



LABORATORY DATA CONSULTANTS, INC.

7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

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

April 15, 2008

SUBJECT: BRC Tronox Parcel H, Data Validation

Dear Ms. Barajas-Albalawi

Enclosed are the final validation reports for the fractions listed below. This SDG was received on April 1, 2008. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 18536:

<u>SDG #</u>	<u>Fraction</u>
F8A250205	Radium-226 & Radium-228, Isotopic Uranium & Isotopic Thorium

The data validation was performed under EPA Level III 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

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

Project/Site Name: BRC Tronox Parcel H
Collection Date: January 24, 2008
LDC Report Date: April 9, 2008
Matrix: Soil
Parameters: Isotopic Uranium & Isotopic Thorium
Validation Level: EPA Level III
Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): F8A250205

Sample Identification

TSB-HJ-05-10'
TSB-HJ-05-0'
TSB-HR-04-10'
TSB-HJ-04-0'
TSB-HR-07-0'
TSB-HJ-04-10'
TSB-HR-04-0'
TSB-HR-07-10'
TSB-HR-06-0'
TSB-HR-06-10'
TSB-HJ-07-0'
TSB-HJ-07-0'-FD
TSB-HJ-07-10'
TSB-HR-08-0'
TSB-HR-08-10'
TSB-HR-08-0'MS
TSB-HR-08-0'DUP

Introduction

This data review covers 17 soil samples listed on the cover sheet. The analyses were per Method RICH-RC5067 for Isotopic Uranium and Method RICH-RC5087 for Isotopic Thorium.

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.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. 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.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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 sample data were qualified based on the contaminants found in the method blanks.

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-HJ-07-0' and TSB-HJ-07-0'-FD were identified as field duplicates. No isotopic uranium or isotopic thorium was detected in any of the samples with the following exceptions:

Isotope	Activity (pCi/g)		RPD (Limits)	Difference (Limits)	Flag	A or P
	TSB-HJ-07-0'	TSB-HJ-07-0'-FD				
Uranium-233/234	1.07	1.11	-	0.04 (≤ 1.00)	-	-
Uranium-235/236	0.0520	0.0451	-	0.01 (≤ 1.00)	-	-
Uranium-238	1.11	0.21 (1.2)	-	0.10 (≤ 1.00)	-	-
Thorium-228	2.25	2.62	15 (≤ 50)	-	-	-
Thorium-230	1.06	1.31	21 (≤ 50)	-	-	-
Thorium-232	1.93	2.55	28 (≤ 50)	-	-	-

**BRC Tronox Parcel H
Isotopic Uranium & Isotopic Thorium - Data Qualification Summary - SDG F8A250205**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel H
Isotopic Uranium & Isotopic Thorium - Laboratory Blank Data Qualification Summary -
SDG F8A250205**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel H
Isotopic Uranium & Isotopic Thorium - Field Blank Data Qualification Summary - SDG
F8A250205**

No Sample Data Qualified in this SDG

LDC #: 18536A59
 SDG #: F8A250205
 Laboratory: Test America

VALIDATION COMPLETENESS WORKSHEET
 Level III

Date: 4-4-08
 Page: 1 of 1
 Reviewer: MG
 2nd Reviewer:

MA
METHOD: Isotopic Uranium (EPA Method 9090/Method RICH-RC5067), Isotopic Thorium (Method RICH-RC-5087)

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: 1-24-08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IVa.	Matrix Spike/(Matrix Spike) Duplicates	A	DUP/MS
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 = 11 + 12
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-HJ-05-10'	11	TSB-HJ-07-0'	21		31	
2	TSB-HJ-05-0'	12	TSB-HJ-07-0'-FD	22		32	
3	TSB-HR-04-10'	13	TSB-HJ-07-10'	23		33	
4	TSB-HJ-04-0'	14	TSB-HR-08-0'	24		34	
5	TSB-HR-07-0'	15	TSB-HR-08-10'	25		35	
6	TSB-HJ-04-10'	16	TSB-HR-08-0'MS	26		36	
<i>MA</i> 7	TSB-HR-07-0'	17	TSB-HR-08-0'DUP	27		37	
8	TSB-HR-07-10'	18	PBS	28		38	
9	TSB-HR-06-0'	19		29		39	
10	TSB-HR-06-10'	20		30		40	

Notes: _____

VALIDATION FINDINGS WORKSHEET
 Field Duplicates

METHOD: Radiochemistry (Method: see cover)

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
	11	12	
U-233/234	1.07	1.11	0.04 pCi/g (≤ 1.00 pCi/g)
U-235/236	0.0520	0.0451	0.01 ()
U-238	1.11	1.21	0.10 ↓ (↓)

Isotopes	Activity (pCi/g)		RPD
	11	12	
Th-228	2.25	2.62	15 (≤ 50)
Th-230	1.06	1.31	21 ()
Th-232	1.93	2.55	26 28 (↓) 99%

Isotopes	Activity ()		RPD

Isotopes	Activity ()		RPD

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

Project/Site Name: BRC Tronox Parcel H
Collection Date: January 24, 2008
LDC Report Date: April 9, 2008
Matrix: Soil
Parameters: Radium-226 & Radium-228
Validation Level: EPA Level III & IV
Laboratory: TestAmerica, Inc.
Sample Delivery Group (SDG): F8A250205

Sample Identification

TSB-HJ-05-10'
TSB-HJ-05-0'
TSB-HR-04-10'
TSB-HJ-04-0'
TSB-HR-07-0'
TSB-HJ-04-10'
TSB-HR-04-0'
TSB-HR-07-10'
TSB-HR-06-0'
TSB-HR-06-10'
TSB-HJ-07-0'
TSB-HJ-07-0'-FD
TSB-HJ-07-10'
TSB-HR-08-0'
TSB-HR-08-10'
TSB-HR-08-0'MS
TSB-HR-08-0'DUP

Introduction

This data review covers 17 soil samples listed on the cover sheet. The analyses were per EPA Method 903.1/Method RICH-RC5005 for Radium-226 and EPA Method 904.0/Method RICH-RC5005 for Radium-228.

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.
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- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. 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.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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 detector and each radionuclide.

Self absorption factors were determined for each sample when applicable.

b. Continuing Calibration

Calibration verification and background determination were performed at the required frequencies. Results were within laboratory 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 Duplicates

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 with the following exceptions:

DUP ID (Associated Samples)	Analyte	DER (Limits)	Flag	A or P
TSB-HJ-02-10'DUP (TSB-HJ-07-10' TSB-HR-08-10')	Radium-228	2.60 (≤ 2.58)	J (all detects) UJ (all non-detects)	A

b. Laboratory Control Samples

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

c. Chemical Recovery

All chemical recoveries were within validation criteria.

V. Minimum Detectable Activity

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-HJ-07-0' and TSB-HJ-07-0'-FD were identified as field duplicates. No radium-226 or radium-228 was detected in any of the samples with the following exceptions:

Isotope	Activity (pCi/g)		RPD (Limits)	Difference (Limits)	Flag	A or P
	TSB-HJ-07-0'	TSB-HJ-07-0'-FD				
Radium-226	1.26	1.52	-	0.26 (≤ 1.00)	-	-
Radium-228	2.32	3.01	-	0.69 (≤ 2.00)	-	-

**BRC Tronox Parcel H
Radium-226 & Radium-228 - Data Qualification Summary - SDG F8A250205**

SDG	Sample	Isotope	Flag	A or P	Reason
F8A250205	TSB-HJ-07-10' TSB-HR-08-10'	Radium-228	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (DER)

**BRC Tronox Parcel H
Radium-226 & Radium-228 - Laboratory Blank Data Qualification Summary - SDG F8A250205**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel H
Radium-226 & Radium-228 - Field Blank Data Qualification Summary - SDG F8A250205**

No Sample Data Qualified in this SDG

LDC #: 18536A29

VALIDATION COMPLETENESS WORKSHEET

Date: 4-4-08

SDG #: F8A250205

Level III

Page: 1 of 1

Laboratory: Test America

Reviewer: MG

2nd Reviewer: W

METHOD: Radium 226 (EPA Method 903.1/Method RICH-RC5005) Radium 228 (EPA Method 904.0/Method RICH-RC5005)

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: 1-24-08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IVa.	Matrix Spike/(Matrix Spike) Duplicates	SW	DUP (SDG: F8A260145) / MS
IVb.	Laboratory control samples	A	LCS
IVc.	Chemical recovery	A	
V.	Sample result verification	N	
VI.	Minimum detectable activity (MDA)	A	
VII.	Overall assessment of data	A	
VIII.	Field duplicates	SW	D = 11 + 12
XIV.	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	2	TSB-HJ-05-10'	11	2	TSB-HJ-07-0'	21		31	
2	2	TSB-HJ-05-0'	12	2	TSB-HJ-07-0'-FD	22		32	
3	2	TSB-HR-04-10'	13	1	TSB-HJ-07-10'	23		33	
4	2	TSB-HJ-04-0'	14	2	TSB-HR-08-0'	24		34	
5	2	TSB-HR-07-0'	15	1	TSB-HR-08-10'	25		35	
6	2	TSB-HJ-04-10'	16	2	TSB-HR-08-0'MS	26		36	
7	2	TSB-HR-07-0'	17	2	TSB-HR-08-0'DUP	27		37	
8	2	TSB-HR-07-10'	18	1	PBS 1	28		38	
9	2	TSB-HR-06-0'	19	2	PBS 2	29		39	
10	2	TSB-HR-06-10'	20			30		40	

Notes: _____

LDC #: 18536A29
 SDG #: F8A250205

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

METHOD: Radiochemistry (Method: see cover)

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 ($\mu\text{Ci/g}$)		by difference RPD
	11	12	
Ra-226	1.26	1.52	0.26 $\mu\text{Ci/g}$ ($\leq 1.00 \mu\text{Ci/g}$)
Ra-228	2.32	3.01	0.69 \downarrow ($\leq 2.00 \downarrow$)

Isotopes	Activity ()		RPD

Isotopes	Activity ()		RPD

Isotopes	Activity ()		RPD