



LABORATORY DATA CONSULTANTS, INC.

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ERM
2525 Natomas Park Drive, Suite 350
Sacramento, CA 95833
ATTN: Ms. Maria Barajas-Albalawi

February 6, 2008

SUBJECT: BRC Tronox Parcel C/D, Data Validation

Dear Ms. Barajas-Albalawi

Enclosed are the final validation reports for the fraction listed below. These SDGs were received on January 28, 2008. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 18215:

<u>SDG #</u>	<u>Fraction</u>
F7L210320, F7L210241, F7L210269, F7L210278, F7L210330	Isotopic Uranium

The data validation was performed under EPA Level III and Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

80/20 LDC #18215 (ERM - Sacramento / BRC Tronox Parcel C/D)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Iso. U (5067)																										
					W	S	W	S	W	S	W	S	W	S	W	S														
Matrix: Water/Soil																														
A	F7L210320	01/28/08	02/18/08	0	20																									
B	F7L210241	01/02/08	01/23/08	0	20																									
C	F7L210269	01/02/08	01/23/08	0	20																									
D	F7L210278	01/02/08	01/23/08	0	20																									
E	F7L210330	01/02/08	01/23/08	0	20																									
Total					0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100
	Laura/LR																													

**BRC Tronox Parcel C/D
Data Validation Reports
LDC# 18215**

Isotopic Uranium

LDC

**Laboratory Data Consultants, Inc.
Data Validation Report**

Project/Site Name: BRC Tronox Parcel C/D
Collection Date: November 12 through November 13, 2007
LDC Report Date: February 1, 2008
Matrix: Soil
Parameters: Isotopic Uranium
Validation Level: EPA Level III
Laboratory: TestAmerica, Inc.
Sample Delivery Group (SDG): F7L210320

Sample Identification

TSB-CR-03-0'
TSB-CR-03-10'
TSB-CJ-05-0'
TSB-CJ-05-10'
TSB-CJ-06-0'
TSB-CJ-06-0'-FD
TSB-CJ-06-10'
TSB-DR-06-0'
TSB-DR-06-10'
TSB-DR-05-0'
TSB-DR-05-0'-FD
TSB-DR-05-10'
TSB-DR-03-0'
TSB-DR-03-10'
TSB-DJ-01-0'
TSB-DJ-01-10'
TSB-DR-04-0'
TSB-DR-04-10'
TSB-CR-04-0'
TSB-CR-04-10'
TSB-DR-03-0'DUP

Introduction

This data review covers 21 soil samples listed on the cover sheet. The analyses were per Method RICH-RC5067 for Isotopic Uranium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section VIII.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UU Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

All criteria for the initial calibration were met.

Detector efficiency was determined for each radionuclide of interest.

b. Continuing Calibration

Calibration verification and background determination were performed at the required frequencies. Results were within control limits.

III. Blanks

Method blanks were reviewed for each matrix as applicable. Blank results contained less than the minimum detectable activity (MDA).

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Matrix Spike/(Matrix Spike) Duplicate

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not required by the method.

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

b. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

c. Tracer Recovery

All tracer recoveries were within validation criteria.

V. Minimum Detectable Activity (MDA)

All minimum detectable activities met required detection limits.

VI. Sample Result Verification

Raw data were not reviewed for this SDG.

VII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

VIII. Field Duplicates

Samples TSB-CJ-06-0' and TSB-CJ-06-0'-FD and samples TSB-DR-05-0' and TSB-DR-05-0'-FD were identified as field duplicates. No isotopic uranium was detected in any of the samples with the following exceptions:

Compound	Concentration (pCi/g)		Difference (Limits)	Flag	A or P
	TSB-CJ-06-0'	TSB-CJ-06-0'-FD			
U-233/234	0.982	0.884	0.10 (≤ 1.0)	-	-
U-235/236	0.0296	0.0168U	0.01 (≤ 1.0)	-	-
U-238	0.891	0.977	0.09 (≤ 1.0)	-	-

Compound	Concentration (pCi/g)		Difference (Limits)	Flag	A or P
	TSB-DR-05-0'	TSB-DR-05-0'-FD			
U-233/234	0.838	0.962	0.12 (≤ 1.0)	-	-
U-235/236	0.0481	0.0268U	0.02 (≤ 1.0)	-	-
U-238	0.955	0.816	0.14 (≤ 1.0)	-	-

**BRC Tronox Parcel C/D
Isotopic Uranium - Data Qualification Summary - SDG F7L210320**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel C/D
Isotopic Uranium - Laboratory Blank Data Qualification Summary - SDG F7L210320**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel C/D
Isotopic Uranium - Field Blank Data Qualification Summary - SDG F7L210320**

No Sample Data Qualified in this SDG

LDC #: 18215A59
 SDG #: F7L210320
 Laboratory: TestAmerica, Inc.

VALIDATION COMPLETENESS WORKSHEET
 Level III

Date: 1-31-08
 Page: 1 of 1
 Reviewer: MG
 2nd Reviewer: W

METHOD: Isotopic Uranium (EPA Method 908/Method RICH-RC5067)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11-12-07 through 11-13-07
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IVa.	Matrix Spike/(Matrix Spike) Duplicates	A	DUP
IVa.	Laboratory control samples	A	LCS
V.	Tracer Recovery	A	
VI.	Minimum Detectable Activity (MDA)	A	
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D = 5+6 , D = 10+11
X.	Field blanks	N	

Note: A = Acceptable
 N = Not provided/applicable
 SW = See worksheet

ND = No compounds detected
 R = Rinsate
 FB = Field blank

D = Duplicate
 TB = Trip blank
 EB = Equipment blank

Validated Samples:

all soil

hyphen

1	TSB-CR-03-0'	11	TSB-DR-05-0' FD - FD	21	TSB-DR-03-0'DUP	31	
2	TSB-CR-03-10'	12	TSB-DR-05-10'	22	PBS	32	
3	TSB-CJ-05-0'	13	TSB-DR-03-0'	23		33	
4	TSB-CJ-05-10'	14	TSB-DR-03-10'	24		34	
5	TSB-CJ-06-0'	15	TSB-DJ-01-0'	25		35	
6	TSB-CJ-06-0'-FD	16	TSB-DJ-01-10'	26		36	
7	TSB-CJ-06-10'	17	TSB-DR-04-0'	27		37	
8	TSB-DR-06-0'	18	TSB-DR-04-10'	28		38	
9	TSB-DR-06-10'	19	TSB-CR-04-0'	29		39	
10	TSB-DR-05-0'	20	TSB-CR-04-10'	30		40	

Notes: Total dissolution prep. method

LDC #: 18215A59
 SDG #: F7L210320

VALIDATION FINDINGS WORKSHEET
 Field Duplicates

Page: 1 of 1
 Reviewer: MG
 2nd reviewer: [Signature]

METHOD: Radiochemistry (Method: RICH-RC-5067)

N N/A
 N N/A

Were field duplicate pairs identified in this SDG?
 Were target isotopes detected in the field duplicate pairs?

Isotopes	Activity (pCi/g)		by difference RPD
	5	6	
U-233/234	0.982	0.884	0.10 pCi/g (≤ 1.0 pCi/g)
U-235/236	0.0296	0.0168 U	0.01 ↓ (↓)
U-238	0.891	0.977	0.09 ↓ (↓)

Isotopes	Activity (pCi/g)		by difference RPD
	10	11	
U-233/234	0.838	0.962	0.12 pCi/g (≤ 1.0 pCi/g)
U-235/236	0.0481	0.0268 U	0.02 ↓ (↓)
U-238	0.955	0.816	0.14 ↓ (↓)

Isotopes	Activity ()		RPD

Isotopes	Activity ()		RPD

**Laboratory Data Consultants, Inc.
Data Validation Report**

Project/Site Name: BRC Tronox Parcel C/D
Collection Date: November 9 through December 12, 2007
LDC Report Date: February 4, 2008
Matrix: Soil
Parameters: Isotopic Uranium
Validation Level: EPA Level III
Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): F7L210241

Sample Identification

TSB-CR-07-0'
TSB-CR-07-10'
TSB-CJ-08-0'
TSB-CJ-08-0'-FD
TSB-CJ-08-10'
TSB-CJ-04-0'
TSB-CJ-04-10'
TSB-CJ-07-0'
TSB-CJ-07-10'
TSB-CJ-03-0'
TSB-CJ-03-10'
TSB-CJ-02-0'
TSB-CJ-02-10'
TSB-CJ-01-0'
TSB-CJ-01-10'
TSB-CJ-01-0'-FD
TSB-CR-02-0'
TSB-CR-02-10'
TSB-CR-01-0'
TSB-CR-01-10'
TSB-CR-01-0'DUP

Introduction

This data review covers 21 soil samples listed on the cover sheet. The analyses were per Method RICH-RC5067 for Isotopic Uranium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section VIII.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
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- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UU Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

All criteria for the initial calibration were met.

Detector efficiency was determined for each radionuclide of interest.

b. Continuing Calibration

Calibration verification and background determination were performed at the required frequencies. Results were within control limits.

III. Blanks

Method blanks were reviewed for each matrix as applicable. Blank results contained less than the minimum detectable activity (MDA).

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Matrix Spike/(Matrix Spike) Duplicate

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not required by the method.

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

b. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

c. Tracer Recovery

All tracer recoveries were within validation criteria.

V. Minimum Detectable Activity (MDA)

All minimum detectable activities met required detection limits.

VI. Sample Result Verification

Raw data were not reviewed for this SDG.

VII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

VIII. Field Duplicates

Samples TSB-CJ-08-0' and TSB-CJ-08-0'-FD and samples TSB-CJ-01-0' and TSB-CJ-01-0'-FD were identified as field duplicates. No isotopic uranium was detected in any of the samples with the following exceptions:

Compound	Concentration (pCi/g)		Difference (Limits)	Flag	A or P
	TSB-CJ-08-0'	TSB-CJ-08-0'-FD			
U-233/234	1.53	1.15	0.38 (≤ 1.0)	-	-
U-235/236	0.0438	0.0358	0.01 (≤ 1.0)	-	-
U-238	0.970	0.984	0.01 (≤ 1.0)	-	-

Compound	Concentration (pCi/g)		Difference (Limits)	Flag	A or P
	TSB-CJ-01-0'	TSB-CJ-01-0'-FD			
U-233/234	1.47	1.50	0.03 (≤ 1.0)	-	-
U-235/236	0.0330	0.0222U	0.01 (≤ 1.0)	-	-
U-238	1.29	1.11	0.18 (≤ 1.0)	-	-

**BRC Tronox Parcel C/D
Isotopic Uranium - Data Qualification Summary - SDG F7L210241**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel C/D
Isotopic Uranium - Laboratory Blank Data Qualification Summary - SDG F7L210241**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel C/D
Isotopic Uranium - Field Blank Data Qualification Summary - SDG F7L210241**

No Sample Data Qualified in this SDG

LDC #: 18215B59
 SDG #: F7L210241
 Laboratory: TestAmerica, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1-31-08
 Page: 1 of 1
 Reviewer: MG
 2nd Reviewer:

9m2
METHOD: Isotopic Uranium (EPA Method 908/Method RICH-RC5067)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11-9-07 through 12-12-07
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IVa.	Matrix Spike/(Matrix Spike) Duplicates	A	DUP
IVa.	Laboratory control samples	A	LCS
V.	Tracer Recovery	A	
VI.	Minimum Detectable Activity (MDA)	A	
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D = 3+4, D = 14+16
X.	Field blanks	N	

Note: A = Acceptable
 N = Not provided/applicable
 SW = See worksheet
 ND = No compounds detected
 R = Rinsate
 FB = Field blank
 D = Duplicate
 TB = Trip blank
 EB = Equipment blank

Validated Samples:
all soil

1	TSB-CR-07-0'	11	TSB-CJ-03-10'	21	TSB-CR-01-0'DUP	31
2	TSB-CR-07-10'	12	TSB-CJ-02-0'	22		32
3	TSB-CJ-08-0'	13	TSB-CJ-02-10'	23		33
4	TSB-CJ-08-0'FB - FD	14	TSB-CJ-01-0'	24		34
5	TSB-CJ-08-10'	15	TSB-CJ-01-10'	25		35
6	TSB-CJ-04-0'	16	TSB-CJ-01-0'FB - FD	26		36
7	TSB-CJ-04-10'	17	TSB-CR-02-0'	27		37
8	TSB-CJ-07-0'	18	TSB-CR-02-10'	28		38
9	TSB-CJ-07-10'	19	TSB-CR-01-0'	29		39
10	TSB-CJ-03-0'	20	TSB-CR-01-10'	30		40

Notes: Total dissolution prep. method

LDC #: 18215B59
 SDG #: F7L210241

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
 Reviewer: MG
 2nd reviewer: [Signature]

METHOD: Radiochemistry (Method: RICH-RC-5067)

N N/A Were field duplicate pairs identified in this SDG?
 N N/A Were target isotopes detected in the field duplicate pairs?

Isotopes	Activity (pCi/g)		by difference RPD
	3	4	
U-233/234	1.53	1.15	0.38 pCi/g (≤ 1.0 pCi/g)
U-235/236	0.0438	0.0358	0.01 ↓ (↓)
U-238	0.970	0.984	0.01 ↓ (↓)

Isotopes	Activity (pCi/g)		by difference RPD
	14	16	
U-233/234	1.47	1.50	0.03 pCi/g (≤ 1.0 pCi/g)
U-235/236	0.0330	0.0222 U	0.01 ↓ (↓)
U-238	1.29	1.11	0.18 ↓ (↓)

Isotopes	Activity ()		RPD

Isotopes	Activity ()		RPD

**Laboratory Data Consultants, Inc.
Data Validation Report**

Project/Site Name: BRC Tronox Parcel C/D
Collection Date: November 9 through November 16, 2007
LDC Report Date: February 1, 2008
Matrix: Soil
Parameters: Isotopic Uranium
Validation Level: EPA Level III
Laboratory: TestAmerica, Inc.
Sample Delivery Group (SDG): F7L210269

Sample Identification

TSB-FJ-03-0'	TSB-FJ-03-0'DUP
TSB-FJ-03-0'-FD	TSB-FR-02-0'MS
TSB-FJ-03-10'	TSB-FR-02-0'MSD
TSB-FJ-10-0'	
TSB-FJ-10-10'	
TSB-FJ-04-0'	
TSB-FJ-02-0'	
TSB-FJ-02-0'-FD	
TSB-FJ-02-10'	
TSB-FR-02-0'	
TSB-FR-02-10'	
TSB-FJ-09-0'	
TSB-FJ-09-10'	
TSB-FR-03-0'	
TSB-FR-03-10'	
TSB-FJ-08-0'	
TSB-FJ-08-10'	
TSB-FR-05-0'	
TSB-FR-05-10'	
TSB-FR-04-0'	

Introduction

This data review covers 23 soil samples listed on the cover sheet. The analyses were per Method RICH-RC5067 for Isotopic Uranium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section VIII.

Raw data were not reviewed for this SDG. The review was based on QC data.

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- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UU Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

All criteria for the initial calibration were met.

Detector efficiency was determined for each radionuclide of interest.

b. Continuing Calibration

Calibration verification and background determination were performed at the required frequencies. Results were within control limits.

III. Blanks

Method blanks were reviewed for each matrix as applicable. Blank results contained less than the minimum detectable activity (MDA).

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Matrix Spike/(Matrix Spike) Duplicate

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

b. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

c. Tracer Recovery

All tracer recoveries were within validation criteria.

V. Minimum Detectable Activity (MDA)

All minimum detectable activities met required detection limits.

VI. Sample Result Verification

Raw data were not reviewed for this SDG.

VII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

VIII. Field Duplicates

Samples TSB-FJ-03-0' and TSB-FJ-03-0'-FD, samples TSB-FJ-02-0' and TSB-FJ-02-0'-FD, and samples TSB-FR-04-0' and TSB-FR-04-0'-FD (from SDG F7L210278) were identified as field duplicates. No isotopic uranium was detected in any of the samples with the following exceptions:

Compound	Concentration (pCi/g)		Difference (Limits)	Flag	A or P
	TSB-FJ-03-0'	TSB-FJ-03-0'-FD			
U-233/234	0.809	1.08	27 (≤ 1.0)	-	-
U-235/236	0.0409	0.0324	0.01 (≤ 1.0)	-	-
U-238	0.868	1.08	0.21 (≤ 1.0)	-	-

Compound	Concentration (pCi/g)		Difference (Limits)	Flag	A or P
	TSB-FJ-02-0'	TSB-FJ-02-0'-FD			
U-233/234	1.07	0.725	0.34 (≤ 1.0)	-	-
U-235/236	0.0420	0.0373	0.00 (≤ 1.0)	-	-
U-238	0.957	0.770	0.19 (≤ 1.0)	-	-

Compound	Concentration (pCi/g)		Difference (Limits)	Flag	A or P
	TSB-FR-04-0'	TSB-FR-04-0'-FD			
U-233/234	0.962	1.38	0.42 (≤ 1.0)	-	-
U-235/236	0.0468	0.0751	0.03 (≤ 1.0)	-	-

Compound	Concentration (pCi/g)		Difference (Limits)	Flag	A or P
	TSB-FR-04-0'	TSB-FR-04-0'-FD			
U-238	0.954	1.15	0.20 (≤ 1.0)	-	-

**BRC Tronox Parcel C/D
Isotopic Uranium - Data Qualification Summary - SDG F7L210269**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel C/D
Isotopic Uranium - Laboratory Blank Data Qualification Summary - SDG F7L210269**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel C/D
Isotopic Uranium - Field Blank Data Qualification Summary - SDG F7L210269**

No Sample Data Qualified in this SDG

gmH
METHOD: Isotopic Uranium (EPA Method 908/Method RICH-RC5067)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

Validation Area			Comments
I.	Technical holding times	A	Sampling dates: 11-9-07 through 11-16-07
Ila.	Initial calibration	A	
Ilb.	Calibration verification	A	
III.	Blanks	A	
IVa.	Matrix Spike/(Matrix Spike) Duplicates	A	MS/MSD/DUP
IVa.	Laboratory control samples	A	LCS
V.	Tracer Recovery	A	
VI.	Minimum Detectable Activity (MDA)	A	
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D = 1+2, D = 7+8 D = 20 + TSB-FR-04-0'-FD
X	Field blanks	N	(SDG: F7L210278)

Note: A = Acceptable ND = No compounds detected D = Duplicate
 N = Not provided/applicable R = Rinsate TB = Trip blank
 SW = See worksheet FB = Field blank EB = Equipment blank

Validated Samples:
all soil

1	TSB-FJ-03-0'	11	TSB-FR-02-10'	21	TSB-FJ-03-0'DUP	31	
2	TSB-FJ-03-0'-FD	12	TSB-FJ-09-0'	22	TSB-FR-02-0'MS	32	
3	TSB-FJ-03-10'	13	TSB-FJ-09-10'	23	TSB-FR-02-0'MSD	33	
4	TSB-FJ-10-0'	14	TSB-FR-03-0'	24	PBS	34	
5	TSB-FJ-10-10'	15	TSB-FR-03-10'	25		35	
6	TSB-FJ-04-0'	16	TSB-FJ-08-0'	26		36	
7	TSB-FJ-02-0'	17	TSB-FJ-08-10'	27		37	
8	TSB-FJ-02-0'-FD	18	TSB-FR-05-0'	28		38	
9	TSB-FJ-02-10'	19	TSB-FR-05-10'	29		39	
10	TSB-FR-02-0'	20	TSB-FR-04-0'	30		40	

Notes: Total dissolution prep. method

VALIDATION FINDINGS WORKSHEET
 Field Duplicates

METHOD: Radiochemistry (Method: RICH-RC-5067)

- N N/A Were field duplicate pairs identified in this SDG?
 N N/A Were target isotopes detected in the field duplicate pairs?

Isotopes	Activity (pCi/g)		by difference RPD
	1	2	
U-233/234	0.809	1.08	0.27 pCi/g (≤ 1.0 pCi/g)
U-235/236	0.0409	0.0324	0.01 ↓ (↓)
U-238	0.868	1.08	0.21 ↓ (↓)

Isotopes	Activity (pCi/g)		by difference RPD
	7	8	
U-233/234	1.07	0.725	0.34 pCi/g (≤ 1.0 pCi/g)
U-235/236	0.0420	0.0373	0.00 ↓ (↓)
U-238	0.957	0.770	0.19 ↓ (↓)

Isotopes	Activity (pCi/g)		by difference RPD
	20	TSB-FR-04-0'-FD	
U-233/234	0.962	1.38	0.42 pCi/g (≤ 1.0 pCi/g)
U-235/236	0.0468	0.0751	0.03 ↓ (↓)
U-238	0.954	1.15	0.20 ↓ (↓)

Isotopes	Activity ()		RPD

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: BRC Tronox Parcel C/D
Collection Date: November 16 through November 19, 2007
LDC Report Date: February 1, 2008
Matrix: Soil
Parameters: Isotopic Uranium
Validation Level: EPA Level III
Laboratory: TestAmerica, Inc.
Sample Delivery Group (SDG): F7L210278

Sample Identification

TSB-GR-02-0'	TSB-GR-02-0'DUP
TSB-GR-02-0'-FD	TSB-GJ-04-0'MS
TSB-GR-02-5'	TSB-GJ-04-0'MSD
TSB-GJ-04-0'	
TSB-GJ-04-5'	
TSB-GJ-02-0'	
TSB-GJ-02-0'-FD	
TSB-GJ-02-05'	
TSB-GJ-07-0'	
TSB-GJ-07-5'	
TSB-GJ-05-0'	
TSB-GJ-05-5'	
TSB-GJ-03-0'	
TSB-GJ-03-5'	
TSB-FR-04-0'-FD	
TSB-FR-04-10'	
TSB-GR-01-0'	
TSB-GR-01-5'	
TSB-GJ-06-0'	
TSB-GJ-06-5'	

Introduction

This data review covers 23 soil samples listed on the cover sheet. The analyses were per Method RICH-RC5067 for Isotopic Uranium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section VIII.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

All criteria for the initial calibration were met.

Detector efficiency was determined for each radionuclide of interest.

b. Continuing Calibration

Calibration verification and background determination were performed at the required frequencies. Results were within control limits.

III. Blanks

Method blanks were reviewed for each matrix as applicable. Blank results contained less than the minimum detectable activity (MDA).

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Matrix Spike/(Matrix Spike) Duplicate

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

b. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

c. Tracer Recovery

All tracer recoveries were within validation criteria.

V. Minimum Detectable Activity (MDA)

All minimum detectable activities met required detection limits.

VI. Sample Result Verification

Raw data were not reviewed for this SDG.

VII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

VIII. Field Duplicates

Samples TSB-GR-02-0' and TSB-GR-02-0'-FD, samples TSB-GJ-02-0' and TSB-GJ-02-0'-FD, and samples TSB-FR-04-0'-FD and TSB-FR-04-0' (from SDG F7L210269) were identified as field duplicates. No isotopic uranium was detected in any of the samples with the following exceptions:

Compound	Concentration (pCi/g)		Difference (Limits)	Flag	A or P
	TSB-GR-02-0'	TSB-GR-02-0'-FD			
U-233/234	0.969	1.00	0.03 (≤ 1.0)	-	-
U-235/236	0.0710	0.0362U	0.03 (≤ 1.0)	-	-
U-238	0.846	0.976	0.13 (≤ 1.0)	-	-

Compound	Concentration (pCi/g)		Difference (Limits)	Flag	A or P
	TSB-GJ-02-0'	TSB-GJ-02-0'-FD			
U-233/234	1.98	1.46	0.52 (≤ 1.0)	-	-
U-235/236	0.0505U	0.0500	0.00 (≤ 1.0)	-	-
U-238	1.55	1.28	0.27 (≤ 1.0)	-	-

Compound	Concentration (pCi/g)		Difference (Limits)	Flag	A or P
	TSB-FR-04-0'-FD	TSB-FR-04-0'			
U-233/234	1.38	0.962	0.42 (≤ 1.0)	-	-
U-235/236	0.0751	0.0468	0.03 (≤ 1.0)	-	-

Compound	Concentration (pCi/g)		Difference (Limits)	Flag	A or P
	TSB-FR-04-0'-FD	TSB-FR-04-0'			
U-238	1.15	0.954	0.20 (≤ 1.0)	-	-

**BRC Tronox Parcel C/D
Isotopic Uranium - Data Qualification Summary - SDG F7L210278**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel C/D
Isotopic Uranium - Laboratory Blank Data Qualification Summary - SDG F7L210278**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel C/D
Isotopic Uranium - Field Blank Data Qualification Summary - SDG F7L210278**

No Sample Data Qualified in this SDG

METHOD: Isotopic Uranium (EPA Method ~~908~~ / Method RICH-RC5067)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

Validation Area			Comments
I.	Technical holding times	A	Sampling dates: 11-16-07 through 11-19-07
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IVa.	Matrix Spike/(Matrix Spike) Duplicates	A	MS/MSD/DUP
IVa.	Laboratory control samples	A	LCS
V.	Tracer Recovery	A	
VI.	Minimum Detectable Activity (MDA)	A	
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D = 1+2, D = 6+7 D = 15+TSB-FR-04-0'
X.	Field blanks	N	(SDG: F7L210269)

Note: A = Acceptable ND = No compounds detected D = Duplicate
 N = Not provided/applicable R = Rinsate TB = Trip blank
 SW = See worksheet FB = Field blank EB = Equipment blank

Validated Samples: all soil

1	TSB-GR-02-0'	11	TSB-GJ-05-0'	21	TSB-GR-02-0'DUP	31	
2	TSB-GR-02-0'-FD	12	TSB-GJ-05-5'	22	TSB-GJ-04-0'MS	32	
3	TSB-GR-02-5'	13	TSB-GJ-03-0'	23	TSB-GJ-04-0'MSD	33	
4	TSB-GJ-04-0'	14	TSB-GJ-03-5'	24	PBS	34	
5	TSB-GJ-04-5'	15	TSB-FR-04-0'-FD	25		35	
6	TSB-GJ-02-0'	16	TSB-FR-04-10'	26		36	
7	TSB-GJ-02-0'-FD	17	TSB-GR-01-0'	27		37	
8	TSB-GJ-02-05'	18	TSB-GR-01-5'	28		38	
9	TSB-GJ-07-0'	19	TSB-GJ-06-0'	29		39	
10	TSB-GJ-07-5'	20	TSB-GJ-06-5'	30		40	

Notes: Total dissolution prep. method

LDC #: 18215D59
 SDG #: F7L210278

VALIDATION FINDINGS WORKSHEET
 Field Duplicates

Page: 1 of 1
 Reviewer: MG
 2nd reviewer:

METHOD: Radiochemistry (Method: RICH-RC-5067)

N N/A Were field duplicate pairs identified in this SDG?
 N N/A Were target isotopes detected in the field duplicate pairs?

Isotopes	Activity (pCi/g)		by difference -RPD-
	1	2	
U-233/234	0.969	1.00	0.03 pCi/g (≤ 1.0 pCi/g)
U-235/236	0.0710	0.0362 U	0.03 ↓ (↓)
U-238	0.846	0.976	0.13 ↓ (↓)

Isotopes	Activity (pCi/g)		by difference -RPD-
	6	7	
U-233/234	1.98	1.46	0.52 pCi/g (≤ 1.0 pCi/g)
U-235/236	0.0505 U	0.0500	0.00 ↓ (↓)
U-238	1.55	1.28	0.27 ↓ (↓)

Isotopes	Activity (pCi/g)		by difference RPD
	15	TSB-FR-04-0'	
U-233/234	1.38	0.962	0.42 pCi/g (≤ 1.0 pCi/g)
U-235/236	0.0751	0.0468	0.03 ↓ (↓)
U-238	1.15	0.954	0.20 ↓ (↓)

Isotopes	Activity ()		RPD

**Laboratory Data Consultants, Inc.
Data Validation Report**

Project/Site Name: BRC Tronox Parcel C/D
Collection Date: November 13 through November 14, 2007
LDC Report Date: February 1, 2008
Matrix: Soil
Parameters: Isotopic Uranium
Validation Level: EPA Level IV
Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): F7L210330

Sample Identification

TSB-CR-05-0'
TSB-CR-05-10'
TSB-CR-06-0'
TSB-CR-06-10'
TSB-FR-01-0'
TSB-FR-01-10'
TSB-FJ-07-0'
TSB-FJ-07-10'
TSB-FJ-06-0'
TSB-FJ-06-0'-FD
TSB-FJ-06-10'
TSB-FJ-05-0'
TSB-FJ-05-10'
TSB-DR-01-0'
TSB-DR-01-10'
TSB-DR-02-0'
TSB-DR-02-10'
TSB-DR-02-0'-FD
NW DITCH01-0'
NW DITCH01-10'
TSB-CR-05-0'DUP

Introduction

This data review covers 21 soil samples listed on the cover sheet. The analyses were per Method RICH-RC5067 for Isotopic Uranium.

The review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section VIII.

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UU Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

All criteria for the initial calibration were met.

Detector efficiency was determined for each radionuclide of interest.

b. Continuing Calibration

Calibration verification and background determination were performed at the required frequencies. Results were within control limits.

III. Blanks

Method blanks were reviewed for each matrix as applicable. Blank results contained less than the minimum detectable activity (MDA).

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Matrix Spike/(Matrix Spike) Duplicate

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not required by the method.

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

b. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

c. Tracer Recovery

All tracer recoveries were within validation criteria.

V. Minimum Detectable Activity (MDA)

All minimum detectable activities met required detection limits.

VI. Sample Result Verification

All sample result verifications were acceptable.

VII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

VIII. Field Duplicates

Samples TSB-FJ-06-0' and TSB-FJ-06-0'-FD and samples TSB-DR-02-0' and TSB-DR-02-0'-FD were identified as field duplicates. No isotopic uranium was detected in any of the samples with the following exceptions:

Compound	Concentration (pCi/g)		Difference (Limits)	Flag	A or P
	TSB-FJ-06-0'	TSB-FJ-06-0'-FD			
U-233/234	0.937	1.18	0.24 (≤ 1.0)	-	-
U-235/236	0.0728	0.0239U	0.05 (≤ 1.0)	-	-
U-238	0.836	1.02	0.18 (≤ 1.0)	-	-

Compound	Concentration (pCi/g)		Difference (Limits)	Flag	A or P
	TSB-DR-02-0'	TSB-DR-02-0'-FD			
U-233/234	1.02	1.30	0.28 (≤ 1.0)	-	-
U-235/236	0.0136U	0.0368	0.02 (≤ 1.0)	-	-
U-238	1.03	1.05	0.02 (≤ 1.0)	-	-

**BRC Tronox Parcel C/D
Isotopic Uranium - Data Qualification Summary - SDG F7L210330**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel C/D
Isotopic Uranium - Laboratory Blank Data Qualification Summary - SDG F7L210330**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel C/D
Isotopic Uranium - Field Blank Data Qualification Summary - SDG F7L210330**

No Sample Data Qualified in this SDG

9m

METHOD: Isotopic Uranium (EPA Method 909/Method RICH-RC5067)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

Validation Area			Comments
I.	Technical holding times	A	Sampling dates: 11-13-07 through 11-14-07
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IVa.	Matrix Spike/(Matrix Spike) Duplicates	A	DUP
IVa.	Laboratory control samples	A	LCS
V.	Tracer Recovery	A	
VI.	Minimum Detectable Activity (MDA)	A	
VII.	Sample result verification	A	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D = 9+10, D = 16+18
X.	Field blanks	N	

Note: A = Acceptable ND = No compounds detected D = Duplicate
 N = Not provided/applicable R = Rinsate TB = Trip blank
 SW = See worksheet FB = Field blank EB = Equipment blank

Validated Samples:

all soil

1	TSB-CR-05-0'	11	TSB-FJ-06-10'	21	TSB-CR-05-0'DUP	31	
2	TSB-CR-05-10'	12	TSB-FJ-05-0'	22	PBS	32	
3	TSB-CR-06-0'	13	TSB-FJ-05-10'	23		33	
4	TSB-CR-06-10'	14	TSB-DR-01-0'	24		34	
5	TSB-FR-01-0'	15	TSB-DR-01-10'	25		35	
6	TSB-FR-01-10'	16	TSB-DR-02-0'	26		36	
7	TSB-FJ-07-0'	17	TSB-DR-02-10'	27		37	
8	TSB-FJ-07-10'	18	TSB-DR-02-0'-FD	28		38	
9	TSB-FJ-06-0'	19	NW DITCH01-0'	29		39	
10	TSB-FJ-06-0'-FD	20	NW DITCH01-10'	30		40	

Notes: Total dissolution prep. method

LDC #: 18215E59
 SDG #: F7L210330

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
 Reviewer: MG
 2nd Reviewer: W

Method: Radiochemistry (EPA Method RICH-RC-5067)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
II. Calibration				
Were all instruments and detectors calibration as required?	✓			
Were NIST traceable standards used for all calibrations?	✓			
Was the check source identified by activity and radionuclide?	✓			
Were check sources including background counts analyzed at the required frequency and within laboratory control limits?	✓			
III. Blanks				
Were blank analyses performed as required?	✓			
Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spikes and Duplicates				
Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. <u>Soil</u> Water.		✓		
Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			✓	
Was a duplicate sample analyzed at the required frequency of 5% in this SDG?	✓			
Were all duplicate sample duplicate error ratios (DER) $\leq \pm 42\%$. <u>2.58</u>	✓			
V. Laboratory control samples				
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%?	✓			
VI. Sample Chemical/Carrier Recovery				
Was a tracer/carrier added to each sample?	✓			
Were tracer/carrier recoveries within the QC limits?	✓			
VII. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
VIII. Sample Result Verification				
Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were the Minimum Detectable Activities (MDA) < RL?	✓			

LDC #: 10215E59
SDG #: F7L210330

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MG
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
IX: Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
X: Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
XI: Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 18215E59
 SDG #: F7L210330

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
 Reviewer: MG
 2nd reviewer: ✓

METHOD: Radiochemistry (Method: RICH-RC-5067)

- N N/A Were field duplicate pairs identified in this SDG?
 N N/A Were target isotopes detected in the field duplicate pairs?

Isotopes	Activity (PCi/g)		by difference -RPD-
	9	10	
U-233/234	0.937	1.18	0.24 PCi/g (≤ 1.0 PCi/g)
U-235/236	0.0728	0.0239 U	0.05 ↓ (↓)
U-238	0.836	1.02	0.18 ↓ (↓)

Isotopes	Activity (PCi/g)		by difference RPD-
	16	18	
U-233/234	1.02	1.30	0.28 PCi/g (≤ 1.0 PCi/g)
U-235/236	0.0136 U	0.0368	0.02 ↓ (↓)
U-238	1.03	1.05	0.02 ↓ (↓)

Isotopes	Activity ()		RPD

Isotopes	Activity ()		RPD

LDC #: 18215 E59
 SDG #: F7L210330

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
 Reviewer: MG
 2nd Reviewer: W

METHOD: Radiochemistry (Method: RICH-RC-5067)

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recalculated using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$
 Where, Found = activity of each analyte measured in the analysis of the sample.
 True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$
 Where, S = Original sample activity
 D = Duplicate sample activity

Sample ID	Type of Analysis	Analyte	Found/S (units)	True/D (units)	Recalculated		Reported		Acceptable (Y/N)
					%R or RPD	%R or RPD			
LCS	Laboratory control sample	U-233/234	1.62 (pci/g)	1.71 (pci/g)	95	95			Y
-	Matrix spike sample	-	-	-	-	-			-
21	Duplicate RPD	U-238	0.838 (pci/g) ± 0.10 (1σ)	0.985 (pci/g) ± 0.12 (1σ)	RER 2 0.9	RER 2 0.9			Y
1	Chemical recovery	U-232	8.5200 (dpm)	9.9971 (dpm)	85	85			↓

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18215E59
SDG #: F7L210330

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MG
2nd reviewer: W

METHOD: Radiochemistry (Method: RICH-RC-5067)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

- N N/A Have results been reported and calculated correctly?
 N N/A Are results within the calibrated range of the instruments?

Analyte results for # 11, U-233/234 reported with a positive detect were recalculated and verified using the following equation:

Activity =

Recalculation:

$$\frac{(\text{cpm} - \text{bckgrd cpm})}{(2.22)(E)(\text{Vol})(\text{CF})}$$

$$\left(\frac{357}{200.067}\right) - 0$$

$$(2.22)(0.38329)(1.00\text{g})(0.82) = 2.557 \text{ pCi/g}$$

E = Efficiency

Vol = Volume

CF = %R, Self-absorbance, abundance, ect.

#	Sample ID	Analyte	Reported Concentration (pCi/g)	Calculated Concentration (pCi/g)	Acceptable (Y/N)
1	1	U-233/234	0.951	0.954	Y
		U-238	0.838	0.841	
2	11	U-233/234	2.56	2.56	
		U-235/236	0.0787	0.0788	
		U-238	1.77	1.77	↓

Note: _____

