDCs for Co-60 were slightly $>$ the CRDL for all samples submitted with SDG 428902 with the exception of sample B3BXK4.

- **Completeness**

W07884 and SDG 428902 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

There were no minor deficiencies leading to qualification of sample results as estimates.

REFERENCES

GRP-GD-002, Rev. 2, Change 0, *Data Validation for Radiochemical Analyses*, September 2016.

DOE/RL-2001-48, Rev. 4, *300 Area Remedial Action Sampling and Analysis Plan*, November 2014

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for and was not detected. The data should be considered usable for decision-making purposes.
- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the MDC. The data should be considered usable for decision-making purposes.
- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.
- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.
- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.
- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.
- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2
Summary of Data Qualification

Radiochemical Data Qualification Summary			
SDGs: W07884 and 428902	Reviewer: AQA	Project: 618-10_618-11	Page 1 of 1
Analyte(s)	Qualifier	Samples Affected	Reason
Co-60 and tritium	None	N/A	N/A

Comments: None

Appendix 3

Data Validation Supporting Documentation

Data Validation for Radiochemical Analyses

Published Date: 09/13/16

SGRP-GD-SMP-50116

Effective Date: 09/13/16

Appendix B - Radiochemical Data Validation Checklist

Validation Level:	A	B	C	D	E
Project: 618-10_618-11			Data Package: VSR17-010		
Validator: Linda Thal		Lab: TestAmerica/GEL		Date: 08/08/17	
			SDG: W07884 and 428902		
Analyses Performed					
<input type="checkbox"/> Gross Alpha/Beta	<input type="checkbox"/> Strontium-90	<input type="checkbox"/> Technetium-99	<input type="checkbox"/> Alpha Spectroscopy	<input checked="" type="checkbox"/> Gamma Spectroscopy	<input checked="" type="checkbox"/> Tritium
<input type="checkbox"/> Total Uranium	<input type="checkbox"/> Radium-22				
Samples/Matrix Soil					
SDG W07884: B3B XK7					
SDG 428902: B3B XK2, B3B XK3, B3B XK4, B3B XK5 and B3B XK6					

1. Completeness and Case Narrative	<input type="checkbox"/> N/A
Technical verification forms present?	Yes (No) N/A

Comments:

2. Initial Calibration (Levels D, E)	<input checked="" type="checkbox"/> N/A
Instruments/detectors calibrated?	Yes No (N/A)
Initial calibration acceptable?	Yes No (N/A)
Standards NIST traceable?	Yes No (N/A)
Standards expired?	Yes No (N/A)
Calculation check acceptable?	Yes No (N/A)

Comments:

Data Validation for Radiochemical Analyses

Published Date: 09/13/16

SGRP-GD-SMP-50116

Effective Date: 09/13/16

Appendix B - (Cont.) Radiochemical Data Validation Checklist

3. Continuing Calibration (Levels D, E)	<input checked="" type="checkbox"/> N/A
Calibration checked within required frequency?	Yes No <input type="radio"/> N/A
Calibration check acceptable?	Yes No <input type="radio"/> N/A
Calibration check standards traceable?	Yes No <input type="radio"/> N/A
Calibration check standards expired?	Yes No <input type="radio"/> N/A
Calculation check acceptable?	Yes No <input type="radio"/> N/A
Comments:	

4. Background Counts (Levels D, E)	<input checked="" type="checkbox"/> N/A
Background counts checked within required frequency?	Yes No <input type="radio"/> N/A
Background counts acceptable?	Yes No <input type="radio"/> N/A
Calculation check acceptable?	Yes No <input type="radio"/> N/A
Comments:	

Data Validation for Radiochemical Analyses

Published Date: 09/13/16

SGRP-GD-SMP-50116

Effective Date: 09/13/16

Appendix B - (Cont.) Radiochemical Data Validation Checklist

5. Blanks (Levels B, C, D, E)	<input type="checkbox"/> N/A
Method blank analyzed within required frequency?	(Yes) No N/A
Method blank results acceptable?	(Yes) No N/A
Analytes detected in method blank?	Yes (No) N/A
Field blank(s) analyzed?	Yes (No) N/A
Field blank results acceptable?	Yes No (N/A)
Analytes detected in field blank(s)?	Yes No (N/A)
Transcription/Calculation Errors? (Levels D, E)	Yes No (N/A)

Comments:

6. Laboratory Control Samples or Blank Spike Samples (Levels C, D, E)	<input type="checkbox"/> N/A
LCS /BSS analyzed within required frequency?	(Yes) No N/A
LCS/BSS recoveries acceptable?	(Yes) No N/A
LCS/BSS traceable? (Levels D,E)	Yes No (N/A)
LCS/BSS expired? (Levels D,E)	Yes No (N/A)
LCS/BSS levels correct? (Levels D,E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments:

Data Validation for Radiochemical Analyses

Published Date: 09/13/16

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Effective Date: 09/13/16

Appendix B - (Cont.) Radiochemical Data Validation Checklist

7. Chemical Carrier Recovery (Levels C, D, E)	<input type="checkbox"/> N/A
Chemical carrier added?	Yes <input checked="" type="radio"/> No <input type="radio"/> N/A
Chemical recovery acceptable?	Yes <input checked="" type="radio"/> No <input type="radio"/> N/A
Chemical carrier traceable? (Levels D, E)	Yes No <input checked="" type="radio"/> N/A
Chemical carrier expired? (Levels D, E)	Yes No <input checked="" type="radio"/> N/A
Transcription/Calculation errors? (Levels D, E)	Yes No <input checked="" type="radio"/> N/A

Comments:

8. Tracer Recovery (Levels C, D, E)	<input type="checkbox"/> N/A
Tracer added?	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
Tracer recovery acceptable?	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> N/A
Tracer traceable? (Levels D, E)	Yes No <input checked="" type="radio"/> N/A
Tracer expired? (Levels D, E)	Yes No <input checked="" type="radio"/> N/A
Transcription/Calculation errors? (Levels D, E)	Yes No <input checked="" type="radio"/> N/A

Comments:

W07884: Tracer reported for tritium analysis

Data Validation for Radiochemical Analyses

Published Date: 09/13/16

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Effective Date: 09/13/16

Appendix B - (Cont.) Radiochemical Data Validation Checklist

9. Matrix Spikes (Levels C, D, E)	<input type="checkbox"/> N/A
Matrix spike analyzed?	(Yes) No N/A
Spike recoveries acceptable?	(Yes) No N/A
Spike source traceable? (Levels D, E)	Yes No (N/A)
Spike source expired? (Levels D, E)	Yes No (N/A)
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments: MS reported for tritium analyses

According to GRP-GD-002 an MS is not required for methods using

a tracer/carrier, gammaspec and gross A/B (GPC)

10. Duplicates (Levels C, D, E)	<input type="checkbox"/> N/A
Duplicates analyzed at required frequency?	(Yes) No N/A
RPD values acceptable?	(Yes) No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No (N/A)

Comments: All sample results ND; RPDs insignificant

Data Validation for Radiochemical Analyses

Published Date: 09/13/16

SGRP-GD-SMP-50116

Effective Date: 09/13/16

Appendix B - (Cont.) Radiochemical Data Validation Checklist

11. Field QC Samples (Levels C, D, E)	<input type="checkbox"/> N/A
Field duplicate sample(s) analyzed?	Yes <input checked="" type="radio"/> No N/A
Field duplicate RPD values acceptable?	Yes <input checked="" type="radio"/> No N/A
Field split sample(s) analyzed?	Yes <input checked="" type="radio"/> No N/A
Field split RPD values acceptable?	Yes No <input checked="" type="radio"/> N/A
Performance audit sample(s) analyzed?	Yes No <input checked="" type="radio"/> N/A
Performance audit sample results acceptable?	Yes No <input checked="" type="radio"/> N/A

Comments:

12. Holding Times (All levels)	<input type="checkbox"/> N/A
Are sample holding times acceptable?	<input checked="" type="radio"/> Yes No N/A

Comments:

13. Results and MDCs (All Levels)	<input type="checkbox"/> N/A
Results reported for all required sample analyses?	<input checked="" type="radio"/> Yes No N/A
Results supported in raw data?(Levels D, E)	Yes No <input checked="" type="radio"/> N/A
Results acceptable? (Levels D, E)	Yes No <input checked="" type="radio"/> N/A
MDC's meet required reporting limits?	Yes <input checked="" type="radio"/> No N/A
Transcription/Calculation errors? (Levels D, E)	Yes No <input checked="" type="radio"/> N/A

Comments:

W07884: Co-60 CRDL for sample B3BXK7 >RDL listed in DOE/RL-2001-48; however, the MDL was < RDL
428902:Co-60 MDCs for all samples except B3BXK4 > RDL in DOE/RL-2001-48

Appendix 4

Additional Documentation Requested By Client

Date: 01-Aug-17

DUPLICATE RESULTS

Lab Name: TestAmerica Inc

SDG: W07884

Collection Date: 7/25/2017 7:45:00 AM

Lot-Sample No.: J7G250404-1

Report No. : 71437

Received Date: 7/25/2017 2:55:00 PM

Client Sample ID: B3BXK7 DUP

COC No. : FRC17-07-006

Matrix: SOIL

Parameter	Result, Orig Rst	Qual	Count Error (2 s)	CSU (2 s)	MDL, Action Lev	Rpt Unit, CRDL	Yield	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 7207010	GAMMA_GS		Work Order: NAATJ1AD		Report DB ID: NAATJ1DR		Orig Sa DB ID: 9NAATJ10					
CO-60	-1.58E-02	U	1.8E-02	1.8E-02	2.90E-02	pCi/g		-0.54	7/27/17 12:39 p		331.5	GER18\$1
	5.13E-03	U	RPD -393.2			1.00E+01		-(1.7)			g	
Batch: 7207011	TRITIUM_DIST_LSC		Work Order: NAATJ1AF		Report DB ID: NAATJ1FR		Orig Sa DB ID: 9NAATJ10					
H-3	-4.12E-02	U	2.7E-01	3.1E-01	7.13E-01	pCi/g	100%	-0.06	7/28/17 02:20 p		11.4	LSC10
	-5.33E-02	U	RPD -25.6			3.00E+01		-0.26			g	

No. of Results: 2 Comments:

TestAmerica Inc RPD - Relative Percent Difference.
rptSTLRchDupV5. MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
8.5 A2002 U Qual - Analyzed for but not detected above limiting criteria, Mdc/Mda/Mdl, Total Uncert, RDL or not identified by gamma scan software.

FORM II

Date: 01-Aug-17

BLANK RESULTS

Lab Name: TestAmerica Inc

SDG: W07884

Matrix: SOIL

Report No. : 71437

Parameter	Result	Qual	Count Error (2 s)	CSU (2 s)	MDL, Lc	Rpt Unit, CRDL	Yield	Rst/MDL, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Primary Detector
Batch: 7207011	TRITIUM_DIST_LSC			Work Order: NAAVJ1AA		Report DB ID: NAAVJ1AB						
H-3	-5.29E-03	U	9.1E-02	1.0E-01	2.38E-01	pCi/g	100%	-0.02	7/28/17 02:44 p		30.7	LSC10
					1.07E-01	3.00E+01		-0.1			g	
Batch: 7207010	GAMMA_GS			Work Order: NAAVH1AA		Report DB ID: NAAVH1AB						
CO-60	-4.17E-03	U	1.2E-02	1.2E-02	2.23E-02	pCi/g		-0.19	7/27/17 09:53 p		348.0	GER19\$1
					1.14E-02	1.00E+01		-0.69			g	
No. of Results: 2	Comments:											

FORM II
LCS RESULTS

Date: 01-Aug-17

Lab Name: TestAmerica Inc

SDG: W07884

Matrix: SOIL

Report No. : 71437

Parameter	Result	Qual	Count Error (2 s)	CSU (2 s)	MDL	Report Unit	Yield	Expected	Expected Uncert	Recovery, Bias	Analysis, Prep Date	Aliquot Size	Primary Detector
Batch: 7207011	TRITIUM_DIST_LSC												
H-3	7.81E-01		1.4E-01	1.6E-01	2.31E-01	pCi/g	100%	8.75E-01	2.63E-02	89%	7/28/17 03:08 p	31.8	LSC10
								Rec Limits: 80	120	-0.1		g	
Batch: 7207010	GAMMA_GS												
CS-137	8.45E-01		1.1E-01	1.1E-01	3.43E-02	pCi/g		9.38E-01	9.67E-03	90%	7/28/17 07:59 a	350.1	GER11\$1
								Rec Limits: 80	120	-0.1		g	
No. of Results: 2	Comments:												

TestAmerica Inc Bias - (Result/Expected)-1 as defined by ANSI N13.30.

rptSTLRchLcs
V5.8.5 A2002

FORM II

Date: 01-Aug-17

MATRIX SPIKE RESULTS

Lab Name: TestAmerica Inc

SDG: W07884

Lot-Sample No.: J7G250404-1, B3BXK7

Report No. : 71437

Matrix: SOIL

Parameter	SpikeResult, Orig Rst	Qual	Count Error (2 s)	CSU (2 s)	MDC MDA	Rpt Unit	Yield	Rec- overy	Expected, Uncert	Analysis, Prep Date	Aliquot Size	Analy Method, Primary Detector
Batch: 7207011	Work Order: NAATJ1AE		Report DB ID: NAATJ1EW		Orig Sa DB ID: 9NAATJ10							
H-3	7.72E+00		6.7E-01	7.8E-01	7.24E-01	pCi/g	100%	85.42%	9.03E+00	7/28/17 01:56 p	11.5	TRITIUM_DIST_LSC
	-5.33E-02								2.71E-01		g	LSC10

Number of Results: 1

Comments:

TestAmerica Inc RER - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.
 rptSTLRchMs Bias - (Result/Expected)-1 as defined by ANSI N13.30.
 V5.8.5 A2002

Sample Results Summary

Date: 01-Aug-17

TestAmerica Inc TARL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 71437

SDG No: W07884

Batch	Client Id Work Order	Parameter	Result +- CSU (2 s)	Qual	Units	Tracer Yield	MDL	CRDL	RPD
7207010 GAMMA_GS									
B3BXX7									
	NAATJ1AC	CO-60	5.13E-03 +- 1.8E-02	U	pCi/g		3.63E-02	1.00E+01	
B3BXX7 DUP									
	NAATJ1AD	CO-60	-1.58E-02 +- 1.8E-02	U	pCi/g		2.90E-02	1.00E+01	-393.2
7207011 TRITIUM_DIST_LSC									
B3BXX7									
	NAATJ1AA	H-3	-5.33E-02 +- 2.9E-01	U	pCi/g	100%	6.55E-01	3.00E+01	
B3BXX7 DUP									
	NAATJ1AF	H-3	-4.12E-02 +- 3.1E-01	U	pCi/g	100%	7.13E-01	3.00E+01	-25.6
No. of Results: 4									

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: July 31, 2017
Page 1 of 2

Client : CH2MHill Plateau Remediation Company
MSIN R3-50 CHPRC
PO Box 1600
Richland, Washington 99352

Contact: Mr. Scot Fitzgerald

Workorder: 428902

Parmname	NOM	Sample	Qual	QC	Units	QC Criteria	Range	Analyst	Date Time
Rad Gamma Spec									
Batch	1685888								
QC1203839777	MB								
Cobalt-60			U	-0.011	pCi/g			MXR1	07/28/1712:14
				Uncert: +/-0.0198					
				TPU: +/-0.0204					
QC1203839778	428902001	DUP							
Cobalt-60		U	0.0184	U	0.0253				07/28/1713:41
				Uncert: +/-0.0363		RPD: 0	N/A		
				TPU: +/-0.0373		RER: 0.264	(0-2)		
QC1203839779	LCS								
Americium-241		488		544	pCi/g	REC: 111	(80%-120%)		07/28/1713:42
				Uncert: +/-5.07					
				TPU: +/-40.0					
Cesium-137		176		187	pCi/g	REC: 106	(80%-120%)		
				Uncert: +/-3.19					
				TPU: +/-8.62					
Cobalt-60		144		139	pCi/g	REC: 96	(80%-120%)		
				Uncert: +/-3.21					
				TPU: +/-6.04					
Rad Liquid Scintillation									
Batch	1685781								
QC1203839837	MB								
Tritium			U	4.98	pCi/g			BXM4	07/29/1702:27
				Uncert: +/-12.5					
				TPU: +/-12.6					
QC1203839838	428902001	DUP							
Tritium		U	2.37	U	5.31				07/29/1702:48
				Uncert: +/-12.5		RPD: 0	N/A		
				TPU: +/-12.5		RER: 0.321	(0-2)		
QC1203839839	428902001	MS							
Tritium		U	2.37		133	pCi/g	REC: 95	(75%-125%)	07/29/1703:10
				Uncert: +/-12.5					
				TPU: +/-12.5					
QC1203839840	LCS								
Tritium		88.0		87.1	pCi/g	REC: 99	(80%-120%)		07/29/1703:31
				Uncert: +/-18.3					
				TPU: +/-26.9					

Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- B The associated QC sample blank has a result $\geq 2X$ the MDA and, after corrections, result is \geq MDA for this sample
- D Results are reported from a diluted aliquot of sample.
- N Spike Sample recovery is outside control limits.