LABORATORY DATA CONSULTANTS, INC.
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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:

SDG #	Fraction
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,

ERauto

Erlinda T. Rauto
Operations Manager/Senior Chemist

80/20

LDC #18536 (ERM-Sacramento / BRC Tronox Parcel H)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Iso. Thorium (5087)		Iso. U (5067)		Ra-226 (5005)		Ra-228 (5005)																									
Matrix: Water/Soil				W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	F8A250205	04/01/08	04/22/08	0	15	0	15	0	15	0	15																								
Total	T/LR			0	15	0	15	0	15	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60

Shaded cells indicate Level IV validation (all other cells are Level IIII validation). These sample counts do not include MS/MSD, and DUPs

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.

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 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~~ 1.21	-	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 **VALIDATION COMPLETENESS WORKSHEET** Date: 4-4-08
SDG #: F8A250205 Level III Page: 1 of 1
Laboratory: Test America Reviewer: MG
2nd Reviewer: ✓

METHOD: Isotopic Uranium (~~EPA Method 908/~~Method RICH-RC5067), Isotopic Thorium (Method RICH-RC-5087) MG

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
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-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	
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	

MG

Notes: _____

LDC #: 18536A59
SDG #: F8A250205

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: MG
2nd reviewer: W

METHOD: Radiochemistry (Method: see cover)

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

Isotopes	Activity (pCi/g) 11	Activity (pCi/g) 12	by difference ~~RPD~~
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) 11	Activity (pCi/g) 12	RPD
Th-228	2.25	2.62	15 (≤ 50)
Th-230	1.06	1.31	21 ( )
Th-232	1.93	2.55	~~0.6~~ 28 ( ) 9MH

Isotopes	Activity ( )	Activity ( )	RPD

Isotopes	Activity ( )	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.

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.

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 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 dectectable 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 (4)	TSB-HR-07-0'	17 2	TSB-HR-08-0'DUP	27		37	
8 2	TSB-HR-07-10'	18 1	PBS1	28		38	
9 2	TSB-HR-06-0'	19 2	PBS2	29		39	
10 2	TSB-HR-06-10'	20		30		40	

Notes: _____

LDC #: 18536A29
SDG #: F8A250205

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Reviewer: MG
2nd Reviewer:

METHOD: Radiochemistry (Method: See cover)

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

(Y) N N/A Was a duplicate sample analyzed the required frequency of 5% in this SDG?

Y (N) N/A Were all duplicate sample duplicate error ratio (DER) $\leq$ 1.42? $DER = \frac{|Act_1 - Act_2|}{2\,|\delta_1^2 + \delta_2^2|^{1/2}}$ Act = sample activity δ = 1 sigma error

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Duplicate ID	Matrix	Isotope	DER (Limits)	Associated Samples	Qualifications
1	TSB-HJ-02-10' DUP	soil	Ra-228	2.60 (≤ 2.58)	13, 15	J/UJ/A

Comments:

LDC #: 18536A29
SDG #: F8A250205

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: MG
2nd reviewer:

METHOD: Radiochemistry (Method: see cover)

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

Isotopes	Activity (pCi/g) 11	Activity (pCi/g) 12	by difference RPD
Ra-226	1.26	1.52	0.26 pCi/g (≤1.00 pCi/g)
Ra-228	2.32	3.01	0.69 ↓ (≤2.00 ↓)

Isotopes	Activity ( )		RPD

Isotopes	Activity ( )		RPD

Isotopes	Activity ( )		RPD