

LABORATORY DATA CONSULTANTS, INC.

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

July 31, 2008

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

SUBJECT: BRC Tronox Parcel C/D/F/G/H, Data Validation

Dear Ms. Barajas-Albalawi

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on July 17, 2008. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 19125:

SDG#	<u>Fraction</u>
210150, 210228, 210334	Perchlorate, Radium-226 & Radium-228, Isotopic Uranium & Isotopic Thorium

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 Organic Data Review, October 1999
- 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

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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: BRC Tronox Parcel C/D/F/G/H

Collection Date: June 10, 2008

LDC Report Date: July 29, 2008

Matrix: Soil

Parameters: Perchlorate

Validation Level: EPA Level III & IV

Laboratory: GEL Laboratories, LLC.

Sample Delivery Group (SDG): 210150

Sample Identification

TSB-FJ-06-02-10**

TSB-FJ-06-02-20

TSB-FJ-06-02-30**

TSB-FR-02-02-10

TSB-FR-02-02-10-FD

TSB-FR-02-02-20**

TSB-FR-02-02-30

TSB-FJ-02-02-10**

TSB-FJ-02-02-20

TSB-FJ-02-02-30

^{**}Indicates sample underwent EPA Level IV review

Introduction

This data review covers 10 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 314.0 for Perchlorate.

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 IX.

Samples indicated by a double asterisk on the front cover underwent a EPA Level IV review. A EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is 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.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No perchlorate was found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

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.

V. Duplicates

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

VI. Laboratory Control Samples

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

VII. Sample Result Verification

All sample result verifications were acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

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

IX. Field Duplicates

Samples TSB-FR-02-02-10 and TSB-FR-02-02-10-FD were identified as field duplicates. No perchlorate was detected in any of the samples with the following exceptions:

	Concentra	ation (ug/Kg)				
Analyte	TSB-FR-02-02-10	TSB-FR-02-02-10-FD	RPD (Limits)	Difference (Limits)	Flag	A or P
Perchlorate	62.8	61.0	-	1.8 (≤46.1)	-	-

BRC Tronox Parcel C/D/F/G/H Perchlorate - Data Qualification Summary - SDG 210150

No Sample Data Qualified in this SDG

BRC Tronox Parcel C/D/F/G/H Perchlorate - Laboratory Blank Data Qualification Summary - SDG 210150

No Sample Data Qualified in this SDG

BRC Tronox Parcel C/D/F/G/H Perchlorate - Field Blank Data Qualification Summary - SDG 210150

No Sample Data Qualified in this SDG

SDG Labor METI The s	#: 19125A6 #: 210150 ratory: GEL Laboratories HOD: (Analyte) Perchlora camples listed below were ation findings worksheets.	LLC te (El		Le 314.0)	evel III.	/IV							Pag eview eview	e: <u>(</u> of er: <u>/1(</u> er: <u>/</u> /	
	Validation	Area							C	omn	ents				
1.	Technical holding times			Α	Samplin	g da	tes:	6-	-10-						
lla.	Initial calibration			A											
IIb.	Calibration verification			Α											
III.	Blanks			A											
IV	Matrix Spike/Matrix Spike D	uplicat	es	Α	MS	1	SD	(50	0 G 5 .	210) 2 2 8	, 2103	334)	
V	Duplicates			A	DUF	>		(V	1)	
VI.	Laboratory control samples			Α	LCS	ŝ									
VII.	Sample result verification			A	Not revi	iewe	d for Le	evel III v	/alidatio	n.					
VIII.	Overall assessment of data			A											
IX.	Field duplicates			SW	D =	4	4 5								
Lx	Field blanks			7											
Note: Valida	A = Acceptable N = Not provided/applicable SW = See worksheet ted Samples: ** Indicates sample		R = Rin FB = Fi	eld blank		d	-		plicate rip blank quipme		nk				
1	TSB-FJ-06-02-10**	11	PBS		21						31				
2	TSB-FJ-06-02-20	12	, , , ,		22	1					32				
3	TSB-FJ-06-02-30**	13			23						33				
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1	TSB-FJ-06-02-10**	11	PBS	21	31	
2	TSB-FJ-06-02-20	12		22	32	
3	TSB-FJ-06-02-30**	13		23	33	
4	TSB-FR-02-02-10	14		24	34	
5	TSB-FR-02-02-10-FD	15		25	35	
6	TSB-FR-02-02-20**	16		26	36	
7	TSB-FR-02-02-30	17		27	37	
8	TSB-FJ-02-02-10**	18		28	38	
9	TSB-FJ-02-02-20	19		29	39	
10	TSB-FJ-02-02-30	20		30	40	

Notes:		

VALIDATION FINDINGS CHECKLIST

Page: __lof_2 Reviewer: __MC 2nd Reviewer: ____/

Method:Inorganics (EPA Method 314.0)

Method:Inorganics (EPA Method 314-0)	,	,	,	
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times		ar ar	(1 11 2)	Carla Hall Pales, All
All technical holding times were met.	1			
Coolcr temperature criteria was met.		<u> </u>		
II. Calibration		Mi.	'n.	es a desirent de la companya del companya del companya de la compa
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/	<u> </u>		
Were all initial calibration correlation coefficients > 0.995?				
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	/			
Were titrant checks performed as required? (Level IV only)			/	
Were balance checks performed as required? (Level IV only)			/	
MEGLANS CANALAST SALES TO SERVICE SALES SA				William Strike Strike
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.				
IV Mauto spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	\ \			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) \leq 20% for waters and \leq 35% for soil samples? A control limit of \leq CRDL(\leq 2X CRDL for soil) was used for samples that were \leq 5X the CRDL, including when only one of the duplicate sample values were \leq 5X the CRDL.	/			
V Laboratory composition pieces (1997)				
Was an LCS anaylzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	\checkmark		_	
Were the LCS percent recoverles (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?				
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		/	\prod	
Were the performance evaluation (PF) samples within the acceptance limits?			<u> </u>	

LDC #:	19125A6
SDG #:	210150

VALIDATION FINDINGS CHECKLIST

	Page:_	2 of 2
	Reviewer:	MG
2nd	Reviewer:	1/

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/	:		
Were detection limits < RL?	/			
VIII. Overall assessment of data				COLOR S MARKET
Overall assessment of data was found to be acceptable.	/			
IX: Field duplicates				
Field duplicate pairs were identified in this SDG.	/			
Target analytes were detected in the field duplicates.	1			
X Field blanks				
Field blanks were identified in this SDG.		/		
Target analytes were detected in the field blanks.				

LDC #: 19125A6 SDG #: 210150

VALIDATION FINDINGS WORKSHEET Field Duplicates

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

METHOD: Inorganics, Method _____314.0

YN N/A Were field duplicate pairs identified in this SDG?

Y)N N/A Were target analytes detected in the field duplicate pairs?

	Concentration	(Mg/kg)			
Analyte	4	50	RPD (Limit)	Difference (Limit)	Qualifier
C104	62.8	61.0		1.8 mg/kg (= 46.1)	
					.
			<u> </u>	11	

	Concentration ()			
Analyte			RPD (Limit)	Difference (Limit)	Qualifier

	Concentration ()			
Analyte			RPD (Limit)	Difference (Limit)	Qualifier

	Concentration ()			
Analyte		RPD (Limit)	Difference (Limit)	Qualifier

LDC #: (9135 A6 SDG #: 310150

Initial and Continuing Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

2nd Reviewer: Page: Reviewer:___

> 3/4.0 METHOD: Inorganics, Method

6-17-08 . was recalculated. Calibration date:__ CIOH The correlation coefficient (i) for the calibration of

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 True

Where, Found = concentration of each analyte measured in the enalysis of the ICV or CCV solution.

True = concentration of each analyte in the ICV or CCV source

Type of Analysis Analyte Conc (unite) Avea (unite) Initial calibration Blank 0.0 (Mg/L) 0 Calibration verification Standard 1 4.0 () 494 l Standard 2 10.0 () 39998 Standard 4 50.0 () 69365 Standard 5 100.0 () 140139 Standard 6 - - - Calibration verification ClO4 CCV 34.34 (Mg/L) 35.0 Calibration verification ClO4 CCV 34.34 (Mg/L) 35.0 ClO4 CCV 34.34 (Mg/L) 35.0 (Mg/L)			Receivilated	Remorted	
Blenk 0. Standard 1 4. Standard 2 10 Standard 3 35 C C y Standard 5 10 Standard 6 Standard 7 C C y C C y C C C C C C C C C	Conc (units)	Avea (units)	ror&R	ror %R	Acceptable (Y/N)
Stendard 1 4. Stendard 2 10 Stendard 3 35 C O	0.0				
Standard 2 10 Standard 3 25 Standard 4 56 Standard 5 10 Standard 6 10 Standard 7 C O 4 C C V C C C C C C C C C		484			
Standard 3 25 C (O 4 Standard 4 Scandard 5 10 Standard 6 Standard 7 16.39 C (O 4 C C V 136 C (O 4 C C V 136		13177			
Standard 4 S6 Standard 5 10 Standard 5 10 Standard 7 16.39 C104 CCV C136	Stendard 3	33398	<u> </u>	þ	•
Standard 5 [0] Standard 6 Standard 7 16.34 C 1 0 4	Standard 4) 63365	T19666.0=	r=0.999617	>
Standard 6 Standard 7 16.89 C104 CCV [136		140139			
Standard 7 16.39 C104 CCV (136	Stendard 6	,			
C104 CCV (136)		,			
C104 CCV 1136 c104 CCV					
C 104 CCV	CC \	1) 25. (mg/L)	47	47	
200	1136				
) A		1) 75. (mg/L	(02	102	 >
Calibration verification					
)	1	1.	1	1	

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

19135A6 210150 LDC #: SDG #:

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Page: Reviewer: 2nd Reviewer:_

> 314.0 METHOD: Inorganics, Method

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

Where, %R = Found x 100

Found =

True =

concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result). concentration of each analyte in the source.

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

x 100 Where, $RPD = \underbrace{1S \cdot D_1}_{(S+D)/2}$

S

Original sample concentration Duplicate sample concentration

Acceptable S/S \succ %R / RPD Reported 2 2 9 Recalculated %R / RPD 96 エニ 3 (mg/pm) 500 (4g/kg) (mg/g) 404 (mg/ha) True / D (units) 231 481.6 (2/4) (24/gw) Found / S (units) 398 363 (SSR-SR) Element C104 $C10_{4}$ CIO Laboratory control sample Type of Analysis Matrix spike sample Duplicate sample TSB- CJ-09-0 TSB-CJ-09-0 \$ 00°P Sample 1D 0115/0133 1733 0152 CCS ž

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

LDC #:_	19125A6
	210150

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

Page:	of
Reviewer:	MG
2nd reviewer:	

				2nd reviewer	:
METH	OD: Inorganics, Metho	d_314.0			-
Please (Y) N (Y) N (Y) N	N/A Have results N/A Are results w	ow for all questions answered "N". Not app been reported and calculated correctly? ithin the calibrated range of the instrumen tion limits below the CRQL?		re identified as "N	√A* .
Compo	ound (analyte) results f ulated and verified usin	or <u></u> 华 (, C104 ng the following equation:	repor	ted with a positiv	e detect were
Concen	tration =	Recalculation:			
	'= Mx + b	CIOy Mg/L= 10[0.00071	16 (4//10)+ 0	. 9054]	
Wha	eve m= 0.0007	= 339. 79 Mg	/.	7	
••	6= 0.8054		\(\(\)		,
	dil= 10x	then (339.79 mg/L)	(0.938) =	36 22.49	Mg/Kg
#	Sample ID	Analyte	Reported Concentration (M9/Kg)	Calculated Concentration	Acceptable (Y/N)
	ı	C104	3620	3620	Y
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Note:					

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: BRC Tronox Parcel C/D/F/G/H

Collection Date: June 11, 2008

LDC Report Date: July 30, 2008

Matrix: Soil/Water

Parameters: Perchlorate

Validation Level: EPA Level III

Laboratory: GEL Laboratories, LLC.

Sample Delivery Group (SDG): 210228

Sample Identification

TSB-GJ-08-10

TSB-GJ-08-20

TSB-GJ-08-30

TSB-GJ-08-40

TSB-GJ-09-10

TSB-GJ-09-20

TSB-GJ-09-30

TSB-GJ-09-40

Rinsate 1

TSB-GJ-08-10MS

TSB-GJ-08-10MSD

TSB-GJ-08-10DUP

Introduction

This data review covers 11 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 314.0 for Perchlorate.

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 IX.

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.
- 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.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No perchlorate was found in the initial, continuing and preparation blanks.

Sample "Rinsate 1" was identified as a rinsate. No perchlorate was found in this blank.

IV. Matrix Spike/Matrix Spike Duplicates

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.

V. Duplicates

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

VI. Laboratory Control Samples

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

VII. Sample Result Verification

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

BRC Tronox Parcel C/D/F/G/H Perchlorate - Data Qualification Summary - SDG 210228

No Sample Data Qualified in this SDG

BRC Tronox Parcel C/D/F/G/H
Perchlorate - Laboratory Blank Data Qualification Summary - SDG 210228

No Sample Data Qualified in this SDG

BRC Tronox Parcel C/D/F/G/H
Perchlorate - Field Blank Data Qualification Summary - SDG 210228

No Sample Data Qualified in this SDG

LDC #: 19125B6	VALIDATION COMPLETENESS WORKSHEET	Date: <u>7-22-</u> 09
SDG #: 210228	Level III	Page: <u> (of_ (</u>
Laboratory: GEL Laboratories	II.C	Paviower: MG

Laboratory: GEL Laboratories LLC

Reviewer: MG

2nd Reviewer:

METHOD: (Analyte) Perchlorate (EPA Method 314.0)

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	Α	Sampling dates: 6-11-08
IIa.	Initial calibration	A	
IIb.	Calibration verification	Α	
111.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	Ā	MS/MSD (SDG: 210334)
V	Duplicates	A	DUP ()
VI.	Laboratory control samples	Α	LCS/LCSD
VII.	Sample result verification	N	
VIII.	Overall assessment of data	Α	
IX.	Field duplicates	N	
х	Field blanks	ND	R=9

Note: A = Acceptable

N = Not provided/applicable

ND = No compounds detected

D = Duplicate TB = Trip blank

SW = See worksheet

R = Rinsate FB = Field blank

EB = Equipment blank

Validated Samples:

P		·					
1	TSB-GJ-08-10	S	11	TSB-GJ-08-10MSD	5	21	31
2	TSB-GJ-08-20		12	TSB-GJ-08-10DUP	1	22	32
3	TSB-GJ-08-30		13	PB5		23	33
4	TSB-GJ-08-40		14 2	PBW		24	34
5	TSB-GJ-09-10		15			25	35
6	TSB-GJ-09-20		16			26	36
7	TSB-GJ-09-30		17			27	37
8	TSB-GJ-09-40	<u> </u>	18			28	38
92	Rinsate 1	W	19			29	39
10	TSB-GJ-08-10MS	5	20			30	40

Notes:			

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: BRC Tronox Parcel C/D/F/G/H

Collection Date: June 12, 2008

LDC Report Date: July 29, 2008

Matrix: Soil/Water

Parameters: Perchlorate

Validation Level: EPA Level III

Laboratory: GEL Laboratories, LLC.

Sample Delivery Group (SDG): 210334

Sample Identification

TSB-CJ-09-0 TSB-CJ-09-10 Rinsate 2

TSB-CJ-09-0MS

TSB-CJ-09-0MSD

TSB-CJ-09-0DUP

Introduction

This data review covers 5 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 314.0 for Perchlorate.

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 IX.

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.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No perchlorate was found in the initial, continuing and preparation blanks.

Sample "Rinsate 2" was identified as a rinsate. No perchlorate was found in this blank.

IV. Matrix Spike/Matrix Spike Duplicates

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.

V. Duplicates

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

VI. Laboratory Control Samples

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

VII. Sample Result Verification

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

BRC Tronox Parcel C/D/F/G/H Perchlorate - Data Qualification Summary - SDG 210334

No Sample Data Qualified in this SDG

BRC Tronox Parcel C/D/F/G/H
Perchlorate - Laboratory Blank Data Qualification Summary - SDG 210334

No Sample Data Qualified in this SDG

BRC Tronox Parcel C/D/F/G/H
Perchlorate - Field Blank Data Qualification Summary - SDG 210334

No Sample Data Qualified in this SDG

LDC #: 19125C6	VALIDATION COMPLETENESS WORKSHEET	Date: <u>7 - 22 -</u> 08
SDG #: <u>210334</u>	Level III	Page: <u> </u> of <u> </u>
Laboratory: GEL Laboratories	<u>LLC</u>	Reviewer: MG
		2nd Reviewer:

METHOD: (Analyte) Perchlorate (EPA Method 314.0)

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
1.	Technical holding times	Α	Sampling dates: 6-12-08
lla.	Initial calibration	Α	
IIb.	Calibration verification	Α	
111.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	Α	MS/MSD (SDG: 210228)
V	Duplicates	Α	DUP (J)
VI.	Laboratory control samples	Α	LCS/LCSD
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	7	
L _X	Field blanks	ND	R= 3

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:

1	TSB-CJ-09-0	S	11	21	31	
2	TSB-CJ-09-10	J	12	22	32	
3 J	Rinsate 2	W	13	23	33	
4	TSB-CJ-09-0MS	5	14	24	34	
5	TSB-CJ-09-0MSD		15	25	35	
6	TSB-CJ-09-0DUP	l	16	26	36	
7 1	PBS		17	27	37	
8 }	PBW		18	28	38	
9			19	29	39	
10			20	30	40	

Notes:			
	 	 · · · · · · · · · · · · · · · · · · ·	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: BRC Tronox Parcel C/D/F/G/H

Collection Date: June 10, 2008

LDC Report Date: July 29, 2008

Matrix: Soil

Parameters: Radium-226 & Radium-228

Validation Level: EPA Level III & IV

Laboratory: GEL Laboratories, LLC.

Sample Delivery Group (SDG): 210150

Sample Identification

TSB-FJ-06-02-10**

TSB-FJ-06-02-20

TSB-FJ-06-02-30**

TSB-FR-02-02-10

TSB-FR-02-02-10-FD

TSB-FR-02-02-20**

TSB-FR-02-02-30

TSB-FJ-02-02-10**

TSB-FJ-02-02-20

TSB-FJ-02-02-30

^{**}Indicates sample underwent EPA Level IV review

Introduction

This data review covers 10 soil samples listed on the cover sheet. The analyses were per EPA Method 903.1 modified for Radium-226 and EPA Method 904.0 modified 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.

Samples indicated by a double asterisk on the front cover underwent a EPA Level IV review. A EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is 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 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) 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 with the following exceptions:

DUP ID (Associated Samples)	Analyte	Difference (Limits)	Flag	A or P
TSB-GJ-08-10DUP (All samples in SDG 210150)	Radium-228	1.44 pCi/g (≤1.00)	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.

The QAPP reporting limits were met with the following exceptions:

Sample	Analyte	Sample MDA	Required Detection Limit (RDL)	Flag	A or P
TSB-FJ-06-02-10** TSB-FJ-06-02-30** TSB-FJ-02-02-10**	Radium-228	1.01 pCi/g	1.0 pCi/g	None	Р
TSB-FJ-06-02-20 TSB-FR-02-02-30	Radium-228	1.02 pCi/g	1.0 pCi/g	None	Р
TSB-FR-02-02-10	Radium-228	1.10 pCi/g	1.0 pCi/g	None	P
TSB-FR-02-02-10-FD	Radium-228	1.57 pCi/g	1.0 pCi/g	None	Р

VI. Sample Result Verification

All sample result verifications were acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

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-FR-02-02-10 and TSB-FR-02-02-10-FD were identified as field duplicates. No radium-226 or radium-228 was detected in any of the samples with the following exceptions:

	Concentra	ation (pCi/g)	200	D:#			
Isotope	TSB-FR-02-02-10 TSB-FR-02-02-10-FD		RPD (Limits)	Difference (Limits)	Flags	A or P	
Radium-228	1.67	0.442U	-	1.228 (≤1.00)	J (all detects) UJ (all non-detects)	А	
Radium-226	2.31	1.24	-	1.07 (≤1.00)	J (all detects)	Α	

BRC Tronox Parcel C/D/F/G/H Radium-226 & Radium-228 - Data Qualification Summary - SDG 210150

SDG	Sample	Isotope	Flag	A or P	Reason
210150	TSB-FJ-06-02-10** TSB-FJ-06-02-20 TSB-FJ-06-02-30** TSB-FR-02-02-10 TSB-FR-02-02-10-FD TSB-FR-02-02-20** TSB-FR-02-02-30 TSB-FJ-02-02-10** TSB-FJ-02-02-20 TSB-FJ-02-02-30	Radium-228	J (all detects) UJ (all non-detects)	A Duplicate analysis (Difference)	
210150	TSB-FJ-06-02-10** TSB-FJ-06-02-30** TSB-FJ-02-02-10** TSB-FJ-06-02-20 TSB-FR-02-02-30 TSB-FR-02-02-10 TSB-FR-02-02-10-FD	Radium-228	None	Р	Minimum detectable activity
210150	TSB-FR-02-02-10 TSB-FR-02-02-10-FD	Radium-228	J (all detects) UJ (all non-detects)	А	Field duplicates (Difference)
210150	TSB-FR-02-02-10 TSB-FR-02-02-10-FD	Radium-226	J (all detects)	А	Field duplicates (Difference)

BRC Tronox Parcel C/D/F/G/H Radium-226 & Radium-228 - Laboratory Blank Data Qualification Summary - SDG 210150

No Sample Data Qualified in this SDG

BRC Tronox Parcel C/D/F/G/H Radium-226 & Radium-228 - Field Blank Data Qualification Summary - SDG 210150

No Sample Data Qualified in this SDG

DG#	: 19125A29 :: 210150 ttory: GEL Laboratories		LIDATIC		evel III/IV	ESS WORKSHEE	Т	Date: <u>7- ∂ ∂ ·</u> Page: <u>I</u> of <u>I</u> Reviewer: <u>M</u> &		
IETH EV#1		Meth	<i>n</i> od 903.1#	Mod. GL-RAD-A	% (} -008 REV	#12) Radium 228 (E	PA Meti	2nd Reviewer: <u> </u>		
	amples listed below were ion findings worksheets.		ewed for ea	ach of the f	following va	alidation areas. Valida	tion find	ings are noted in attached		
	Validation	Area			<u> </u>	Com	ments			
I.	Technical holding times			A	Sampling d	ates: 6-10-08	3			
IIa.	Initial calibration			Α						
IIb.	Calibration verification			A						
III.	Blanks			Α						
IVa.	Matrix Spike/(Matrix Spike)	Duplica	ites	SW	MS/M	SD/DUP (SDGE	: 210	228, 210334)		
IVb.	Laboratory control samples			Α	LCS					
IVc.	Chemical recovery			A						
V.	Sample result verification			Α	Not reviewed for Level III validation.					
VI.	Minimum dectectable activit	ty (MD/	۸)	5W						
VII.	Overall assessment of data			Α						
VIII.	Field duplicates			SW	D= 4+5					
XIV	Field blanks			7						
ote: alidate	A = Acceptable N = Not provided/applicable SW = See worksheet ed Samples: ** Indicates sam		R = Ri FB = F	Field blank		D = Duplicate TB = Trip blank EB = Equipment b	lank			
Ι	all soil	T				T				
	TSB-FJ-06-02-10**	11	PBS		21		31	· · · ·		
	TSB-FJ-06-02-20	12			22		32			
	TSB-FJ-06-02-30**	13			23		33			
	TSB-FR-02-02-10	14			24		34			
	TSB-FR-02-02-10-FD	15			25		35			
+	TSB-FR-02-02-20**	16			26		36			
	TSB-FR-02-02-30	17			27		37			
-	TSB-FJ-02-02-10**	18			28		38			
· ·	TSB-FJ-02-02-20	19			29		39			
10	TSB-FJ-02-02-30	20			30		40			

LDC #: 19125 A 29 SDG #: 210150

VALIDATION FINDINGS CHECKLIST

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

Method: Radiochemistry (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
l. Technical holding times				
All technical holding times were met.	/			
II. Calibration				
Were all instruments and detectors calibration as required?	1			
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 requiried frequency and within laboratory control limits?	1			
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. Soil / Water.	1			
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.	<u></u>			
Was a duplicate sample anaylzed at the required frequency of 5% in this SDG?	1			
Were all duplicate sample duplicate error rations (DER) ≤1.42?.				
/, Laboratory control samples				
Nas an LCS analyzed per analytical batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) vithin the 75-125%	/			
II: Sample Chemical/Carrier Recovery				
Vas a tracer/carrier added to each sample?	/			
Vere tracer/carrier recoveries within the QC limits?	/			
II: Regional Quality Assurance and Quality Control				
/ere performance evaluation (PE) samples performed?		/		
ere the performance evaluation (PE) samples within the acceptance limits?				
II. Sample Result Verification				
ere activities adjusted to reflect all sample dilutions and dry weight factors oplicable to level IV validation?	/			
ere the Minimum Detectable Activities (MDA) < RL?		/		

LDC #: 19125 A29 SDG #: 210150

VALIDATION FINDINGS CHECKLIST

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

Validation Area	Yes	No	NA	Fihdings/Comments
IX. Overall assessment of data				
Overall assessment of data was found to be acceptable.	1			
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.				

19135A39 SDG #: 310150 LDC #:_

VALIDATION FINDINGS WORKSHEET **Duplicate Analysis**

Page: Reviewer:_

2nd Reviewer:_

cover 560 METHOD: Radiochemistry (Method:_

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

Were all duplicate sample duplicate error ratio (DER) \leq 1.42? DER= $\frac{|Act_1-Act_2|}{2^{1/2}}$ Was a duplicate sample analyzed the required frequency of 5% in this SDG?

Act = sample activity $\delta = 1$ sigma error

LEVEL IV ONLY:

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

Duplicate ID Matrix Isotope γγαττρέτες Associated Samples Qualifications TS8-6J-08-IO soil Rα-228 I. 44 r ^C /q (±1.00) α11 J/UJ/A					1.00000		
Soil Ra-338 1.44 Feig (£1.00) all	[Duplicate ID	Matrix		DER (Limits)	Associated Samples	
	- [TS8-63-08-10	soil		1.44 PCi/a (£1.00)		Cualifications
	- 1	DUP		Г	1	3	J/00/A
	- 1						
	1						
	-						
	1						
	- [
	1						
	1						
	- 1						
	1						
	1						
	1						

LDC #: 19135 A39 SDG #: 210150

VALIDATION FINDINGS WORKSHEET Minimum Detectable Activities

of Page:

METHOD: Radiochemistry (Method: See Cover

The following sample MDAs are above the RDL:

#	Sample ID	Sotobe	QAPP BN (wate)	LAB		
_		Ro-239	, Collins)	MIDA (units)		Qualifications
		000	1.0	1.01 (PC1/a)	Lab MDA > GAPP RI	Noue / P
7	(>	0		
L	4	Ka-228		1.02 (
7	2					
	7	Ka-220		() 10.1		
:	D					
3	4	Ra-228		1.10 (
N	8	Ra - 238		1 2		
				/ / / c - 1		
		0				
9	9	K4-938		1.02 ()		
	Ø	Ra- 238				
			8) io.)	>	->
			-			
Comments:						

LDC #: 19125A29 SDG #: 210150

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:_	of_
Reviewer:_	MG
2nd reviewer:_	1~/

			2nd reviewer:
METHOD: Radiochemistry (Method: See	? cover)	- 0
Y) N N/A Were field duplicate pairs in the pair in the pair in the pairs in the pair in the	dentified in this SDG?	te pairs?	
	Activity (pci/g)	1. difference
Isotopes	. 4	5	by difference Oval parentonly RPD-
Ra-228	1.67	0.442 U	1.228 (=1.00) J/UJ/A.
Ra-226	2.31	1.24	1.07 () Jdets/A
Isotopes	Activity (<u>.</u>
isotohes			RPD
	Activity ()	
Isotopes			RPD
		·	
	Activity ()	
Isotopes			RPD
			

19135A39 LDC #:

SDG #: 310150

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

o. Page: (Reviewer: 2nd Reviewer:

1

METHOD: Radiochemistry (Method:_

See Cover

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

%R = Found x 100 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 = $\frac{1S-D_{\perp}}{(S+D)/2} \times 100$

S = Original sample activity D = Duplicate sample activity Where,

	42				Recalculated	Reported	
Sample ID	Type of Analysis	Analyte	Found/S (units)	True/D (units)	%R or BDD	9	Acceptable
	Laboratory control sample					WA OF RPD	(Y/N)
527		Ra-236	(0.5 (PC)/g)	10.5 (PCi/2) 9.70 (PCi/4)	80/	801	>
	Matrix spike sample		2				
TSB-6J-38-10		ı	•				
Ms		Ra-336	10.35 (PCi/g)	1.35 (PCi/g) 11.6 (PCi/g)	68	90	
	Duplicate RPD		>				
75B-63-09-10		Ra-238	2.73 U (PC:/4) 1.39 (PC://	1.39 (pc:/)	73	7.2	
			D	8	S		
	Chemical recovery	Ba-133		ŕ			
		for Ra-328	(cpm)	(61.9 (cpm) 289.5 (cpm)	56	56	

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.

Version 1.0 (3/2/2000)

LDC #: 19125 A 29 SDG #: 210150

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	of
Reviewer:	MG
nd reviewer.	

see cover METHOD: Radiochemistry (Method:__

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

<u>/Y)N N/A</u> Have results been reported and calculated correctly?

<u>Ý) N N/A</u> Are results within the calibrated range of the instruments?

Analyte results for $\frac{\# 1}{Ra - 2\partial 8}$ and verified using the following equation: reported with a positive detect were recalculated

Activity =

(cpm - bckgrd cpm) (2.22)(E)(Vol)(CF)

Recalculation: $\frac{(64/90) - 0.356}{(3.33)(0.6792)(0.500g)(0.5592)} \times \frac{1}{0.989} \times \frac{1}{0.669} \times 1.087 = 1.384 \text{ pci/g}$

E = Efficiency Voi = Volume

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

#	Sample ID	Analyte	Reported Concentration	Calculated Concentration	Acceptable (Y/N)
		. Ra-228	1.38	1.38	Ý
		1 Ra-226	.1.26	1.26	J
				1	
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	·				
	Part All Control of the Control of t				

Note:		

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: BRC Tronox Parcel C/D/F/G/H

Collection Date: June 11, 2008

LDC Report Date: July 29, 2008

Matrix: Soil/Water

Parameters: Radium-226 & Radium-228

Validation Level: EPA Level III

Laboratory: GEL Laboratories, LLC.

Sample Delivery Group (SDG): 210228

Sample Identification

TSB-GJ-08-10

TSB-GJ-08-20

TSB-GJ-08-30

TSB-GJ-08-40

TSB-GJ-09-10

TSB-GJ-09-20

TSB-GJ-09-30

TSB-GJ-09-40

Rinsate 1

TSB-GJ-08-10MS

TSB-GJ-08-10MSD

TSB-GJ-08-10DUP

Introduction

This data review covers 11 soil samples and one water sample listed on the cover sheet. The analyses were per EPA Method 903.1 modified for Radium-226 and EPA Method 904.0 modified 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.
- 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 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) with the following exceptions:

Method Blank ID	Isotope	Activity (pCi/L)	Associated Samples
PBW	Radium-228	0.753	All water samples in SDG 210228

No sample data were qualified based on the contaminants found in the method blanks.

Sample "Rinsate 1" was identified as a rinsate. No radium-226 or radium-228 was found in this blank with the following exceptions:

Rinsate ID	Sampling Date	Isotope	Concentration	Associated Samples
Rinsate 1	6/11/08	Radium-226	0.505 pCi/L	All soil samples in SDG 210228

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Isotope	Reported Concentration	Modified Final Concentration
TSB-GJ-08-10	Radium-226	0.949 pCi/g	1.00U pCi/g
TSB-GJ-09-30	Radium-226	0.327 pCi/g	1.00U pCi/g

IV. Accuracy and Precision Data

a. Matrix Spike/Matrix Spike Duplicates

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 with the following exceptions:

DUP ID (Associated Samples)	Analyte	Difference (Limits)	Flag	A or P
TSB-GJ-08-10DUP (All soil samples in SDG 210228)	Radium-228	1.44 pCi/g (≤1.00)	J (all detects) UJ (all non-detects)	А

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.

The QAPP reporting limits were met with the following exceptions:

Sample	Analyte	Sample MDA	Required Detection Limit (RDL)	Flag	A or P
TSB-GJ-08-10	Radium-228	1.15 pCi/g	1.0 pCi/g	None	P
TSB-GJ-08-20	Radium-228	1.29 pCi/g	1.0 pCi/g	None	Р

Sample	Analyte	Sample MDA	Required Detection Limit (RDL)	Flag	A or P
TSB-GJ-08-30 TSB-GJ-09-20	Radium-228	1.02 pCi/g	1.0 pCi/g	None	Р
TSB-GJ-08-40	Radium-228	1.13 pCi/g	1.0 pCi/g	None	Р
TSB-GJ-09-10	Radium-228	1.45 pCi/g	1.0 pCi/g	None	Р
TSB-GJ-09-30 TSB-GJ-09-40	Radium-228	1.01 pCi/g	1.0 pCi/g	None	Р

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

No field duplicates were identified in this SDG.

5

BRC Tronox Parcel C/D/F/G/H Radium-226 & Radium-228 - Data Qualification Summary - SDG 210228

SDG	Sample	Isotope	Flag	A or P	Reason
210228	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40 TSB-GJ-09-10 TSB-GJ-09-20 TSB-GJ-09-30 TSB-GJ-09-40	Radium-228	J (all detects) UJ (all non-detects)	A	Duplicate analysis (Difference)
210228	TSB-GJ-08-10 TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-09-20 TSB-GJ-08-40 TSB-GJ-09-10 TSB-GJ-09-30 TSB-GJ-09-40	Radium-228	None	P	Minimum detectable activity

BRC Tronox Parcel C/D/F/G/H

Radium-226 & Radium-228 - Laboratory Blank Data Qualification Summary - SDG 210228

No Sample Data Qualified in this SDG

BRC Tronox Parcel C/D/F/G/H Radium-226 & Radium-228 - Field Blank Data Qualification Summary - SDG 210228

SDG	Sample	Isotope	Modified Final Concentration	A or P
210228	TSB-GJ-08-10	Radium-226	1.00U pCi/g	А
210228	TSB-GJ-09-30	Radium-226	1.00U pCi/g	Α

SDG	#:19125B29 #:_210228 ratory:_GEL_Laboratories		LIDATIOI		LETE evel l		WORK	SHEET		Date: <u>7- 22-</u> 0 Page: <u>1_of_1</u> Reviewer: <u>MG</u>
	•			9m A						2nd Reviewer:
METI REV#		Meth	nod 903.1/ G	•	008-RI	EV #12)	Radium	228 (EPA	Meth	мь.Л od 904.0 /GL-RAD-A-009
	amples listed below were ation findings worksheets.		ewed for ea	ch of the fo	llowing	y validati	on areas	. Validation	findir	ngs are noted in attached
	Validation	Area						Comme	nts	
I.	Technical holding times			A	Samplin	g dates:	6-1	1-08		
lla.	Initial calibration			Α						
IIb.	Calibration verification			A						
III.	Blanks			SW						
IVa.	Matrix Spike/(Matrix Spike) I	Duplica	ates	SW	MS	/MSD/	100°	(SDG: 3	096	06, 210334)
IVb.	Laboratory control samples			A	LC	5				,
IVc.	Chemical recovery			A						
V.	Sample result verification			N						
VI.	Minimum dectectable activit	y (MD	۹)	SW						
VII.	Overall assessment of data			A						
VIII.	Field duplicates			N	<u> </u>					
_XIV	Field blanks			SW	R =	9				
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet	ı	R = Rin	o compounds sate eld blank	detecte	ed	D = Dupli TB = Trip EB = Equ			
Validat	ted Samples:									
1	TSB-GJ-08-10 S	11	TSB-GJ-08-1	<i>ჵ%. ъъв</i> 0MSD	5 2	1		[;	31	
2	TSB-GJ-08-20	12	TSB-GJ-08-1	226, ∂28		2		;	32	
3	TSB-GJ-08-30	13			2:	3		;	33	
4	TSB-GJ-08-40	14			2.	4		;	34	
5	TSB-GJ-09-10	15			2	5		;	35	
6	TSB-GJ-09-20	16			2	6		;	36	
7	TSB-GJ-09-30	17			2	7		;	37	
8	TSB-GJ-09-40	18			2	8			38	
9	Rinsate 1 W	19			2	9			39	
10	TSB-GJ-08-10MS 5	20			3	0			10	
Notes	S:									

19135 839 310238 LDC #:_ SDG #:

VALIDATION FINDINGS WORKSHEET

2nd Reviewer: Reviewer:_

_of 1

Page:

METHOD: Radiochemistry (Method: See Cover

Were blank analyses performed as required? If no, please see qualifications below. Y)N N/A

Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see qualifications below. all water Associated Samples:_ YN N/A Units:

	e cotos	<u> </u>	Blank	
	adonosi	Diank ID	Action	Sample Identification
		PBW	Level	No samolo was dualitio
ر الا	Ra-238 0.753	0.753		
	Units:		A	Associated Samples:

	_		 	_	_	 	-	
					-			
Level								
	Tevel Level	Tevel Level	Tevel			Tevel		

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT: If there is activity in the blank above the MDA, sample results within 10x the blank activity will be qualified as not detected "U".

LDC #: 19135 839 SDG #: 310338

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: 2nd Reviewer:_ Reviewer:

METHOD: Radiochemistry (Method: See Cover

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

Blank units: PCi/L Associated sample units: PCi/g

Sampling date: 6-11-08

Field blank type: (circle one) Field Blank / Rinsate Other:_

all soil Associated Samples:

Sample Identification 1.00 0.327/ 00.1/646.00 Blank Action Limit Blank ID 0.505 O < RL | Ra- 226 Analyte

Associated sample units: Blank units:

Sampling date:

Field blank type: (circle one) Field Blank / Rinsate / Other:

Associated Samples:

Sample Identification Blank Action Limit Blank ID Analyte

Samples with isotope concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected."U".

Version 1.0 (3/2/2000)

FBLKASC4.35

LDC #: 19125 B39 BCE 016

VALIDATION FINDINGS WORKSHEET

Duplicate Analysis

Page: 1 of) Reviewer: MG

2nd Reviewer:

see cover METHOD: Radiochemistry (Method:_

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? Were all duplicate sample duplicate error ratio (DER) \leq 1.42? DER= $\frac{|Act_1-Act_2|}{2}$ $|Act_2-Act_2|$ 2 $|\delta_1^2+\delta_2^2|^{1/2}$

 $\delta = 1$ sigma error Act = sample activity

LEVEL IV ONLY:

Y (N) N/A

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

L				100		
#	Duplicate ID	Matrix	Isotope	by difference	Accordated Comples	
\exists	12	50,1	1 ~	1,44 PC:/ (2) 001	Associated Samples	Qualifications
				R	201	D/03/A
<u>L</u>						
<u> </u>						
<u> </u>						
Com	Comments:					

LDC #: 19135 B39 SDG #: 310339

VALIDATION FINDINGS WORKSHEET Minimum Detectable Activities

Page: | of |

MIIIIIIIIIII Detectable Ac

METHOD: Radiochemistry (Method: Sec cover The following sample MDAs are above the RDL:

#	Sample ID	Isotope	APA CO	LAB		
_	_	010 - م	Z Cullist	MDA (units)	Finding	Qualifications
)	1.0 (PC1/a	1.15 (PC1/g)	Lab MDA> QAPP RL	None /P
0	7		>	2		
	6	Ka - 4/8		() 60.)		
3	3	Pa - 239				
		004		1.02 (
7	7	Ra-238		1.13		
7	٧	Ra-238		1.45 (
ه	9	Ra-238		1.02 (
1		- 1				
	7	Ra-238		1.01		
,						
α	30	Ra-338	->	1.01		
						•
Comments:						

DETLIMIT.35

Version 1.0 (3/2/2000)

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: BRC Tronox Parcel C/D/F/G/H

Collection Date: June 12, 2008

LDC Report Date: July 29, 2008

Matrix: Soil/Water

Parameters: Radium-226 & Radium-228

Validation Level: EPA Level III

Laboratory: GEL Laboratories, LLC.

Sample Delivery Group (SDG): 210334

Sample Identification

TSB-CJ-09-0

TSB-CJ-09-10

Rinsate 2

TSB-CJ-09-0MS

TSB-CJ-09-0MSD

TSB-CJ-09-0DUP

Rinsate 2MS

Rinsate 2MSD

Rinsate 2DUP

Introduction

This data review covers 4 soil samples and 4 water samples listed on the cover sheet. The analyses were per EPA Method 903.1 modified for Radium-226 and EPA Method 904.0 modified 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.
- 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 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) with the following exceptions:

Method Blank ID	Isotope	Activity (pCi/L)	Associated Samples
PBW	Radium-228	0.753	All water samples in SDG 210334

No sample data were qualified based on the contaminants found in the method blanks.

Sample "Rinsate 2" was identified as a rinsate. No radium-226 or radium-228 was found in this blank.

IV. Accuracy and Precision Data

a. Matrix Spike/Matrix Spike Duplicates

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. Chemical Recovery

All chemical recoveries were within validation criteria.

V. Minimum Detectable Activity

All minimum detectable activities met required detection limits.

The QAPP reporting limits were met with the following exceptions:

Sample	Analyte	Sample MDA	Required Detection Limit (RDL)	Flag	A or P
TSB-CJ-09-0	Radium-228	2.34 pCi/g	1.0 pCi/g	None	Р
TSB-CJ-09-10	Radium-228	1.02 pCi/g	1.0 pCi/g	None	Р

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

No field duplicates were identified in this SDG.

BRC Tronox Parcel C/D/F/G/H Radium-226 & Radium-228 - Data Qualification Summary - SDG 210334

SDG	Sample	Isotope	Flag	A or P	Reason
210334	TSB-CJ-09-0 TSB-CJ-09-10	Radium-228	None	Р	Minimum detectable activity

BRC Tronox Parcel C/D/F/G/H

Radium-226 & Radium-228 - Laboratory Blank Data Qualification Summary - SDG 210334

No Sample Data Qualified in this SDG

BRC Tronox Parcel C/D/F/G/H

Radium-226 & Radium-228 - Field Blank Data Qualification Summary - SDG 210334

No Sample Data Qualified in this SDG

	: 19125C29 : 210334	VA	LIDATIO		PLETENI Level III	ESS WORKSHI	EET	Date: <u>^{7∼∂∂-}</u> Page: <u></u> _of_(
	atory: GEL Laboratories	LLC		Mod	9m2	4		Reviewer: MG 2nd Reviewer: V~
ETH E V# ′	OD : Radium 226 (EPA 14)	Meth	od 903.1		•	~	(EPA Meth	мಾನ od 904.0/ GL-RAD-A-00
ne sa Ilidat	amples listed below were ion findings worksheets.	e revie	ewed for e	each of the f	ollowing v	alidation areas. Val	idation findir	ngs are noted in attache
	Validation	Area				С	omments	
I.	Technical holding times			Α	Sampling d	lates: 6-10	- 08	
lla.	Initial calibration			A				
llb.	Calibration verification			A				
III.	Blanks			SW				
Va.	Matrix Spike/(Matrix Spike) I	Duplica	ites	A	MS/	MSD/DUP	(SDG: 2	109606)
Vb.	Laboratory control samples			A	LCS			
Vc.	Chemical recovery			Α				
V.	/. Sample result verification		N					
/I. Minimum dectectable activity (MDA)		5W						
/II.	. Overall assessment of data		Α					
/III.	l. Field duplicates			7				
αV	Field blanks			ND	R=3			
te: lidate	A = Acceptable N = Not provided/applicable SW = See worksheet d Samples:		R = F	No compound Rinsate Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipmer		
Ţ.	TSB-CJ-09-0 S	11 7	PBW		21		31	
-	TSB-CJ-09-10	12			22		32	
a	Rinsate 2 W	13			23		33	
	TSB-CJ-09-0MS 3%, 2% 5	14			24		34	
<u> </u> -	736, 938 TSB-CJ-09-0MSD	15			25		35	
	736, 339 TSB-CJ-09-0DUP	16			26		36	
٦ .	Rinsate 2 ms w	17			27		37	
J	Rinsute 2 MSD 208	18			28		38	
2	Rinsate 2 DUP 228 1	19			29		39	
1	PB 5	20			30		40	

LDC #: 19125C29 SDG #: 310334

VALIDATION FINDINGS WORKSHEET Blanks

Page: __of_ Reviewer:_

2nd Reviewer:_

cover	
Sec	
(Method:	
Radiochemistry	
THOD:	

Were blank analyses performed as required? If no, please see qualifications below. (Y) N/A

Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see qualifications below. Y) N N/A

pci/L Units:

Associated Samples: all water

	Isotope	Blank ID	Blank	Sample Identification	
		PRIN	Level		
.07	,			No sample was qualified	lied -
7	XQ-473	0.755			
_					
-	Units:		` 	Associated Samples:	
			1		
	Isotope	Blank ID	Blank Action	Sample Identification	
			revel		

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT: If there is activity in the blank above the MDA, sample results within 10x the blank activity will be qualified as not detected "U".

19135639 SDG #: 310334 LDC #:__

VALIDATION FINDINGS WORKSHEET

Minimum Detectable Activities

Page: of 1 Reviewer: 2nd Reviewer:_

METHOD: Radiochemistry (Method: See cover

The following sample MDAs are above the RDL:

*	Sample ID		OAPP	LAB		
		edonosi	RDL (units)	MDA (units)	Finding	Qualifications
		KQ - 438	1.0 (PC1/g)	2.34 (PC:/4)	Lab MDA > GAPP RI	A) oncolu
C	C		9			7 9400
*	8	Ra-228	→	1.02 (
						•
Comments:						

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

BRC Tronox Parcel C/D/F/G/H

Collection Date:

June 10, 2008

LDC Report Date:

July 30, 2008

Matrix:

Soil

Parameters:

Isotopic Uranium & Isotopic Thorium

Validation Level:

EPA Level III & IV

Laboratory:

GEL Laboratories, LLC.

Sample Delivery Group (SDG): 210150

Sample Identification

TSB-FJ-06-02-10**

TSB-FJ-06-02-20

TSB-FJ-06-02-30**

TSB-FR-02-02-10

TSB-FR-02-02-10-FD

TSB-FR-02-02-20**

TSB-FR-02-02-30

TSB-FJ-02-02-10**

TSB-FJ-02-02-20

TSB-FJ-02-02-30

^{**}Indicates sample underwent EPA Level IV review

Introduction

This data review covers 10 soil samples listed on the cover sheet. The analyses were per DOE EML HASL-300 Method and U-02-RC Method modified for Isotopic Uranium and DOE EML HASL-300 Method and Th-01-RC Method modified 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.

Samples indicated by a double asterisk on the front cover underwent a EPA Level IV review. A EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is 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) with the following exceptions:

Method Blank ID	Isotope	Activity (pCi/g)	Associated Samples
PBS	Uranium-233/234	0.461	All samples in SDG 210150

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Isotope	Reported Concentration	Modified Final Concentration
TSB-FJ-06-02-10**	Uranium-233/234	0.829 pCi/g	100U pCi/g
TSB-FJ-02-02-10**	Uranium-233/234	0.987 pCi/g	100U pCi/g

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.

The QAPP reporting limits were met with the following exceptions:

Sample	Analyte	Sample MDA	Required Detection Limit (RDL)	Flag	A or P
TSB-FJ-06-02-30**	Uranium-233/234 Uranium-238	1.42 pCi/g 1.18 pCi/g	1.0 pCi/g 1.0 pCi/g	None None	Р

VI. Sample Result Verification

All sample result verifications were acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by EPA Level III criteria.

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-FR-02-02-10 and TSB-FR-02-02-10-FD were identified as field duplicates. No isotopic uranium or isotopic thorium was detected in any of the samples with the following exceptions:

	Concentra	tion (pCi/g)				
Isotope	TSB-FR-02-02-10	TSB-FR-02-02-10-FD	RPD (Limits)	Difference (Limits)	Flags	A or P
Thorium-228	1.46	1.67	-	0.21 (≤1.00)	-	-
Thorium-230	1.01	0.847	-	0.163 (≤1.00)	-	-
Thorium-232	1.25	1.12	•	0.13 (≤1.00)	-	-
Uranium-233/234	1.26	1.76	-	0.50 (≤1.00)	-	-
Uranium-238	0.696	1.73	-	1.034 (≤1.00)	J (all detects)	А

BRC Tronox Parcel C/D/F/G/H Isotopic Uranium & Isotopic Thorium - Data Qualification Summary - SDG 210150

SDG	Sample	Isotope	Flag	A or P	Reason
210150	TSB-FJ-06-02-30**	Uranium-233/234 Uranium-238	None None	Р	Minimum detectable activity
210150	TSB-FR-02-02-10 TSB-FR-02-02-10-FD	Uranium-238	J (all detects)	А	Field duplicates (Difference)

BRC Tronox Parcel C/D/F/G/H Isotopic Uranium & Isotopic Thorium - Laboratory Blank Data Qualification Summary - SDG 210150

SDG	Sample	Isotope	Modified Final Concentration	A or P
210150	TSB-FJ-06-02-10**	Uranium-233/234	100U pCi/g	А
210150	TSB-FJ-02-02-10**	Uranium-233/234	100U pCi/g	Α

BRC Tronox Parcel C/D/F/G/H Isotopic Uranium & Isotopic Thorium - Field Blank Data Qualification Summary - SDG 210150

No Sample Data Qualified in this SDG

SDG#	19125A59 VALIDATIO 210150 tory: GEL Laboratories LLC		PLETENESS WORKSHEET evel III/IV Page:of Reviewer:MG 2nd Reviewer:
METH(OD: Isotopic Uranium (DOE EML HASL-	-300, U-02	P-RC Modified), Isotopic Thorium (DOE EML HASL-300, Th-01-RC
The sa	•	ch of the f	ollowing validation areas. Validation findings are noted in attached
	Validation Area		Comments
l.	Technical holding times	Α	Sampling dates: 6 -10 - 08
lla.	Initial calibration	Α	
IIb.	Calibration verification	Α	
III.	Blanks	SW	
IVa.	Matrix Spike/(Matrix Spike) Duplicates	Α	MS/MSD/DUP (SDG: 210223)
IVa.	Laboratory control samples	A	LCS
V.	Tracer Recovery	A	
VI.	Minimum Detectable Activity (MDA)	SW	
VII.	Sample result verification	Α	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D=4+5
Lx	Field blanks	7	
Note:	N = Not provided/applicable R = Rin	o compound sate eld blank	s detected D = Duplicate TB = Trip blank EB = Equipment blank
Validate	d Samples: ** Indicates sample underwent Level	IV validation	

	<u> </u>					
1	TSB-FJ-06-02-10**	11	PBS	21	31	
2	TSB-FJ-06-02-20	12		22	32	
3	TSB-FJ-06-02-30**	13		23	33	
4	TSB-FR-02-02-10	14		24	34	
5	TSB-FR-02-02-10-FD	15		25	35	
6	TSB-FR-02-02-20**	16		26	36	
7	TSB-FR-02-02-30	17		27	37	
8	TSB-FJ-02-02-10**	18		28	38	
9	TSB-FJ-02-02-20	19		29	39	
10	TSB-FJ-02-02-30	20		30	40	

Notes:		

VALIDATION FINDINGS CHECKLIST

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

Method: Radiochemistry (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
l, Technical holding times				
All technical holding times were met.	/			
II. Calibration				
Were all instruments and detectors calibration as required?	V			
Were NIST traceable standards used for all calibrations?	1			
Was the check source identified by activity and radionuclide?	/			
Were check sources including background counts analyzed at the requiried frequency and within laboratory control limits?	1			
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.	/			
V. 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. Soil / 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.	· 🗸			
Nas a duplicate sample analyzed at the required frequency of 5% in this SDG?	V .			
Vere all duplicate sample duplicate error rations (DER) ≤1.42?.	1			
Laboratory control samples				
Vas an LCS analyzed per analytical batch?				
Vere the LCS percent recoveries (%R) and relative percent difference (RPD) vithin the 75-125%	/			
I. Sample Chemical/Carrier Recovery				
as a tracer/carrier added to each sample?	/			
ere tracer/carrier recoveries within the QC limits?	/			
!: Regional Quality Assurance and Quality Control				
ere performance evaluation (PE) samples performed?		/		
ere the performance evaluation (PE) samples within the acceptance limits?			1	
II. Sample Result Verification				
ere activities adjusted to reflect all sample dilutions and dry weight factors plicable to level IV validation?	/			,
ere the Minimum Detectable Activities (MDA) < RL?		/		

LDC #: 19125A59 SDG #: 210153

VALIDATION FINDINGS CHECKLIST

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

Validation Area	Yes	No	NA	Findings/Comments
IX. Overall assessment of data				
Overall assessment of data was found to be acceptable.	/			
X:Fleid duplicates				
Field duplicate pairs were identified in this SDG.	/			,
Target analytes were detected in the field duplicates.	1			
XI. Field blanks				
Field blanks were identified in this SDG.		/		
Target analytes were detected in the field blanks.				

LDC #: 19135A59 210150 SDG #:

VALIDATION FINDINGS WORKSHEET Blanks

Page: Lof Reviewer:

2nd Reviewer:_

_	14 00
Š	Were blank analyses performed as required? If no
9	as b
Ü	J. L
see cover	perfor
:pot	vses
(Meth	anal
stry	Slank
hemi	ere t
diocl	≥
METHOD: Radiochemistry (Method: S	¥,
THO	Z
ME.	S

Were blank analyses performed as required? If no, please see qualifications below.

Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see qualifications below. <u>a</u> Associated Samples:_ PC: Y)N N/A Units:

	Sotone	Cl Anell	Blank								
		S A I	Action			Š	Sample Identification				
		PBS	Level	_	80						
- RL	< RL U-333/234 0.461	0.461		0.829/1.00 0.487	0.487/1.00					Ę	
										• • •	
											-
			_								
								1			
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									-		
-	17.10										

	,	 	 							
tification										
Sample Identification	-									
					1					
				-			-			
Blank	Level									
Blank ID										
Isotope										
						_			_	

Associated Samples:

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT: If there is activity in the blank above the MDA, sample results within 10x the blank activity will be qualified as not detected "U".

LDC #: 19135A59 SDG #: 310150

VALIDATION FINDINGS WORKSHEET Minimum Detectable Activities

7 Page: 1 of 1

METHOD: Radiochemistry (Method: See cover

The following sample MDAs are above the RDL:

#	di dina		OA PP	148		
*	Sample ID	Isotope	RDL (units)	MDA (units)	Finding	Qualifications
-	C	U-233/234	(pci/c)	1.42 (PC:/6)	000000	4/
		() - 338	-		TO I	None / P
			*	1.18	->	->
Comments:						

LDC #: 19105A 59 SDG #: 210150

VALIDATION FINDINGS WORKSHEET <u>Field Duplicates</u>

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

METHOD: Radiochemistry (Method: See Cover

YN N/A YN N/A

Were field duplicate pairs identified in this SDG?

Y) N N/A Were target isotopes detected in the field duplicate pairs?

	Activity (pcila,	by difference
Isotopes	4	5	Qual parent only
Th-228	1.46	1.67	0.21 (1.00)
Th-230	1.01	0.847	0.163 ()
Th-232	1.25	1.12	0.13 ()
U-233/234	1.26	1.76	0.50 ()
U-238	0.696	1.73	1.034 () Jdets/A

	Activity ()	
isotopes		RPD
·		

	Activity ()	
Isotopes			RPD
		į	

	Activity ()	
Isotopes		RPD

LDC #: 19135A59 SDG #: 210150

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Page: 1 of 1 Reviewer: 2nd Reviewer:

1

METHOD: Radiochemistry (Method: See cover

%R = Found x 100 True

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

Where,

RPD = $\frac{|S-D|}{(S+D)/2} \times 100$

S = Original sample activity D = Duplicate sample activity

					Recalculated	Reported	
Sample ID	Type of Analysis	Analyte	Found/S (units)	True/D (units)	%R or RPD	200.00	Acceptable
	Laboratory control sample					O'An or ne.	(A/N)
7.05		U-333	24.3 (PC:/4)	14.3 (PC:/2) 33.8 (PC:/2)	(02	201	>-
	Matrix spike sample		d.	, ,			
TSB-65-08-10							
MS		Th-332	10.19 (PC/1)	10.19 (PC/) 10.1 (PC/4)	101	101	·
	Dimlicate BPD		0	0			
758-67-08-10 Duf		V-233/234	-	52 (pci/ 1.68 (pci/)	0	0	
	Chemical recovery		0	3			
		T6-270	7 21162 (1)		7	1	
-		000	0.01(3) (dpm) 4.37964 (dpm)	4.37964 (apm)	<i>\</i>	12	
			1				>

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.

Version 1.0 (3/2/2000)

LDC #:_	19125A59
SDG #:	210150

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	of
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".

Have results been reported and calculated correctly? Ý) N N/A

Are results within the calibrated range of the instruments?

Analyte results for ± 1 ± 1 ± 1 ± 1 and verified using the following equation: ____reported with a positive detect were recalculated Activity = Recalculation: * net area corrected due to tracer impurity (cpm - bckgrd cpm) (2.22)(E)(Vol)(CF) E = Efficiency Vol = Volume CF = %R, Self-absorbance, abundance, ect.

#	Sample ID	Analyte	Reported Concentration (PC / q)	Calculated Concentration (PCi/q)	Acceptable (Y/N)
		Th-228	1.85	1.83	Y
		Th-230	1.45	1.45	
		Th-232	1.66	1.66	
		U-233/234 U-238	0.829	0.829	
		U-238	1.42	1.42	L. J
		·			
		'			
	•				

Note:

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: BRC Tronox Parcel C/D/F/G/H

Collection Date: June 11, 2008

LDC Report Date: July 30, 2008

Matrix: Soil/Water

Parameters: Isotopic Uranium & Isotopic Thorium

Validation Level: EPA Level III

Laboratory: GEL Laboratories, LLC.

Sample Delivery Group (SDG): 210228

Sample Identification

TSB-GJ-08-10

TSB-GJ-08-20

TSB-GJ-08-30

TSB-GJ-08-40

TSB-GJ-09-10

TSB-GJ-09-20

TSB-GJ-09-30

TSB-GJ-09-40

Rinsate 1

TSB-GJ-08-10MS

TSB-GJ-08-10MSD

TSB-GJ-08-10DUP

TSB-GJ-08-10MSRE

TSB-GJ-08-10DUPRE

Introduction

This data review covers 13 soil samples and one water sample listed on the cover sheet. The analyses were per DOE EML HASL-300 Method and U-02-RC Method modified for Isotopic Uranium and DOE EML HASL-300 Method and Th-01-RC Method modified 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) with the following exceptions:

Method Blank ID	Isotope	Activity (pCi/g)	Associated Samples
PBS1	Uranium-233/234	0.212	TSB-GJ-08-20 TSB-GJ-08-30 TSB-GJ-08-40 TSB-GJ-09-10 TSB-GJ-09-20 TSB-GJ-09-30 TSB-GJ-09-40
PBS2	Uranium-233/234	0.416	TSB-GJ-08-10

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified.

Sample "Rinsate 1" was identified as a rinsate. No isotopic uranium or isotopic thorium were found in this blank.

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

No field duplicates were identified in this SDG.

BRC Tronox Parcel C/D/F/G/H Isotopic Uranium & Isotopic Thorium - Data Qualification Summary - SDG 210228

No Sample Data Qualified in this SDG

BRC Tronox Parcel C/D/F/G/H Isotopic Uranium & Isotopic Thorium - Laboratory Blank Data Qualification Summary - SDG 210228

No Sample Data Qualified in this SDG

BRC Tronox Parcel C/D/F/G/H Isotopic Uranium & Isotopic Thorium - Field Blank Data Qualification Summary - SDG 210228

No Sample Data Qualified in this SDG

SDG	#:19125B59 #:210228 ratory: <u>GEL Laboratories</u>		ALIDATIO			TENI el III	ESS	WORKSHE	ET	Revi	Date: 7-22-08 Page: 1 of 1 lewer: 46
Modif	HOD: Isotopic Uranium (ied) amples listed below wer										
valida	ation findings worksheets	5, 			01104	, iii 9 V	andati	on areas. Valle	adion	indings are not	ed iii allaciied
	Validation	Area						Co	mmen	ts	
I.	Technical holding times			Α	Sam	pling d	ates:	6-11-0	၁႘		
IIa.	Initial calibration			Α							
llb.	Calibration verification			A							
III.	Blanks			SW							
IVa.	Matrix Spike/(Matrix Spike)	Duplic	ates	Α		45/	Mse	4UQ\c	SDG:	210334)	
IVa.	Laboratory control samples			Α	Į,	_cs					
V.	Tracer Recovery			Α						,	
VI.	Minimum Detectable Activit	y (MDA	A)	A							
VII.	Sample result verification			N							
VIII.	Overall assessment of data			Α							
IX.	Field duplicates			7						· · · · · · · · · · · · · · · · · · ·	
L _X	Field blanks			ND	R	= 9					
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet	9	R = Rin	lo compounds sate ield blank	s dete	ected		D = Duplicate TB = Trip blank EB = Equipment	blank		
	ed Samples:										
1,3	TSB-GJ-08-10 5	1, 3	TSB-GJ-08-1	OMSD Th, U	5	21			31		
2 1	TSB-GJ-08-20	12 l	TSB-GJ-08-1	Th. U	b	22			32		
1 1	TSB-GJ-08-30	13 (PBSI			23			33		
4	TSB-GJ-08-40	14 9	1			24			34		
5	TSB-GJ-09-10	15 3	PBS2			25			35		
6	TSB-GJ-09-20	16 3	TSB-GJ-0	18-16 MS RE	u	26			36		
7 1	TSB-GJ-09-30		TSB-GJ-0			27			37		

Notes:				

W

TSB-GJ-09-40

TSB-GJ-08-10MS

LDC #: 19135 B59 Beecie SDG #:

VALIDATION FINDINGS WORKSHEET

2nd Reviewer: Page: of Reviewer:_

> see cover METHOD: Radiochemistry (Method:_

(Y)N N/A Y)N N/A

Were blank analyses performed as required? If no, please see qualifications below.

Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see qualifications below. qualified Sample Identification 2010 e s3 → 8 Samp 0 Z Associated Samples: Accordated C Blank Action Level 0.312 Blank 1D PBSI PC: /4 < Ru 0-333/234 Isotope Units: Units:_

		ıtion								
Associated Samples:		Sample Identification								
,	Blank	Action								
	Blank ID						<u>- : .</u>			
	Isotope									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT: If there is activity in the blank above the MDA, sample results within 10x the blank activity will be qualified as not detected "U".

LDC #: 19125 1359 806 C16 :# 50S

VALIDATION FINDINGS WORKSHEET

Page: of 2nd Reviewer:_ Reviewer:

> see cover METHOD: Radiochemistry (Method:_

Were blank analyses performed as required? If no, please see qualifications below. (X)N N/A

Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see qualifications below. (Y)N N/A

gualified Sample Identification Sample Identification 222 Sample S Associated Samples: Associated Samples: Blank Action Level Blank Action Level Blank ID PBS2 0.461 Blank ID PCi/4 U-233/234 Isotope Isotope Units: Units:_ 181

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT: If there is activity in the blank above the MDA, sample results within 10x the blank activity will be qualified as not detected "U".

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: BRC Tronox Parcel C/D/F/G/H

Collection Date: June 12, 2008

LDC Report Date: July 30, 2008

Matrix: Soil/Water

Parameters: Isotopic Uranium & Isotopic Thorium

Validation Level: EPA Level III

Laboratory: GEL Laboratories, LLC.

Sample Delivery Group (SDG): 210334

Sample Identification

TSB-CJ-09-0

TSB-CJ-09-10

Rinsate 2

TSB-CJ-09-0MS

TSB-CJ-09-0MSD

TSB-CJ-09-0DUP

Rinsate 2MS

Rinsate 2MSD

Rinsate 2DUP

Introduction

This data review covers 5 soil samples and 4 water samples listed on the cover sheet. The analyses were per DOE EML HASL-300 Method and U-02-RC Method modified for Isotopic Uranium and DOE EML HASL-300 Method and Th-01-RC Method modified 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.
- 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.
- P 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).

Sample "Rinsate 2" was identified as a rinsate. No isotopic uranium or isotopic thorium were found in this blank.

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 with the following exceptions:

DUP ID (Associated Samples)	Analyte	Difference (Limits)	Flag	A or P
TSB-CJ-09-0DUP (All soil samples in	Thorium-228	1.52 pCi/g (≤1.00)	J (all detects)	Α
SDG 210334)	Thorium-230	1.88 pCi/g (≤1.00)	UJ (all non-detects) J (all detects) UJ (all non-detects)	

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.

The QAPP reporting limits were met with the following exceptions:

Sample	Analyte	Sample MDA	Required Detection Limit (RDL)	Flag	A or P
TSB-CJ-09-0	Thorium-228 Thorium-232	1.26 pCi/g 1.05 pCi/g	1.0 pCi/g 1.0 pCi/g	None None	Р
TSB-CJ-09-10	Thorium-228 Thorium-230 Thorium-232	1.31 pCi/g 1.09 pCi/g 1.09 pCi/g	1.0 pCi/g 1.0 pCi/g 1.0 pCi/g	None None None	Р

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

No field duplicates were identified in this SDG.

BRC Tronox Parcel C/D/F/G/H Isotopic Uranium & Isotopic Thorium - Data Qualification Summary - SDG 210334

SDG	Sample	Isotope	Flag	A or P	Reason
210334	TSB-CJ-09-0 TSB-CJ-09-10	Thorium-228 Thorium-230	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	А	Duplicate analysis (Difference)
210334	TSB-CJ-09-0	Thorium-228 Thorium-232	None None	Р	Minimum detectable activity
210334	TSB-CJ-09-10	Thorium-228 Thorium-230 Thorium-232	None None None	Р	Minimum detectable activity

BRC Tronox Parcel C/D/F/G/H Isotopic Uranium & Isotopic Thorium - Laboratory Blank Data Qualification Summary - SDG 210334

No Sample Data Qualified in this SDG

BRC Tronox Parcel C/D/F/G/H Isotopic Uranium & Isotopic Thorium - Field Blank Data Qualification Summary - SDG 210334

No Sample Data Qualified in this SDG

SDG :	#: <u>19125C59</u> VA #: <u>210334</u> atory: <u>GEL Laboratories LLC</u>	LIDATIO		PLETEN Level III		RKSHEET	Date: <u>7⁻∂∂</u> -o∂ Page: <u>I</u> of <u>I</u> Reviewer: <u>MG</u> 2nd Reviewer: <u>\</u>
METH Modifi	IOD: Isotopic Uranium (DOE E	ML HASL-	-300, U-02	2-RC Mod	lified),Isotop	oic Thorium (D	OOE EML HASL-300, Th-01-RC
The savalida	amples listed below were revie tion findings worksheets.	wed for ea	ch of the f	following v	/alidation ar	reas. Validatio	n findings are noted in attached
	Validation Area					Comme	ents
1.	Technical holding times		A	Sampling of	dates:	6-12-08	
IIa.	Initial calibration		A				
IIb.	Calibration verification		A				
111.	Blanks		A				
IVa.	Matrix Spike/(Matrix Spike) Duplicat	es	SW	MS/	mso/Du	ρ	
IVa.	Laboratory control samples		Α	LCS			
V.	Tracer Recovery		Α				
VI.	Minimum Detectable Activity (MDA)		SW				
VII.	Sample result verification		N				
VIII.	Overall assessment of data		A				
IX.	Field duplicates		7				
L _X	Field blanks		ND	R=3	3		
Note: Validate	A = Acceptable N = Not provided/applicable SW = See worksheet d Samples:	R = Rins	o compound sate eld blank	s detected	TB =	ouplicate Trip blank Equipment blank	
1	TSB-CJ-09-0 5 11 2	PBW		21	Ī		31
	TSP C 00 10	1 27 77					51

1	TSB-CJ-09-0 5	112	PBW	21	31
2	TSB-CJ-09-10	12		22	32
3 2	Rinsate 2	13		23	33
4	TSB-CJ-09-0MS Th,U S	14		24	34
5	TSB-CJ-09-0MSD Th, U	15		25	35
6	TSB-CJ-09-0DUP	16		26	36
7 2	Rinsate 2MS Th, U	17		27	37
8 2	Rinsate 2MSD	18		28	38
9 2	Rinsate 2DUP	19		29	39
10 ^l	PBS	20		30	40

Notes:			

LDC #: 19135659 210334 SDG #:

VALIDATION FINDINGS WORKSHEET

Duplicate Analysis

Lof Reviewer:_

Page: 2nd Reviewer:_

> Cover METHOD: Radiochemistry (Method: See

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". (Y) N/A Was a duplicate sample analyzed the required frequency of 5% in this SDG? (Y) N/A Were all duplicate sample duplicate error ratio (DER) (Y) N/A Were all duplicate sample duplicate error ratio (DER) (Y) N/A Were all duplicate sample duplicate error ratio (DER) (Y) N/A Were all duplicate sample duplicate error ratio (DER) (Y) N/A DER (Y) N/A Act (Y) N/A Act (Y) N/A Act (Y) N/A

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

 $\delta = 1$ sigma error

Were recalculated results acceptable? Se Y N N/A

LEVEL IV ONLY:

Secondarion of the secondarion of the secondarion of the secondarion of the secondarions.	JiP M

Version 1.0 (3/2/2000)

LDC #: 19105c59 SDG #: 310334

VALIDATION FINDINGS WORKSHEET

see cover METHOD: Radiochemistry (Method:_

The following sample MDAs are above the RDL:

Minimum Detectable Activities

Page: 1 of 1

2nd Reviewer:_ Reviewer:

#	Sample ID	-	CAPP	LAR		
_		Prince:	L (units)	MDA (units)	Finding	Out History
	-	366-41	1.0 (12:1/4)	1.36 (PC:/	12.1. MAN	≣
	*	Th -332	-	0 40 -	2	None / P
C				1 (0)		
7	7	Th- 338				
		Th. 320		(, 51		
	→	T1- 222		() 60)		
		75124	->	(→) 60.)	-	
						4
(
Comments:						

Version 1.0 (3/2/2000)