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

Northgate Environmental Management, Inc.
1100 Quail Street Ste. 102
Newport Beach, CA 92660
ATTN: Ms. Cindy Arnold

November 5, 2009

SUBJECT: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Data Validation

Dear Ms. Arnold,

Enclosed are the revised data validation reports for the fractions listed below. Please replace the previously submitted reports with the enclosed revised reports.

LDC Project # 21666:

SDG #	Fraction
R0903713	Volatiles
8304626	Organophosphorus Pesticides

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

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

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

Northgate Environmental Management, Inc.
1100 Quail Street Ste. 102
New Port beach, CA 92660
ATTN: Ms. Cindy Arnold

October 22, 2009

SUBJECT: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Data Validation

Dear Ms. Arnold,

Enclosed are the final validation report for the fraction listed below. These SDGs were received on September 29, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 21666:

SDG #	Fraction
R0903713, TRX09081351, TRX09090358, 233415, 235926, 8304627, 8304626	Volatiles, Semivolatiles, Chlorinated Pesticides, Metals, Wet Chemistry, Organophosphorus Pesticides, Organic Acids, Radium-226 & Radium-228, Isotopic Uranium & Isotopic Thorium

The data validation was performed under Stage 2B/4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- Standard Operating Procedures (SOP) 40, Data Review/Validation, BRC 2009
- Quality Assurance Project Plan Tronox LLC Facility, Henderson Nevada, June 2009
- NDEP Guidance, May 2006
- Multi Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual, July 2004
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

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

Sincerely,

ERauto

Erlinda T. Rauto
Operations Manager/Senior Chemist

Stage 2B/4 EDD — LDC #21666 (Tronox LLC-Northgate, Henderson NV / Tronox Phase B 2009)

LDC	SDG#	DATE REC'D	(3) DATE DUE	VOA (8260B)		SVOA (8270C)		Pest. (8081A)		Metals (SW846)		As,Se (6020)		OPHS Pest. (8141A)		Organic Acids (HPLC)		Ra-226 (903.1)		Ra-228 (904.0)		Iso. Th (300)		Iso. U (300)		Alk. (2320B)		NH_3-N (350.1)		Br,SO_4 (9056)		Cl NO_2-N (9056)		NO_3-N (353.2)			
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	R0903713	09/29/09	10/20/09	15	0	7	0	9	0	9	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	0	7	0	7	0	7	0	7	0		
F	TRX09081351	09/29/09	10/20/09	-	-	-	-	-	-	-	-	-	-	-	-	2	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
G	TRX09090358	09/29/09	10/20/09	-	-	-	-	-	-	-	-	-	-	-	-	1	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
H	233415	09/29/09	10/20/09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	11	0	11	0	11	0	11	-	-	-	-	-	-	-	-	-	-		
I	235926	09/29/09	10/20/09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20	0	20	0	20	0	20	-	-	-	-	-	-	-	-	-	-		
W	8304627	09/29/09	10/20/09	-	-	-	-	-	-	-	-	-	-	0	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
X	8304626	09/29/09	10/20/09	-	-	-	-	-	-	-	-	-	-	1	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Total	T/LR			15	0	7	0	9	0	9	0	0	0	1	11	3	18	0	31	0	31	0	31	0	31	7	0	7	0	7	0	7	0	7	0	0	232

Stage 2B/4 — LDC #21666 (Tronox LLC-Northgate, Henderson NV / Tronox Phase B 2009)

LDC	SDG#	DATE REC'D	(3) DATE DUE	CN- (9012)		Cond. (120.1)		Cr(VI) (7199)		pH (9040 /9045)		Phos-phorus (365.1)		CLO_4 (314.0)		TSS (2540D)		TDS (2540C)		MBAS (5540C)		TOC (9060/ L/K)		Chlorate (300.1)													
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	R0903713	09/29/09	10/20/09	7	0	7	0	7	0	7	0	7	0	7	0	7	0	7	0	7	0	7	0	7	0												
Total	T/LR			7	0	7	0	7	0	7	0	7	0	7	0	7	0	7	0	7	0	7	0	7	0	0	0	0	0	0	0	0	0	0	0	0	77

Shaded cells indicate Stage 4 validation (all other cells are Stage 2B validation). These sample counts do not include MS/MSD, and DUPs

EDD CHECKLIST

Reviewer: JE
2nd Reviewer: BC

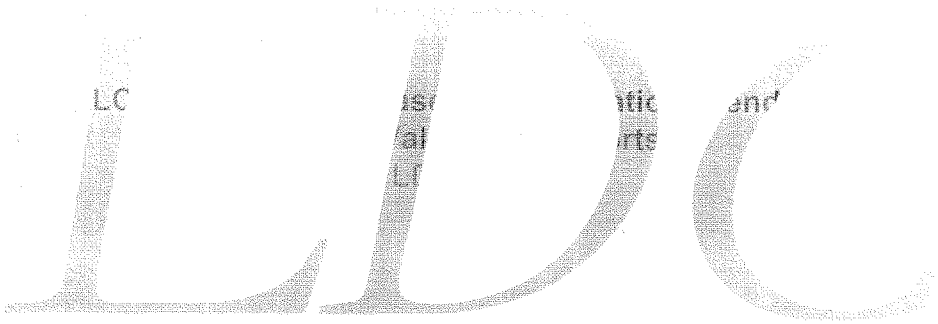
LDC #: 21666
SDG #: R0903713, TRX09081351, TRX09090358,
233415, 235926
8304614, 8304619, 8304627, 8304626

Tronox Northgate Henderson Worksheet

EDD Area	Yes	No	NA	Findings/Comments
I. Completeness				
Is there an EDD for the associated Tronox validation report?	X			
II. EDD Qualifier Population				
Were all qualifiers from the validation report populated into the EDD?	X			
III. EDD Lab Anomalies				
Were EDD anomalies identified?	X			
If yes, were they corrected or documented for the client?	X			See EDD_discrepancy_ form_LDC21666_102109.doc
IV. EDD Delivery				
Was the final EDD sent to the client?	X			

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #21666

Volatiles



Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: July 6 through July 13, 2009

LDC Report Date: November 4, 2009

Matrix: Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903713

Sample Identification

M-117B
TB070609-GW1(7/6 10:00)
M-120B
TB070709-GW1
M-103B
TB070609-GW1(7/8 07:26)
TB070809-W1
M-118B
TB070909-GW1
M-10B
M-121B
TB070609-GW1(7/10 07:10)
TB071009-W1
H-11B
TB071309-GW1

Introduction

This data review covers 15 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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 V.

Field duplicates are summarized in Section XVI.

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.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

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.

*Indicates change as the result of report review.

I. Technical Holding Times

All technical holding time requirements were met.

All samples were received in good condition with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
TB070909-GW1	All TCL compounds	A significant headspace was apparent in the sample containers.	There should be no headspace in the sample containers.	J- (all detects) UJ (all non-detects)	A

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
6/18/09	2-Methyl-2-propanol	0.026 (≥0.05)	All samples in SDG R0903713	J (all detects) UJ (all non-detects)	A

*Indicates change as the result of report review.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
7/10/09	Dichlorodifluoromethane	25.3	M-117B TB070609-GW1 (7/6 10:00) M-120B TB070709-GW1 M-103B TB070609-GW1 (7/8 07:26) TB070809-W1 161113MB	J+ (all detects)	A
7/17/09	Acetone	30.2	H-11B TB071309-GW1 16152MB	J- (all detects) UJ (all non-detects)	A

All of the continuing calibration RRF values were within method and validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/10/09	2-Methyl-2-propanol	0.023 (≥0.05)	M-117B TB070609-GW1 (7/6 10:00) M-120B TB070709-GW1 M-103B TB070609-GW1 (7/8 07:26) TB070809-W1 161113MB	J (all detects) UJ (all non-detects)	A
7/14/09	2-Methyl-2-propanol	0.024 (≥0.05)	M-118B TB070909-GW1 M-10B M-121B TB070609-GW1 (7/10 07:10) TB071009-W1 161413MB	J (all detects) UJ (all non-detects)	A

*Indicates change as the result of report review.

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/17/09	2-Methyl-2-propanol	0.023 (≥0.05)	H-11B TB071309-GW1 16152MB	J (all detects) UJ (all non-detects)	A

*V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

Samples TB070609-GW1(7/6 10:00), TB070709-GW1, TB070609-GW1(7/8 07:26), TB070809-W1, TB070909-GW1, TB070609-GW1(7/10 07:10), TB071009-W1, and TB071309-GW1 were identified as trip blanks. No volatile contaminants were found in these blanks with the following exceptions:

Trip Blank ID	Sampling Date	Compound	Concentration	Associated Samples
TB070609-GW1(7/6 10:00)	7/6/09	Acetone Dichloromethane	1.6 ug/L 0.50 ug/L	M-117B
TB070709-GW1	7/7/09	Dichloromethane	0.37 ug/L	M-120B
TB070609-GW1(7/8 07:26)	7/8/09	Chloroform Dichloromethane Toluene	0.20 ug/L 0.48 ug/L 0.30 ug/L	M-103B
TB070809-W1	7/8/09	Chloroform Dichloromethane	0.21 ug/L 0.34 ug/L	M-103B
TB070909-GW1	7/9/09	Chloroform Dichloromethane Toluene	0.21 ug/L 0.50 ug/L 0.24 ug/L	M-118B
TB070609-GW1(7/10 07:10)	7/10/09	Dichloromethane	0.43 ug/L	M-10B M-121B
*TB071009-W1	7/10/09	Dichloromethane	0.31 ug/L	M-10B M-121B
*TB071309-GW1	7/13/09	Acetone Chloroform Dichloromethane Toluene	1.7 ug/L 0.21 ug/L 0.66 ug/L 0.22 ug/L	H-11B

*Changed TB071009-W1 to TB071309-GW1 and added TB071009-W1

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

Sample	Compound	Reported Concentration	Modified Final Concentration
M-117B	Acetone	2.4 ug/L	2.4U ug/L
M-120B	Dichloromethane	0.74 ug/L	0.74U ug/L
M-103B	Dichloromethane	0.27 ug/L	0.27U ug/L
M-10B	Dichloromethane	0.30 ug/L	0.30U ug/L
M-121B	Dichloromethane	0.62 ug/L	0.62U ug/L
H-11B	Dichloromethane Toluene	0.85 ug/L 0.36 ug/L	0.85U ug/L 0.36U ug/L

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
161113LCS	1,2-Dibromo-3-chloropropane	73 (75-125)	M-117B TB070609-GW1 (7/6 10:00) M-120B TB070709-GW1 M-103B TB070609-GW1 (7/8 07:26) TB070809-W1 161113MB	J- (all detects) UJ (all non-detects)	P

*Indicates change as the result of report review.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903713	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0903713

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903713	TB070909-GW1	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Sample condition (headspace) (vh)
R0903713	M-117B TB070609-GW1 (7/6 10:00) M-120B TB070709-GW1 M-103B TB070609-GW1 (7/8 07:26) TB070809-W1 M-118B TB070909-GW1 M-10B M-121B TB070609-GW1 (7/10 07:10) TB071009-W1 H-11B TB071309-GW1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0903713	M-117B TB070609-GW1 (7/6 10:00) M-120B TB070709-GW1 M-103B TB070609-GW1 (7/8 07:26) TB070809-W1	Dichlorodifluoromethane	J+ (all detects)	A	Continuing calibration (%D) (c)
R0903713	H-11B TB071309-GW1	Acetone	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0903713	M-117B TB070609-GW1 (7/6 10:00) M-120B TB070709-GW1 M-103B TB070609-GW1 (7/8 07:26) TB070809-W1 M-118B TB070909-GW1 M-10B M-121B TB070609-GW1 (7/10 07:10) TB071009-W1 H-11B TB071309-GW1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)

*Indicates change as the result of report review.

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903713	M-117B TB070609-GW1 (7/6 10:00) M-120B TB070709-GW1 M-103B TB070609-GW1 (7/8 07:26) TB070809-W1	1,2-Dibromo-3-chloropropane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0903713	M-117B TB070609-GW1 (7/6 10:00) M-120B TB070709-GW1 M-103B TB070609-GW1 (7/8 07:26) TB070809-W1 M-118B TB070909-GW1 M-10B M-121B TB070609-GW1 (7/10 07:10) TB071009-W1 H-11B TB071309-GW1	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0903713

No Sample Data Qualified in this SDG

***Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada**
Volatiles - Trip Blank Data Qualification Summary - SDG R0903713

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903713	M-117B	Acetone	2.4U ug/L	A	bt
R0903713	M-120B	Dichloromethane	0.74U ug/L	A	bt
R0903713	M-103B	Dichloromethane	0.27U ug/L	A	bt
R0903713	M-10B	Dichloromethane	0.30U ug/L	A	bt
R0903713	M-121B	Dichloromethane	0.62U ug/L	A	bt
R0903713	H-11B	Dichloromethane Toluene	0.85U ug/L 0.36U ug/L	A	bt

*Changed code in table above

*Indicates change as the result of report review.

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21666A1
SDG #: R0903713
Laboratory: Columbia Analytical Services

Date: 10/09/09
Page: 1 of 1
Reviewer: JW
2nd Reviewer: J

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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	SW	Sampling dates: 7/06 - 13/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	
IV.	Continuing calibration/ICV	SW	CCV ≤ 25%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	TB = 2 4 6 7 9 12 13 15

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: Water

1	1 M-117B	11	2 M-121B	21	1 161113 MB	31	
2	1 TB070609-GW1 (7/6 10:00)	12	2 TB070609-GW1 (7/10 7:10)	22	2 161413 MB	32	
3	1 M-120B	13	2 TB071009-W1	23	3 161952 MB	33	
4	1 TB070709-GW1	14	3 H-11B	24		34	
5	1 M-103B	15	3 TB071309-GW1	25		35	
6	1 TB070609-GW1 (7/8 7:26)	16		26		36	
7	1 TB070809-W1	17		27		37	
8	2 M-118B	18		28		38	
9	2 TB070909-GW1	19		29		39	
10	2 M-10B	20		30		40	

(no rr, no ICV)

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride**	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform*	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. ~~Methylene chloride~~ Dichloromethane	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene**	BB. 1,1,2,2-Tetrachloroethane*	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane*	CC. Toluene**	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene*	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform**	EE. Ethylbenzene**	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN. 2-Methyl-2-propanol
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane**	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

* = System performance check compounds (SPCC) for RRF ; ** = Calibration check compounds (CCC) for %RSD.

LDC #: 21666A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

All circled dates have exceeded the technical holding times.
(Y) N N/A Were all cooler temperatures within validation criteria?

METHOD : GC/MS VOA (EPA SW 846 Method 8260B)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
9	Vials	contain significant amount of headspace					J-/UJ/A (vh)

TECHNICAL HOLDING TIME CRITERIA

Water unpreserved:	Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Water preserved:	Both within 14 days of sample collection.
Soil:	Both within 14 days of sample collection.

LDC #: 21666A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 1
Reviewer: SVL
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

(Y) N N/A Did the laboratory perform a 5 point calibration prior to sample analysis?
(Y) N N/A Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
(Y) N N/A Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? NA
Y N (N/A) Did the initial calibration meet the acceptance criteria?
Y (N) N/A Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %RSD (Limit: <30.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	6/18/09	ICAL	NNNN	6	0.026	All + Blks	J/UJ/A (c)

INICAL.1SB

LDC #: 21666A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: JVG
2nd Reviewer: [signature]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
(Y) N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
(Y) N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y (N) N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	7/10/09	B9347	JJ (+)	25.3		1-7, 161113 MB	J+ dets /A (c)
	↓		NNNN		0.023	↓	J/UJ /A
	7/14/09	B9398	NNNN		0.024	8-13, 161413 MB	J/UJ /A
	7/17/09	B9549	F (-)	30.2		14, 15, 161952 MB	J-/UJ /A
	↓		NNNN		0.023	↓	J/UJ /A

CONCAL.1SB

LDC #: 21666A1
SDG #: Sea Cruz

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 3
Reviewer: JVG
2nd Reviewer: R

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N /N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

Blank units: ug/L **Associated sample units:** ug/L

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 1 (bt)

Compound	Blank ID 2	Blank ID	Sample Identification							
Sampling Date	7/06/09		1							
F	1.6		2.4 / U							
E	0.50									

3.Y
1.0

Blank units: ug/L **Associated sample units:** ug/L

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 3 (bt)

Compound	Blank ID 4	Blank ID	Sample Identification							
Sampling Date	7/07/09		3							
E	0.37		0.74 / U							

0.74

LDC #: 21666A1
SDG #: Lee Cove

VALIDATION FINDINGS WORKSHEET
Field Blanks

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Blank units: ug/L **Associated sample units:** ug/L

Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: Associated Samples: 5 (6t)

Compound	Blank ID 6	Blank ID 7	Sample Identification							
Sampling Date	7/08/09	→	5							
K	0.20	0.21	(0.54)							
E	0.48	0.34	0.27 /U							
CC	0.30									

Blank units: ug/L **Associated sample units:** ug/L

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 8 (ND)

Compound	Blank ID 9	Blank ID	Sample Identification							
Sampling Date	7/09/09									
K	0.21									
E	0.50									
CC	0.24									

LDC #: 21666A1
SDG #: Eu Group

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N /N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

Blank units: ug/L **Associated sample units:** ug/L

Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: Associated Samples: 10 11 (6t)

Compound	Blank ID 12	Blank ID 13	Sample Identification							
Sampling Date	7/10/09		10	11						
E	0.40	0.31	0.30/U	0.62/U						

Blank units: ug/L **Associated sample units:** ug/L

Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: Associated Samples: 14 (6t)

Compound	Blank ID 15	Blank ID	Sample Identification							
Sampling Date	7/13/09		14							
F	1.7									
K	0.21									
E	0.66		0.85/U							
CC	0.22		0.36/U							

LDC #: 21666A1
SDG #: Cu Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

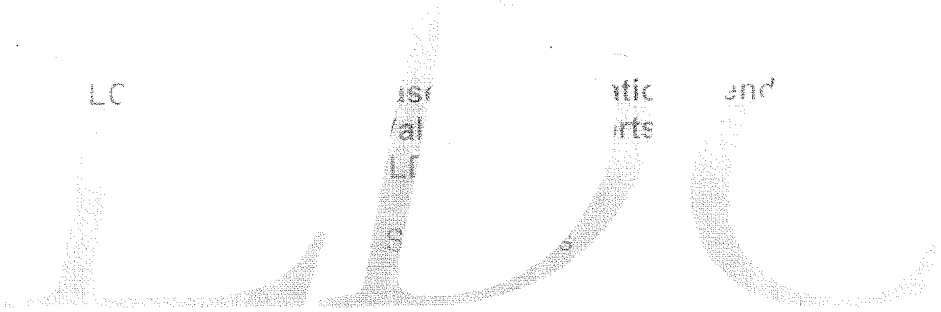
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a LCS required?
Y (N) N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		161113 LCS	MM	73 (75-125)	( )	( )	1-7, 161113MB	J-/UJ/P (1)
				( )	( )	( )		

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #21666

Semivolatiles



Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: July 6 through July 13, 2009

LDC Report Date: October 14, 2009

Matrix: Water

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903713

Sample Identification

M-117B
M-120B
M-103B
M-118B
M-10B
M-121B
H-11B

Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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 V.

Field duplicates are summarized in Section XVI.

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.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

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. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all semivolatile target compounds and system performance check compounds (SPCCs) were greater than or equal to 0.05 as required.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
7/21/09	Di-n-butylphthalate	25.5	M-118B M-10B M-121B H-11B 162794MB	J- (all detects) UJ (all non-detects)	A

All of the continuing calibration RRF values were greater than or equal to 0.05 .

V. Blanks

Method blanks were reviewed for each matrix as applicable. No semivolatile contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
161016MB	7/8/09	2-Methylnaphthalene Naphthalene	0.080 ug/L 0.16 ug/L	M-117B M-120B
162794MB	7/14/09	Anthracene Butylbenzylphthalate Di-n-butylphthalate Diethylphthalate Fluoranthene Phenanthrene Pyrene	0.050 ug/L 0.21 ug/L 2.4 ug/L 0.32 ug/L 0.040 ug/L 0.10 ug/L 0.030 ug/L	M-118B M-10B M-121B

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	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
M-118B	Anthracene Phenanthrene	0.10 ug/L 0.15 ug/L	0.10U ug/L 0.15U ug/L
M-10B	Di-n-butylphthalate	0.77 ug/L	0.77U ug/L

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
90939LCS/D (M-117B M-120B 90939MB)	Pyridine 1,4-Dioxane	19 (50-120) 46 (50-120)	23 (50-120) 47 (50-120)	- -	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P
91096LCS/D (M-103B 91096MB)	Pyridine	33 (50-120)	46 (50-120)	33 (≤30)	J (all detects) UJ (all non-detects)	P
91237LCS/D (M-118B M-10B M-121B 91237MB)	Pyridine	31 (50-120)	3 (50-120)	164 (≤70)	J (all detects) R (all non-detects)	P
91519LCS/D (H-11B 91519MB)	Pyridine	28 (50-120)	36 (50-120)	-	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903713	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG R0903713

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903713	M-118B M-10B M-121B H-11B	Di-n-butylphthalate	J- (all detects) UJ (all non-detects)	A	Continuing calibration (ICV %D) (c)
R0903713	M-117B M-120B	Pyridine 1,4-Dioxane	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0903713	M-103B	Pyridine	J (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)(RPD) (l,ld)
R0903713	M-118B M-10B M-121B	Pyridine	J (all detects) R (all non-detects)	P	Laboratory control samples (%R)(RPD) (l,ld)
R0903713	H-11B	Pyridine	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0903713	M-117B M-120B M-103B M-118B M-10B M-121B H-11B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG R0903713

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0903713	M-118B	Anthracene Phenanthrene	0.10U ug/L 0.15U ug/L	A	bl
R0903713	M-10B	Di-n-butylphthalate	0.77U ug/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles- Field Blank Data Qualification Summary - SDG R0903713

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21666A2a
SDG #: R0903713
Laboratory: Columbia Analytical Services

Date: 10/09/09
Page: 1 of 1
Reviewer: JV6
2nd Reviewer:

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/06 - 13/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	3 RSD rr
IV.	Continuing calibration/ICV	SW	CCV/ICV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	~~SW~~ N	~~FB = FB080309-S0 (R0904279)~~

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: Water

1 1	M-117B	+ 11 1	161016 MB	(90936) 21		31		
2 1	M-120B	− 12 ✓	161477 MB	(91096) 22		32		
3 ✓	M-103B	+ 13 3	162794 MB	(91237) 23		33		
4 3	M-118B	14 3	↓	(91519) 24		34		
5 3	M-10B	15		25		35		
6 3	M-121B	16		26		36		
7 3	H-11B	17		27		37		
8		18		28		38		
9		19		29		39		
10		20		30		40		

VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

A. Phenol**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	TTT. 1,4- Dioxane
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	UUU Octachlorostyrene
N. 2-Nitrophenol**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	VVV.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	WWW.

Notes:* = System performance check compound (SPCC) for RRF; ** = Calibration check compound (CCC) for %RSD.

LDC #: 21666 A2a

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Continuing Calibration

Page: 1 of 1

Reviewer: JVC

2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

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

(Y) N N/A Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument?

(Y) N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?

Y (N) N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	7/21/09	AU129 (ICV)	XX (-)	25.5		4-7, 162794 MB	J-/UJ/A (C)

CONCAL.2S

LDC #: 21666A2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: JV6
2nd Reviewer: A

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

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

Y N N/A Was a method blank analyzed for each matrix?
Y N N/A Was a method blank analyzed for each concentration preparation level?
Y N N/A Was a method blank associated with every sample?
Y N N/A Was the blank contaminated? If yes, please see qualification below.

Blank extraction date: 7/08/09 **Blank analysis date:** 7/09/09
Conc. units: ug/L Associated Samples: 1, 2 (ND)

Compound	Blank ID	Sample Identification								
	161016 MB									
W	0.080									
S	0.16									

Blank extraction date: 7/14/09 **Blank analysis date:** 7/23/09
Conc. units: ug/L Associated Samples: 4-B (bl)

Compound	Blank ID	Sample Identification								
	162794 MB	4	5							
VV	0.050	0.10/U								
AAA	0.21									
XX	2.4		0.77/U							
LL	0.32									
YY	0.040	(0.094)								
UU	0.10	0.15/U								
ZZ	0.030	(0.075)								

5x Phthalates
2x all others

LDC #: 21666 A2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: JR
2nd Reviewer: R

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

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

Y N N/A Was a LCS required?
Y N N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		90939 LCS/D	RRR	19 (50-120)	23 (50-120)	( )	1, 2, 90939 MB	J-/UJ/P (L)
			TTT	46 (↓)	47 (↓)	( )	↓	
				( )	( )	( )		
				( )	( )	( )		
		91096 LCS/D	RRR	33 (50-120)	46 (50-120)	33 (30)	3, 91096 MB	J/UJ/P (L, Ld)
				( )	( )	( )		
				( )	( )	( )		
		91237 LCS/D	RRR	31 (50-120)	3 (50-120)	164 (30)	4-6, 91237 MB	J/~~UJ~~R/P (L, Ld)
				( )	( )	( )		
				( )	( )	( )		
		91519 LCS/D	RRR	28 (50-120)	36 (50-120)	( )	7, 91519 MB	J-/UJ/P (L)
			TTT	48 (↓)	( )	( )	↓	No qual (LCSD in
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #21666

Chlorinated Pesticides

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: July 6 through July 13, 2009

LDC Report Date: October 14, 2009

Matrix: Water

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903713

Sample Identification

M-117B
M-117BRE
M-120B
M-120BRE
M-103B
M-118B
M-10B
M-121B
H-11B

Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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 V.

Field duplicates are summarized in Section XIV.

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.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

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 with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag	A or P
M-117BRE	All TCL compounds	10	7	J- (all detects) UJ (all non-detects)	A
M-120BRE	All TCL compounds	9	7	J- (all detects) UJ (all non-detects)	A

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

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of single compounds were performed for the primary (quantitation) column and confirmation column as required by this method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
7/23/09	CCV3A	STX-CLP2	4,4'-DDT	23.9	M-118B M-10B M-121B 91107MB	J- (all detects) UJ (all non-detects)	A

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
7/23/09	CCV3B	STX-CLP2	gamma-Chlordane alpha-Chlordane Endrin aldehyde Endosulfan sulfate Endrin ketone	21.2 21.8 21.9 21.1 20.3	M-118B M-10B M-121B 91107MB	J- (all detects) UJ (all non-detects)	A

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No chlorinated pesticide contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
M-117B	Not specified	Tetrachloro-m-xylene	17 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	A
90940MB	Not specified	Tetrachloro-m-xylene	31 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	P

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
91494LCS/D (M-117BRE M-120BRE H-11B 91494MB)	Endrin aldehyde	149 (50-130)	-	52 (≤30)	J (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903713	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
M-117BRE M-120BRE	All TCL compounds	X	A

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG R0903713

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903713	M-117BRE M-120BRE	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
R0903713	M-118B M-10B M-121B	4,4'-DDT gamma-Chlordane alpha-Chlordane Endrin aldehyde Endosulfan sulfate Endrin ketone	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0903713	M-117B	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Surrogate spikes (%R) (s)
R0903713	M-117BRE M-120BRE H-11B	Endrin aldehyde	J (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)(RPD) (l,ld)
R0903713	M-117B M-117BRE M-120B M-120BRE M-103B M-118B M-10B M-121B H-11B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0903713	M-117BRE M-120BRE	All TCL compounds	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG R0903713

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG R0903713

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21666A3a
SDG #: R0903713
Laboratory: Columbia Analytical Services

Date: 10/09/09
Page: 1 of 1
Reviewer: JVC
2nd Reviewer: [signature]

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)

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	SW	Sampling dates: 7/06 - 13/09
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	%RSD ≤ 20%
IV.	Continuing calibration/ICV	SW	CCV/ICV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	SW	
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	SW	
XIV.	Field duplicates	N	
XV.	Field blanks	NB	~~EB = FB080509-50 (R0904279)~~

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: Water

1 1	M-117B	11 1	90440 MB	21		31	
2 Y	M-117BRE	12 Y	91494	22		32	
3 1	M-120B	13 3	91107	23		33	
4 Y	M-120BRE	14 4	91238	24		34	
5 3	M-103B	15		25		35	
6 4	M-118B	16		26		36	
7 4	M-10B	17		27		37	
8 4	M-121B	18		28		38	
9 Y	H-11B	19		29		39	
10		20		30		40	

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH.
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	II.
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. DB 1701	LL.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE.	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF.	NN.

Notes:_____

LDC #: 21666A3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: SVL
2nd Reviewer: [signature]

All circled dates have exceeded the technical holding times.
Y N N/A Were all cooler temperatures within validation criteria?

METHOD : GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
2	W	N	7/06/09	7/16/09	7/23/09	10	J-/UJA (h)
4			7/07/09	7/16/09	7/23/09	9	

TECHNICAL HOLDING TIME CRITERIA

Water: Extracted within 7 days, analyzed within 40 days.
Soil: Extracted within 14 days, analyzed within 40 days.

LDC #: 21664A3a
SDG #: In Comp

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: JVC
2nd Reviewer: [signature]

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)
Please see qualifications below for all questions answered "N" Not applicable questions are identified as "N/A".

What type or calibration verification calculation was performed? ___ %D or ___ RPD

Y N N/A Were Evaluation mix standards run before initial calibration and before samples?

Y N N/A Were Endrin & 4,4'-DDT breakdowns acceptable in the Evaluation Mix standard (≤15.0% for individual breakdowns)?

Y N N/A Was at least one standard run daily to verify the working curve?

Y N N/A Did the continuing calibration standards meet the percent difference (%D) / relative percent difference (RPD) criteria of ≤~~15.0%~~ 20?

Level IV/D Only

Y N N/A Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Column	Compound	%D (Limit ≤ ~~15.0~~ 20)	RT (Limits)	Associated Samples	Qualifications
	7/23/09	CCV3A	STX-CLP2	O (-)	23.9	( )	6-8, 91107 MB	J-/UJ/A (C)
		CCV3B		T (-)	21.2	( )		
				S (-)	21.8	( )		
				R (-)	21.9	( )		
				N (-)	21.1	( )		
				Q (-)	20.3	( )		
						( )		
						( )		
						( )		
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						( )		
						( )		
						( )		
						( )		
						( )		

A. alpha-BHC	E. Heptachlor	I. Dieldrin	M. 4,4'-DDD	Q. Endrin ketone	U. Toxaphene	Y. Aroclor-1242	CC. DB 608	GG.
B. beta-BHC	F. Aldrin	J. 4,4'-DDE	N. Endosulfan sulfate	R. Endrin aldehyde	V. Aroclor-1016	Z. Aroclor-1248	DD. DB 1701	HH.
C. delta-BHC	G. Heptachlor epoxide	K. Endrin	O. 4,4'-DDT	S. alpha-Chlordane	W. Aroclor-1221	AA. Aroclor-1254	EE.	II.
D. gamma-BHC	H. Endosulfan I	L. Endosulfan II	P. Methoxychlor	T. gamma-Chlordane	X. Aroclor-1232	BB. Aroclor-1260	FF.	JJ.

LDC #: 21666A3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: JVG
2nd Reviewer:

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

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

Y (N) N/A Were surrogates spiked into all samples, standards and blanks?

Y (N) N/A Did all surrogate percent recoveries (%R) meet the QC limits?

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		1	Not spec	A	17 (40-140)	J- /UJ /A (S)
		90940 MB	↓	↓	31 ( )	J- /UJ /P
					( )	
					( )	
					( )	
					( )	
					( )	
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					( )	
					( )	

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	Tetrachloro-m-xylene			
B	Decachlorobiphenyl			

LDC #: 21666A39
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: Q

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

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

(Y) N N/A Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG? ____________

Y (N) N/A Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

Level IV/D Only

Y N (N/A) Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		91494 LCS/D	R	149 (50-130)	( )	52 (30)	2, 4, 9, 91494 MB	J/UJ/P (dets/nds)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		

LDC #: 21666 A3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: e

METHOD: GC Pesticides/PCBs (EPA SW846 Method 8081/8082)

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		2, 4	Outside H.T.		X /A (o)

Comments: _____

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #21666

Metals

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: July 6 through July 13, 2009

LDC Report Date: October 14, 2009

Matrix: Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903713

Sample Identification

M-117B
M-120B
M-103B
M-118B
M-10B
M-121B
M-10BDISS
H-11B
H-11BDISS
M-117BMS
M-117BDUP

Introduction

This data review covers 11 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and 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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Calcium Zinc	8.1 ug/L 0.7 ug/L	All samples in SDG R0903713
ICB/CCB	Boron Copper Strontium Tungsten	6.5 ug/L 1.2 ug/L 0.1 ug/L 0.04 ug/L	All samples in SDG R0903713
ICB/CCB	Barium Sodium	1.1 ug/L 62 ug/L	M-120B M-103B M-118B M-10B M-121B M-10BDISS H-11B H-11BDISS
ICB/CCB	Barium Cobalt	0.5 ug/L 0.4 ug/L	M-117B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Calcium	12.8 ug/L	M-117B M-120B M-118B M-10B M-121B M-10BDISS H-11B
ICB/CCB	Calcium	7.9 ug/L	M-103B H-11BDISS

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	Analyte	Reported Concentration	Modified Final Concentration
M-117B	Copper Tungsten Cobalt	1.6 ug/L 0.63 ug/L 0.4 ug/L	10.0U ug/L 1.00U ug/L 10.0U ug/L
M-120B	Copper Tungsten Zinc	4.1 ug/L 0.55 ug/L 2.1 ug/L	10.0U ug/L 1.00U ug/L 10.0U ug/L
M-103B	Copper Tungsten	1.3 ug/L 0.74 ug/L	10.0U ug/L 1.00U ug/L
M-118B	Tungsten Zinc	0.84 ug/L 3.1 ug/L	1.00U ug/L 10.0U ug/L
M-10B	Copper Tungsten	1.2 ug/L 0.62 ug/L	10.0U ug/L 1.00U ug/L
M-121B	Tungsten Zinc	0.75 ug/L 1.1 ug/L	1.00U ug/L 10.0U ug/L
M-10BDISS	Copper Tungsten	1.9 ug/L 0.55 ug/L	10.0U ug/L 1.00U ug/L
H-11B	Zinc	4.0 ug/L	10.0U ug/L
H-11BDISS	Zinc	1.3 ug/L	10.0U ug/L

No field blanks were identified in this SDG.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

Matrix spike (MS) samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

Raw data were not reviewed for this SDG.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903713	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG R0903713

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0903713	M-117B M-120B M-103B M-118B M-10B M-121B M-10BDISS H-11B H-11BDISS	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0903713

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903713	M-117B	Copper Tungsten Cobalt	10.0U ug/L 1.00U ug/L 10.0U ug/L	A	bl
R0903713	M-120B	Copper Tungsten Zinc	10.0U ug/L 1.00U ug/L 10.0U ug/L	A	bl
R0903713	M-103B	Copper Tungsten	10.0U ug/L 1.00U ug/L	A	bl
R0903713	M-118B	Tungsten Zinc	1.00U ug/L 10.0U ug/L	A	bl
R0903713	M-10B	Copper Tungsten	10.0U ug/L 1.00U ug/L	A	bl
R0903713	M-121B	Tungsten Zinc	1.00U ug/L 10.0U ug/L	A	bl
R0903713	M-10BDISS	Copper Tungsten	10.0U ug/L 1.00U ug/L	A	bl
R0903713	H-11B	Zinc	10.0U ug/L	A	bl
R0903713	H-11BDISS	Zinc	10.0U ug/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG R0903713

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21666A4
SDG #: R0903713
Laboratory: Columbia Analytical Services

Date: 10-8-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

METHOD: Metals (EPA SW 846 Method 6010B/6020/7000)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/6/09-7/13/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	A	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

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

Validated Samples: water

1	M-117B	11	M-117BDUP	21		31	
2	M-120B	12		22		32	
3	M-103B	13		23		33	
4	M-118B	14		24		34	
5	M-10B	15		25		35	
6	M-121B	16		26		36	
7	M-10BDISS	17		27		37	
8	H-11B	18		28		38	
9	H-11BDISS	19		29		39	
10	M-117BMS	20		30		40	

Notes: _____

LDC #: 21666A4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-9	—	(Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn)
QC:10,11		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS		Al, **Sb**, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, **Pb**, Mg, Mo, Mn, Hg, Ni, **Pt**, K, Se, Ag, Na, Sr, **Tl**, Sn, Ti, **W**, **U**, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 21666A4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: ug/L

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: NA
Associated Samples: All

Reason: bl
Raise to RL

Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	1	2	3	4	5	6	7	8	9	
B		6.5												
Cu		1.2		10.0	1.6	4.1	1.3		1.2		1.9			
Ca	8.1													
Sr		0.1												
W		0.04		1.00	0.63	0.55	0.74	0.84	0.62	0.75	0.55			
Zn	0.7			10.0		2.1		3.1		1.1		4.0	1.3	

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 2-9

Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	No Qualifiers									
Ba		1.1												
Na		62												

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1

Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	1									
Ba		0.5												
Co		0.4			0.4 / 10.0									

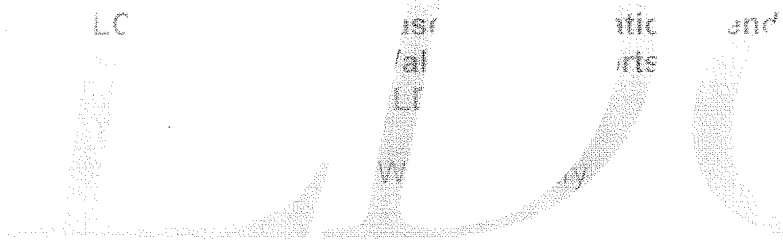
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: Ca*=1, 2, 4-8, Ca**=3, 9,

Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	No Qualifiers									
Ca*		12.8												
Ca**		7.9												

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #21666

Wet Chemistry



Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: July 6 through July 13, 2009

LDC Report Date: October 20, 2009

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903713

Sample Identification

M-117B
M-120B
M-103B
M-118B
M-10B
M-121B
H-11B
M-103BMS
M-103BMSD
M-103BDUP

Introduction

This data review covers 10 water samples listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA Method 353.2 for Nitrite as Nitrogen, EPA Method 300.1 for Chlorate, EPA Method 120.1 for Conductivity, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Dissolved Hexavalent Chromium, EPA SW 846 Method 9040B for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, Standard Method 2540C for Total Dissolved Solids, Standard Method 2540D for Total Suspended Solids, and EPA SW 846 Method 9060 for Total Organic Carbon.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and 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 X.

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.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

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

Calibration verification frequency and analysis criteria were met for each method when applicable with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
7/7/09	CCV	Surfactants	112 (90-110)	M-117B	J+ (all detects)	P

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Ammonia as N Total phosphorus	0.008 mg/L 0.005 mg/L	All samples in SDG R0903713
ICB/CCB	Alkalinity	1.0 mg/L	All samples in SDG R0903713
PB (prep blank)	Chloride	0.16 mg/L	M-117B
ICB/CCB	Ammonia as N Total phosphorus	0.009 mg/L 0.0052 mg/L	M-117B
PB (prep blank)	Chloride	0.13 mg/L	M-120B
ICB/CCB	Chloride Total phosphorus	0.16 mg/L 0.0094 mg/L	M-120B
PB (prep blank)	Chloride	0.1 mg/L	M-103B M-118B M-10B M-121B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Chloride Total phosphorus	0.10 mg/L 0.0066 mg/L	M-103B M-118B M-10B M-121B
ICB/CCB	Bromide Sulfate	0.06 mg/L 0.11 mg/L	H-11B
ICB/CCB	Sulfate	0.12 mg/L	M-120B M-103B M-118B M-10B M-121B

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	Analyte	Reported Concentration	Modified Final Concentration
M-117B	Total phosphorus	0.042 mg/L	0.050U mg/L
M-120B	Ammonia as N Total phosphorus	0.021 mg/L 0.018 mg/L	0.050U mg/L 0.050U mg/L
M-118B	Ammonia as N Total phosphorus	0.026 mg/L 0.014 mg/L	0.050U mg/L 0.050U mg/L
M-10B	Total phosphorus	0.015 mg/L	0.050U mg/L
M-121B	Total phosphorus	0.018 mg/L	0.050U mg/L
H-11B	Total phosphorus	0.013 mg/L	0.050U mg/L

Sample MC-3B-FILT (from SDG R0902886) was identified as a filter blank. No contaminant concentrations were found in this blank.

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses 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. Surrogates

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits.

VIII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903713	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

IX. Overall Assessment

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

X. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R0903713

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0903713	M-117B	Surfactants	J+ (all detects)	A	Calibration (CCV %R) (c)
R0903713	M-117B M-120B M-103B M-118B M-10B M-121B H-11B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0903713

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903713	M-117B	Total phosphorus	0.050U mg/L	A	bl
R0903713	M-120B	Ammonia as N Total phosphorus	0.050U mg/L 0.050U mg/L	A	bl
R0903713	M-118B	Ammonia as N Total phosphorus	0.050U mg/L 0.050U mg/L	A	bl
R0903713	M-10B	Total phosphorus	0.050U mg/L	A	bl
R0903713	M-121B	Total phosphorus	0.050U mg/L	A	bl
R0903713	H-11B	Total phosphorus	0.050U mg/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0903713

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21666A6
SDG #: R0903713
Laboratory: Columbia Analytical Services

Date: 10-909
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N,Sulfate (EPA SW846 Method 9056), Nitrite-N (EPA Method 353.2), Chlorate (EPA SW846 Method 9056M), Conductivity (EPA Method 120.1), Cyanide (EPA SW846 Method 9012A), Dissolved Hexavalent Chromium (EPA Method 218.6), pH (EPA SW846 Method 9040B), Surfactants (SM5540C), Perchlorate (EPA Method 314.0), Total Phosphorus (EPA Method 365.1), TDS (SM2540C), TSS (SM2540D), TOC (EPA SW846 Method 9060),
The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/6/09 - 7/13/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW	
III.	Blanks	SW	
IV	Surrogate Spikes	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS/D
VI.	Duplicates	A	DUP
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	ND	FilterBlank= MC-3B-FILT (SIOG# R0902886)

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: water

1	M-117B	11	PBW1	21		31	
2	M-120B	12		22		32	
3	M-103B	13		23		33	
4	M-118B	14		24		34	
5	M-10B	15		25		35	
6	M-121B	16		26		36	
7	H-11B	17		27		37	
8	M-103BMS	18		28		38	
9	M-103BMSD	19		29		39	
10	M-103BDUP	20		30		40	

Notes:

LDC #: 21666A6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-7	W	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
QC: 8	W	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
9	↓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
↓ 10		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio

Comments:

LDC #: 21666A6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Calibration

METHOD: Inorganics, EPA Method see cover

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

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?
Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% ?
Y N N/A Are all correlation coefficients ≥0.995 ?

LEVEL IV/D ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recaluculation Worksheet for recalulations.
Y N N/A Was a balance check conducted prior to the TDS analysis.?
Y N N/A Was the titrant normality checked?

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
	2/7/09	CCV	MBAS	112	1	J+ det LP

Comments:

LDC #: 21666A6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer: W

METHOD: Inorganics, Method See Cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/L **Associated Samples: All**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			1	2	4	5	6	7				
Alk		1.0											
NH3-N	0.008				0.021 / 0.050	0.026 / 0.050							
T-P	0.005			0.042 / 0.050	0.018 / 0.050	0.014 / 0.050	0.015 / 0.050	0.018 / 0.050	0.013 / 0.050				

Conc. units: mg/L **Associated Samples: 1**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			1									
Cl	0.16												
NH3-N		0.009											
T-P		0.0052		See PB									

Conc. units: mg/L **Associated Samples: 2**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			2									
Cl	0.13	0.16											
T-P		0.0094		See PB									

LDC #: 21666A6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/L **Associated Samples:** 3-6

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			4	5	6	7						
Cl	0.1	0.10											
T-P		0.0066		See PB	See PB	See PB	See PB						

Conc. units: mg/L **Associated Samples:** 7

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
Br		0.06											
SO4		0.11											

Conc. units: mg/L **Associated Samples:** 2-6

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
SO4		0.12											

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #21666

Organophosphorus Pesticides

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 3, 2009

LDC Report Date: October 14, 2009

Matrix: Soil

Parameters: Organophosphorus Pesticides

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 8304627

Sample Identification

SA106-12B
SA106-35B
SA58-0.5B
SA58-28B
SA58009-28B

Introduction

This data review covers 5 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8141A for Organophosphorus Pesticides.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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.

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.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

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

Initial calibration of compounds was performed for the primary (quantitation) column and confirmation column as required by this method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. The coefficient of determination (r^2) was greater than or equal to 0.990 .

b. Calibration Verification

Calibration verification was performed at the required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were less than or equal to 20.0% with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
9/15/09	021F2101	1	Dimethoate Azinphos-methyl	21.2 35.3	All samples in SDG 8304627	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
9/15/09	021F2101	2	Azinphos-methyl	35.9	All samples in SDG 8304627	J- (all detects) UJ (all non-detects)	A

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
9/10/09	031F310	1	Naled	21.0	All samples in SDG 8304627	J- (all detects) UJ (all non-detects)	A

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
9/10/09	031F310	2	Mevinphos Naled Phorate Trichloronate	21.8 28.1 30.1 22.0	All samples in SDG 8304627	J- (all detects) UJ (all non-detects)	A
9/10/09	031F310	2	Parathion-ethyl	27.2	All samples in SDG 8304627	J+ (all detects)	A

III. Blanks

Method blanks were reviewed for each matrix as applicable. No organophosphorus pesticide contaminants were found in the method blanks.

Sample FB072909-SO (from SDG 8304620) was identified as a field blank. No organophosphorus pesticide contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. The percent recoveries (%R) were within QC limits.

b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

c. Laboratory Control Samples

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

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304627	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VII. System Performance

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

Samples SA58-28B and SA58009-28B were identified as field duplicates. No organophosphorus pesticides were detected in any of the samples.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304627

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304627	SA106-12B SA106-35B SA58-0.5B SA58-28B SA58009-28B	Dimethoate Azinphos-methyl	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304627	SA106-12B SA106-35B SA58-0.5B SA58-28B SA58009-28B	Mevinphos Naled Phorate Trichloronate	J- (all detects) UJ (all non-detects)	A	Continuing calibration (ICV %D) (c)
8304627	SA106-12B SA106-35B SA58-0.5B SA58-28B SA58009-28B	Parathion-ethyl	J+ (all detects)	A	Continuing calibration (ICV %D) (c)
8304627	SA106-12B SA106-35B SA58-0.5B SA58-28B SA58009-28B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG 8304627

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG 8304627

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21666W17
SDG #: 8304627
Laboratory: Test America

Date: 10/12/09
Page: 1 of 1
Reviewer: SVG
2nd Reviewer:

METHOD: GC Organophosphorus Pesticides (EPA SW 846 Method 8141A)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/03/09
IIa.	Initial calibration	A	%RSD ≤20% rr
IIb.	Calibration verification/ICV	SW	CCV/ICV ≤20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	Client spec
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	D = 4,5
X.	Field blanks	ND	FB = FB072909-SO (8304620)

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: Soil

1	SA106-12B	11	9251497 MB	21		31	
2	SA106-35B	12		22		32	
3	SA58-0.5B	13		23		33	
4	SA58-28B D	14		24		34	
5	SA58009-28B D	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

VALIDATION FINDINGS WORKSHEET

METHOD: ✓ GC ___ HPLC

8310	8330	8151	8141	8141 (Con't)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensulfothion	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Bolstar	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X. EPN	EE. Ethyl Benzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	Y. Azinphos-methyl	SSS. O-Xylene
E. Benzo(a)pyrene	E. Tetryl	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. MP-Xylene
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total Xylene
G. Benzo(g,h,i)perylene	G. 2.4.6-Trinitrotoluene	G. Dicamba	G. Sulfotep	BB. Trichloronate	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Trichlorinate	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotolune	J. MCPA	J. Diazinon	EE. Def	
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowl	
L. Fluorene	L. 2-Nitrotoluene	L.. 2,4,5-TP (silvex)	L. Parathion-methyl	GG. Ethion	
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel	HH. Tetrachlorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	II. Sulprofos	
O. Phenanthrene	O.		O. Chlorpyrifos	JJ. Thionazin	
P. Pyrene	P.		P. Fenthion	kk. Phosmet	
Q.	Q		Q. Parathion-ethyl	LL. O,O,o-Triethylphosphorothioate	
R.			R. Trichloronate	MM. Famphur	
S.			S. Merphos	NN. Carbophenothion	
			T. Stirofos	OO. Carbophenothion-methyl	
			U. Tokuthion		

Notes: _____

cmpd_list.wpd

LDC #: 21666 W17
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: JVC
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
What type of continuing calibration calculation was performed? ✓ %D or ___ RPD
Y N N/A Were continuing calibration standards analyzed at the required frequencies? 20
Y (N) N/A Did the continuing calibration standards meet the %D / RPD validation criteria of ~~≤15.0~~ 20%?
~~Level IV Only~~
Y N N/A Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit ≤ ~~15.0~~ 20)	RT (limit)	Associated Samples	Qualifications
	9/10/09	031F310	Col. 1	F (-)	21.0	( )	All + Blk	J-/UJ/A (c)
		(ICV)	Col. 2	B (-)	21.8	( )		
				F (-)	28.1	( )		
				H (-)	30.1	( )		
				R (-)	22.0	( )		
				Q (+)	27.2	( )		J+ dets/A
						( )		
	9/15/09	021F2101	Col. 1	I (-)	21.2	( )		J-/UJ/A
		(CCV)	↓	Y (-)	35.3	( )		
			Col. 2	Y (-)	35.9	( )		
						( )		
						( )		
						( )		
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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: August 24 through August 28, 2009

LDC Report Date: November 3, 2009

Matrix: Soil/Water

Parameters: Organophosphorus Pesticides

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 8304626

Sample Identification

SA154-0.5B
SA154-10B
SA154-33B
RSAS3-0.5B
RSAS3009-0.5B
RSAS3-44B
FB082809-SO
SA154-0.5BMS
SA154-0.5BMSD
RSAS3-0.5BMS
RSAS3-0.5BMSD

Introduction

This data review covers 10 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8141A for Organophosphorus Pesticides.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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.

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.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

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.

*Indicates change as the result of report review.

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

Initial calibration of compounds was performed for the primary (quantitation) column and confirmation column as required by this method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. The coefficient of determination (r^2) was greater than or equal to 0.990 .

*b. Calibration Verification

Calibration verification was performed at the required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were less than or equal to 20.0% with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
9/15/09	021F2101	1	Dimethoate Azinphos-methyl	21.2 35.3	RSAS3-0.5B RSAS3-0.5BMS RSAS3-0.5BMSD 9251497MB	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
9/15/09	021F2101	2	Azinphos-methyl	35.9	RSAS3-0.5B RSAS3-0.5BMS RSAS3-0.5BMSD 9251497MB	J- (all detects) UJ (all non-detects)	A

The percent differences (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
9/10/09	031F3101	1	Naled	21.0	All samples in SDG 8304626	J- (all detects) UJ (all non-detects)	A

*Indicates change as the result of report review.

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
*9/10/09	031F3101	2	Naled Phorate Trichloronate Mevinphos	28.1 30.1 22.0 21.8	All samples in SDG 8304626	J- (all detects) UJ (all non-detects)	A
9/10/09	031F3101	2	Parathion-ethyl	27.2	All samples in SDG 8304626	J+ (all detects)	A

*Added mevinphos to table above

III. Blanks

Method blanks were reviewed for each matrix as applicable. No organophosphorus pesticide contaminants were found in the method blanks.

Sample FB082809-SO was identified as a field blank. No organophosphorus pesticide contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. The percent recoveries (%R) were within QC limits.

b. 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.

c. Laboratory Control Samples

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

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304626	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VII. System Performance

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

Samples RSAS3-0.5B and RSAS3009-0.5B were identified as field duplicates. No organophosphorus pesticides were detected in any of the samples.

*Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organophosphorus Pesticides - Data Qualification Summary - SDG 8304626

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304626	RSAS3-0.5B	Dimethoate Azinphos-methyl	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
*8304626	SA154-0.5B SA154-10B SA154-33B RSAS3-0.5B RSAS3009-0.5B RSAS3-44B FB082809-SO	Naled Phorate Trichloronate Mevinphos	J- (all detects) UJ (all non-detects)	A	Continuing calibration (ICV %D) (c)
8304626	SA154-0.5B SA154-10B SA154-33B RSAS3-0.5B RSAS3009-0.5B RSAS3-44B FB082809-SO	Parathion-ethyl	J+ (all detects)	A	Continuing calibration (ICV %D) (c)
8304626	SA154-0.5B SA154-10B SA154-33B RSAS3-0.5B RSAS3009-0.5B RSAS3-44B FB082809-SO	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG 8304626

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG 8304626

No Sample Data Qualified in this SDG

*Indicates change as the result of report review.

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21666X17
SDG #: 8304626
Laboratory: Test America

Date: 10/19/09
Page: 1 of 1
Reviewer: JVC
2nd Reviewer: [signature]

METHOD: GC Organophosphorus Pesticides (EPA SW 846 Method 8141A)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8/24 - 28/09
IIa.	Initial calibration	A	%RSD r2
IIb.	Calibration verification/ICV	SW	CCV/ICV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS/D
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	D = 4, 5
X.	Field blanks	ND	FB = 7

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: Soil + Water

1	SA154-0.5B	S	11	RSAS3-0.5BMSD	S	21	9242023 MB	31	
2	SA154-10B		12			22	9251497 MB	32	
3	SA154-33B		13			23	9243476 MB	33	
4	RSAS3-0.5B	D	14			24		34	
5	RSAS3009-0.5B	D	15			25		35	
6	RSAS3-44B		16			26		36	
7	FB082809-SO	W	17			27		37	
8	SA154-0.5BMS	S	18			28		38	
9	SA154-0.5BMSD		19			29		39	
10	RSAS3-0.5BMS		20			30		40	

Notes: _____

VALIDATION FINDINGS WORKSHEET

METHOD: ✓ GC ___ HPLC

8310	8330	8151	8141	8141 (Con't)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensulfothion	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Bolstar	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X. EPN	EE. Ethyl Benzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	Y. Azinphos-methyl	SSS. O-Xylene
E. Benzo(a)pyrene	E. Tetryl	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. MP-Xylene
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total Xylene
G. Benzo(g,h,i)perylene	G. 2,4,6-Trinitrotoluene	G. Dicamba	G. Sulfotep	BB. Trichloronate	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Trichlorinate	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotolune	J. MCPA	J. Diazinon	EE. Def	
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowl	
L. Fluorene	L. 2-Nitrotoluene	L.. 2,4,5-TP (silvex)	L. Parathion-methyl	GG. Ethion	
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel	HH. Tetrachlorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	II. Sulprofos	
O. Phenanthrene	O.		O. Chlorpyrifos	JJ. Thionazin	
P. Pyrene	P.		P. Fenthion	kk. Phosmet	
Q.	Q		Q. Parathion-ethyl	LL. O,O,o-Triethylphosphorothioate	
R.			R. Trichloronate	MM. Famphur	
S.			S. Merphos	NN. Carbophenothion	
			T. Stirofos	OO. Carbophenothion-methyl	
			U. Tokuthion		

Notes: _____

cmpd_list.wpd

LDC #: 21666X17
SDG #: Sulfur

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ✓ GC __ HPLC

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

What type of continuing calibration calculation was performed? ✓ %D or __ %R

(Y) N N/A Were continuing calibration standards analyzed at the required frequencies?

Y (N) N/A Did the continuing calibration standards meet the %D / RPD validation criteria of ≤20.0%?

Level IV Only

Y N (N/A) Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Detector/ Column	Compound	%D (Limit ≤ 20.0)	RT (limit)	Associated Samples	Qualifications
	9/10/09	031F3101	Col. 1	F (-)	21.0	( )	All + blks	J-/UJ/A (c)
		(ICV)	Col. 2	F (-)	28.1	( )	↓	↓
				H (-)	30.1	( )	↓	↓
				R (-)	22.0	( )	↓	↓
				Q (+)	27.2	( )	↓	J+dets/A
				B (-)	21.8	( )	↓	J-/UJ/A
						( )		
	9/15/09	621F2101	Col. 1	I (-)	21.2	( )	4, 10, 11, 9251497MB	J-/UJ/A
		(CCV)	↓	Y (-)	35.3	( )	↓	↓
			Col. 2	Y (-)	35.9	( )	↓	↓
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #21666

Radium-226 & Radium-228

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: July 13 through August 5, 2009

LDC Report Date: October 14, 2009

Matrix: Soil

Parameters: Radium-226 & Radium-228

Validation Level: Stage 2B

Laboratory: GEL Laboratories, LLC.

Sample Delivery Group (SDG): 233415

Sample Identification

RSAM3-10BSPLP
SA166-10BSPLP
SA56-10BSPLP
SA182-10BSPLP
RSAL6-0.5BSPLP
RSAL6-28BSPLP
RSAU4-20BSPLP
RSAU4-50BSPLP
RSAJ3-10BSPLP
RSAJ3-29BSPLP
RSAU5-0.5BSPLP
RSAM3-10BSPLPMS
RSAM3-10BSPLPDUP

Samples in this SDG underwent SPLP extraction

Introduction

This data review covers 13 soil samples listed on the cover sheet. The analyses were per EPA Methods 903.1 and 904.0 for Radium-226 and Radium-228.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and the Multi-Agency Radiological Laboratory Analytical Protocols Manual (MARLAP) 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.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

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 and a self-absorption curve was generated for each radionuclide of interest.

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) Duplicate

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) 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. Sample Result Verification and Project Quantitation Limit

All isotopes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 233415	All isotopes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VI. Minimum Detectable Activity (MDA)

All minimum detectable activities met required PQLs.

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.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Radium-226 & Radium-228 - Data Qualification Summary - SDG 233415

SDG	Sample	Isotope	Flag	A or P	Reason (Code)
233415	RSAM3-10BSPLP SA166-10BSPLP SA56-10BSPLP SA182-10BSPLP RSAL6-0.5BSPLP RSAL6-28BSPLP RSAU4-20BSPLP RSAU4-50BSPLP RSAJ3-10BSPLP RSAJ3-29BSPLP RSAU5-0.5BSPLP	All isotopes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Radium-226 & Radium-228 - Laboratory Blank Data Qualification Summary - SDG 233415

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Radium-226 & Radium-228 - Field Blank Data Qualification Summary - SDG 233415

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21666H29
SDG #: 233415
Laboratory: GEL Laboratories LLC

Date: 10-13
Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Radium 226 and Radium 228 (EPA Method 903.1 & 904)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7-13-09 through 8-5-09
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IVa.	Matrix Spike/(Matrix Spike) Duplicates	A	MS/DUP
IVb.	Laboratory control samples	A	LCS
IVc.	Chemical recovery	A	
V.	Sample result verification	N	
VI.	Minimum dectectable activity (MDA)	A	
VII.	Overall assessment of data	A	
VIII.	Field duplicates	N	
XIV	Field blanks	N	

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

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

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:
911 soil

1	RSAM3-10BSPLP	11	RSAU5-0.5BSPLP	21		31	
2	SA166-10BSPLP	12	RSAM3-10BSPLPMS 226 228	22		32	
3	SA56-10BSPLP	13	RSAM3-10BSPLPDUP 226 228	23		33	
4	SA182-10BSPLP	14	PBW	24		34	
5	RSAL6-0.5BSPLP	15	PBSPLP	25		35	
6	RSAL6-28BSPLP	16		26		36	
7	RSAU4-20BSPLP	17		27		37	
8	RSAU4-50BSPLP	18		28		38	
9	RSAJ3-10BSPLP	19		29		39	
10	RSAJ3-29BSPLP	20		30		40	

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: August 24 through August 26, 2009

LDC Report Date: October 14, 2009

Matrix: Soil

Parameters: Radium-226 & Radium-228

Validation Level: Stage 2B

Laboratory: GEL Laboratories, LLC.

Sample Delivery Group (SDG): 235926

Sample Identification

SA150-10B	RSAT3-10BMS
SA150-30B	RSAT3-10BDUP
SA154-0.5B	
SA154-10B	
SA154-20B	
SA154-33B	
SA64-10B	
SA64-23B	
SA60-10B	
SA60-20B	
SA60009-20B	
SA60-33B	
RSAN5-10B	
RSAN5-20B	
RSAN5-33B	
SA94-0.5B	
SA94-10B	
SA94-29B	
RSAT3-10B	
RSAT3-25B	

Introduction

This data review covers 22 soil samples listed on the cover sheet. The analyses were per EPA Methods 903.1 and 904.0 for Radium-226 and Radium-228.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and the Multi-Agency Radiological Laboratory Analytical Protocols Manual (MARLAP) 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.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

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 and a self-absorption curve was generated for each radionuclide of interest.

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).

Sample FB072909-SO (from SDG 234267) was identified as an equipment blank. No radium-226 or radium-228 was found in this blank.

IV. Accuracy and Precision Data

a. Matrix Spike/(Matrix Spike) Duplicate

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) 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. Sample Result Verification and Project Quantitation Limit

All isotopes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 235926	All isotopes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VI. Minimum Detectable Activity (MDA)

All minimum detectable activities met required PQLs with the following exceptions:

Sample	Isotope	Lab DL (pCi/g)	QAPP PQL (pCi/g)	Flag	A or P
SA154-10B	Radium-228	0.511	0.5	None	P
SA154-20B	Radium-228	0.537	0.5	None	P
SA64-10B	Radium-228	0.619	0.5	None	P
SA60-10B	Radium-228	0.540	0.5	None	P
RSAN5-33B	Radium-228	0.676	0.5	None	P
RSAT3-10B	Radium-228	0.566	0.5	None	P
RSAT3-25B	Radium-228	0.714	0.5	None	P

The MDA was greater than the PQL as listed above.

VII. Overall Assessment of Data

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

VIII. Field Duplicates

Samples SA60-20B and SA60009-20B were identified as field duplicates. No radium-226 or radium-228 was detected in any of the samples with the following exceptions:

Analyte	Concentration (pCi/g)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA60-20B	SA60009-20B				
Radium-228	1.28	1.19	-	0.09 (≤0.5)	-	-
Radium-226	1.81	2.56	-	0.75 (≤0.5)	J (all detects)	A

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Radium-226 & Radium-228 - Data Qualification Summary - SDG 235926

SDG	Sample	Isotope	Flag	A or P	Reason (Code)
235926	SA154-10B SA154-20B SA64-10B SA60-10B RSAN5-33B RSAT3-10B RSAT3-25B	Radium-228	None	P	Minimum detectable activity (PQL)
235926	SA150-10B SA150-30B SA154-0.5B SA154-10B SA154-20B SA154-33B SA64-10B SA64-23B SA60-10B SA60-20B SA60009-20B SA60-33B RSAN5-10B RSAN5-20B RSAN5-33B SA94-0.5B SA94-10B SA94-29B RSAT3-10B RSAT3-25B	All isotopes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
235926	SA60-20B SA60009-20B	Radium-226	J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Radium-226 & Radium-228 - Laboratory Blank Data Qualification Summary - SDG 235926

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Radium-226 & Radium-228 - Field Blank Data Qualification Summary - SDG 235926

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21666I29
SDG #: 235926
Laboratory: GEL Laboratories LLC

Date: 10-13-09
Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Radium 226 and Radium 228 (EPA Method 903.1 & 904)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8-24-09 through 8-26-09
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IVa.	Matrix Spike/(Matrix Spike) Duplicates	A	MS/DUP
IVb.	Laboratory control samples	A	LCS
IVc.	Chemical recovery	A	
V.	Sample result verification	N	
VI.	Minimum dectectable activity (MDA)	SW	
VII.	Overall assessment of data	A	
VIII.	Field duplicates	SW	D = 10 + 11
XIV	Field blanks	ND	FB = FB072909-SO (SDG: 234267)

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

Validated Samples:
all soil

1	SA150-10B	11	SA60009-20B	21	RSAT3-10BMS 226 228	31	
2	SA150-30B	12	SA60-33B	22	RSAT3-10BDUP 226 228	32	
3	SA154-0.5B	13	RSAN5-10B	23	PBS	33	
4	SA154-10B	14	RSAN5-20B	24		34	
5	SA154-20B	15	RSAN5-33B	25		35	
6	SA154-33B	16	SA94-0.5B	26		36	
7	SA64-10B	17	SA94-10B	27		37	
8	SA64-23B	18	SA94-29B	28		38	
9	SA60-10B	19	RSAT3-10B	29		39	
10	SA60-20B	20	RSAT3-25B	30		40	

Notes:

LDC #: 21666I29
SDG #: 235926

VALIDATION FINDINGS WORKSHEET
Minimum Detectable Activities

Reviewer: MG
2nd Reviewer:

METHOD: Radiochemistry (Method: see cover)

The following sample MDAs are above the RDL:

#	Sample ID	Isotope	QAPP PQL RDL (units)	Lab DL MDA (units)	Finding	Qualifications
1	4	Ra-228	0.5 (pCi/g)	0.511 (pCi/g)	Lab DL > QAPP PQL	None / P
2	5			0.537 ( )		
3	7			0.619 ( )		
4	9			0.540 ( )		
5	15			0.676 ( )		
6	19			0.566 ( )		
7	20			0.714 ( )		

Comments:

LDC #: 21666I29
SDG #: 235926

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

METHOD: Radiochemistry (Method: see cover)

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

Isotopes	Activity (pCi/g) 10	Activity (pCi/g) 11	by difference Qual parent only RPD
Ra-228	1.28	1.19	0.09 (≤0.5)
Ra-226	1.81	2.56	0.75 (↓) Jdets/Afd

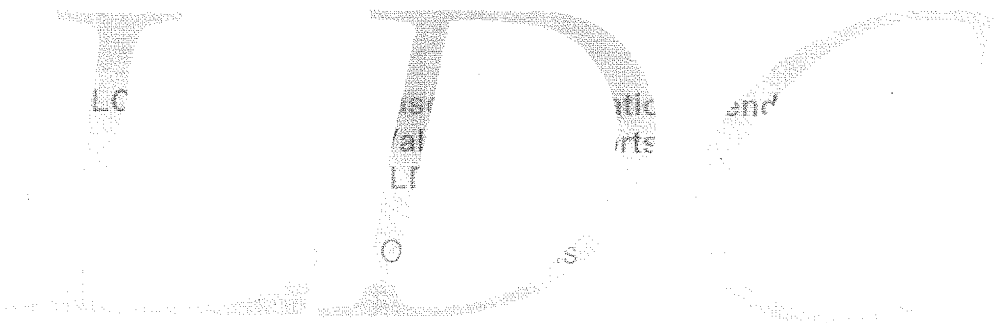
Isotopes	Activity ( )		RPD

Isotopes	Activity ( )		RPD

Isotopes	Activity ( )		RPD

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #21666

Organic Acids



Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: August 10 through August 12, 2009

LDC Report Date: October 21, 2009

Matrix: Soil/Water

Parameters: Organic Acids

Validation Level: Stage 4

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): TRX09081351

Sample Identification

EB081009-SO2
SA92-10B
SA92-31B
SA119-0.5B
SA119-10B
SA119-48B
EB081109-SO
SA107-0.5B
SA107-10B
SA107009-10B
SA107-29B
SA86-10B
SA86009-10B
SA86-28B
EB081009-SO2MS
EB081009-SO2MSD
SA92-10BMS
SA92-10BMSD

Introduction

This data review covers 14 soil samples and 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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 V.

Field duplicates are summarized in Section XVI.

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.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

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

Initial calibration of compounds was performed for the primary (quantitation) column and confirmation column as required by this method.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990 .

b. Calibration Verification

Calibration verification was performed at the required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

Samples EB081009-SO2 and EB081109-SO were identified as equipment blanks. No organic acid contaminants were found in these blanks.

Samples FB072909-SO (from SDG TRX9073051) and FB080309-SO (from SDG TRX09080450) were identified as field blanks. No organic acid contaminants were found in these blanks.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were not required by the method.

b. 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.

c. Laboratory Control Samples

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

V. Target Compound Identification

All target compound identifications were within validation criteria.

VI. Project Quantitation Limit

All project quantitation limits were within validation criteria.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG TRX09081351	All compounds reported below the PQL.	J (all detects)	A

VII. System Performance

The system performance was acceptable.

VIII. Overall Assessment of Data

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

IX. Field Duplicates

Samples SA107-10B and SA107009-10B and samples SA86-10B and SA86009-10B were identified as field duplicates. No organic acids were detected in any of the samples.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Organic Acids - Data Qualification Summary - SDG TRX09081351

SDG	Sample	Compound	Flag	A or P	Reason (Code)
TRX09081351	EB081009-SO2 SA92-10B SA92-31B SA119-0.5B SA119-10B SA119-48B EB081109-SO SA107-0.5B SA107-10B SA107009-10B SA107-29B SA86-10B SA86009-10B SA86-28B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09081351

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Organic Acids - Field Blank Data Qualification Summary - SDG TRX09081351

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage ~~2B~~ 4

LDC #: 21666F47
SDG #: TRX09081351
Laboratory: Alpha Analytical, Inc.

Date: 10/09/09
Page: 1 of 1
Reviewer: JVC
2nd Reviewer: [signature]

METHOD: HPLC Organic Acids (HPLC Method)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8/10 - 12/09
IIa.	Initial calibration	A	r ✓
IIb.	Calibration verification/ICV	A	CCV ≤ 20 % ICV ≤ 30 %
III.	Blanks	A	
IVa.	Surrogate recovery	N	Not reqd.
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	D_1 = 9, 10 D_2 = 12, 13
X.	Field blanks	ND	EB = 1, 7 FB = FB072909-SO (TRX09073051) FB080309-SO (TRX09080450)

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: water + soil

1 ✓	EB081009-SO2	W	11	SA107-29B	S	21 ✓	MB2k-22548	31	
2	SA92-10B	S	12	SA86-10B	D_2	22 ✓	MB2k-22549	32	
3	SA92-31B		13	SA86009-10B	D_2	23		33	
4	SA119-0.5B		14	SA86-28B		24		34	
5	SA119-10B		15 ✓	EB081009-SO2MS	W	25		35	
6	SA119-48B		16 ✓	EB081009-SO2MSD		26		36	
7 ✓	EB081109-SO	W	17	SA92-10BMS	S	27		37	
8	SA107-0.5B	S	18	SA92-10BMSD		28		38	
9	SA107-10B	D_1	19			29		39	
10	SA107009-10B	D_1	20			30		40	

Notes: _____

LDC #: 21666F47
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: SVL
2nd Reviewer: [illegible]

Method: ______GC ✓ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?			✓	
Was a curve fit used for evaluation?	✓			
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?	✓			
Were the RT windows properly established?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20%.0 or percent recoveries 80-120%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?			✓	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 21666F47
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.		✓		
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.		✓		

LDC # 21666 F47
SDG# Sep Corr

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: HPLC

Parameter: 4-Chlorobenzenesulfonic acid

Date	Detector	Compound	X Conc (ppm)	Y Area	Y^2
6/02 to 6/03/09	UV HPLC 3	4-Chlorobenzenesulfonic acid	0.025	105332	
			0.050	201649	
			0.100	464100	
			0.250	1152183	
			0.500	2262016	
			1.000	4485504	
			1.500	6696299	
			2.000	8851547	

RF 4213280
4032980
4641000
4608732
4524032
4485504
4464199
4425774
Ave 4424438

Regression Output:			Reported	
Constant		-4.19374E-003	c =	-0.004194
Std Err of Y Est		0.00735		
R Squared		0.999917	r 2	0.999917
No. of Observations		8.00000		
Degrees of Freedom		6.00000		
X Coefficient(s)	2.254E-007	-9.41E-015	b =	2.254E-007

LDC #: 21666 F47
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: JM
2nd Reviewer: [illegible]

METHOD: GC_____HPLC ✓

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %R	Recalculated %R
1	B4878001.D02	8/14/09	p-CBSA	0.500	0.491	0.491	98.2	98.2
2	B4888001.D17	8/14/09		1.000	1.007	1.007	100.7	100.7
3	B4900001.D24	8/15/09		0.500	0.505	0.505	101	101
4	B4912001.D36	8/15/09		1.000	1.003	1.003	100.3	100.3
	B4934001.D40	8/16/09	✓	1.000	1.003	1.003	100.3	100.3

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

LDC #: 21666F47
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: JV6
2nd Reviewer: [illegible]

METHOD: __ GC ✓ HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added
RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: 15/16

Compound	Spike Added (mg/L)		Sample Conc. (mg/L)	Spike Sample Concentration (mg/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	--	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
p-CBSA (HPLC)	1.0	1.0	0	0.98	0.966	98	98	97	97	1.4	1.4

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

LDC #: 21666F47
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Page: 1 of 1
Reviewer: JV6
2nd Reviewer: [illegible]

METHOD: ___ GC ✓ HPLC

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100* (SSC-SC)/SA
RPD = I LCS - LCSD I * 2/(LCS + LCSD)

Where: SSC = Spiked sample concentration
SA = Spike added
LCS = Laboratory control sample percent recovery
SC = Concentration
LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: LCS-22548

Compound	Spike Added (mg/kg)		Spiked Sample Concentration (mg/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										
p-CBSA (HPLC)	2	NA	2.13	NA	106	106				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 21666 F47
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: SVB
2nd Reviewer: [illegible]

METHOD: ___ GC ✓ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound in the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID._____ Compound Name NP

Concentration =_____

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: August 24 through August 28, 2009

LDC Report Date: October 14, 2009

Matrix: Soil/Water

Parameters: Organic Acids

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): TRX09090358

Sample Identification

SA154-0.5B
SA154-10B
SA154-33B
RSAS3-0.5B
RSAS3009-0.5B
RSAS3-44B
FB082809-SO
SA154-0.5BMS
SA154-0.5BMSD
FB082809-SOMS
FB082809-SOMSD

Introduction

This data review covers 8 soil samples and 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) 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 V.

Field duplicates are summarized in Section XVI.

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.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

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

Initial calibration of compounds was performed for the primary (quantitation) column and confirmation column as required by this method.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990 .

b. Calibration Verification

Calibration verification was performed at the required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

Samples FB072909-SO (from SDG TRX9073051) and FB082809-SO were identified as field blanks. No organic acid contaminants were found in these blanks.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were not required by the method.

b. 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.

c. Laboratory Control Samples

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

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG TRX09090358	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VII. System Performance

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

Samples RSAS3-0.5B and RSAS3009-0.5B were identified as field duplicates. No organic acids were detected in any of the samples.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Organic Acids - Data Qualification Summary - SDG TRX09090358

SDG	Sample	Compound	Flag	A or P	Reason (Code)
TRX09090358	SA154-0.5B SA154-10B SA154-33B RSAS3-0.5B RSAS3009-0.5B RSAS3-44B FB082809-SO	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09090358

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Organic Acids - Field Blank Data Qualification Summary - SDG TRX09090358

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21666G47
SDG #: TRX09090358
Laboratory: Alpha Analytical, Inc.

Date: 10/09/09
Page: 1 of 1
Reviewer: SVG
2nd Reviewer: [signature]

METHOD: HPLC Organic Acids (HPLC Method)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8/24-28/09
IIa.	Initial calibration	A	r r
IIb.	Calibration verification/ICV	A	CCV ≤ 20 ? ICV ≤ 30 ?
III.	Blanks	A	
IVa.	Surrogate recovery	N	Not reqd.
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	D = 4,5
X.	Field blanks	ND	FB = 7 ; FB 072909-SO (TRX090730-51

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

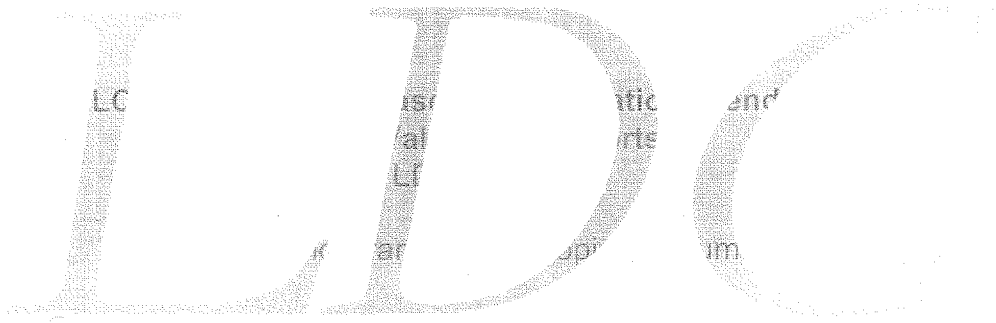
Validated Samples: Soil + Water

1	SA154-0.5B S	11	FB082809-SOMSD W	21		31		
2	SA154-10B	12	MBLK-22710	22		32		
3	SA154-33B	13	MBLK-22724	23		33		
4	RSAS3-0.5B D	14		24		34		
5	RSAS3009-0.5B D	15		25		35		
6	RSAS3-44B	16		26		36		
7	FB082809-SO W	17		27		37		
8	SA154-0.5BMS S	18		28		38		
9	SA154-0.5BMSD	19		29		39		
10	FB082809-SOMS W	20		30		40		

Notes: _____

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #21666

Isotopic Uranium & Isotopic Thorium



Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: July 13 through August 5, 2009

LDC Report Date: October 14, 2009

Matrix: Soil

Parameters: Isotopic Uranium & Isotopic Thorium

Validation Level: Stage 2B

Laboratory: GEL Laboratories, LLC.

Sample Delivery Group (SDG): 233415

Sample Identification

RSAM3-10BSPLP
SA166-10BSPLP
SA56-10BSPLP
SA182-10BSPLP
RSAL6-0.5BSPLP
RSAL6-28BSPLP
RSAU4-20BSPLP
RSAU4-50BSPLP
RSAJ3-10BSPLP
RSAJ3-29BSPLP
RSAU5-0.5BSPLP
RSAM3-10BSPLPMS
RSAM3-10BSPLPDUP
SA166-10BSPLPMS
SA166-10BSPLPDUP

Samples in this SDG underwent SPLP extraction

Introduction

This data review covers 15 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.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and the Multi-Agency Radiological Laboratory Analytical Protocols Manual (MARLAP) 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.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

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	Associated Samples
SPLP1 PB (prep blank)	Uranium-238	0.0247 pCi/L	RSAM3-10BSPLP
SPLP2 PB (prep blank)	Uranium-235/236	0.00713 pCi/L	SA166-10BSPLP SA56-10BSPLP SA182-10BSPLP RSAL6-0.5BSPLP RSAL6-28BSPLP RSAU4-20BSPLP RSAU4-50BSPLP RSAJ3-10BSPLP RSAJ3-29BSPLP RSAU5-0.5BSPLP

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 Activity	Modified Final Activity
SA166-10BSPLP	Uranium-235/236	0.026 pCi/L	0.03U pCi/L

Sample	Isotope	Reported Activity	Modified Final Activity
SA56-10BSPLP	Uranium-235/236	0.0125 pCi/L	0.03U pCi/L
SA182-10BSPLP	Uranium-235/236	0.0158 pCi/L	0.03U pCi/L
RSAJ3-29BSPLP	Uranium-235/236	0.0225 pCi/L	0.03U pCi/L

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Matrix Spike/(Matrix Spike) Duplicate

Matrix spike (MS) samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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)	Isotope	Difference (Limits)	Flag	A or P
RSAM3-10BSPLPDUP (RSAM3-10BSPLP)	Thorium-230 Uranium-233/234	0.0547 pCi/L (≤0.03) 0.116 pCi/L (≤0.03)	J (all detects) UJ (all non-detects) 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. Tracer Recovery

All tracer recoveries were within validation criteria.

V. Minimum Detectable Activity (MDA)

All minimum detectable activities met required PQLs with the following exceptions:

Sample	Isotope	Lab DL (pCi/g)	PQL (pCi/g)	Flag	A or P
RSAM3-10BSPLP	Thorium-228 Thorium-230 Thorium-232 Uranium-233/234 Uranium-235/236 Uranium-238	0.163 0.104 0.0592 0.0635 0.0983 0.111	0.03 0.03 0.03 0.03 0.03 0.03	None None None None None None	P
SA166-10BSPLP	Thorium-228 Thorium-230	0.0312 0.0314	0.03 0.03	None None	P
SA56-10BSPLP	Thorium-228 Thorium-230 Uranium-233/234	0.0373 0.0306 0.0322	0.03 0.03 0.03	None None None	P
SA182-10BSPLP	Thorium-228 Thorium-230 Uranium-233/234	0.057 0.0304 0.0307	0.03 0.03 0.03	None None None	P
RSAL6-0.5BSPLP	Thorium-228	0.0572	0.03	None	P
RSAL6-28BSPLP	Thorium-228 Uranium-233/234 Uranium-238	0.0646 0.0329 0.0358	0.03 0.03 0.03	None None None	P
RSAU4-20BSPLP	Thorium-228 Uranium-233/234	0.036 0.0308	0.03 0.03	None None	P
RSAU4-50BSPLP	Thorium-228	0.0358	0.03	None	P
RSAJ3-10BSPLP	Thorium-228 Uranium-233/234	0.041 0.0318	0.03 0.03	None None	P
RSAJ3-29BSPLP	Thorium-228	0.0465	0.03	None	P
RSAU5-0.5BSPLP	Thorium-228	0.0481	0.03	None	P

The MDA was greater than the PQL as listed above.

VI. Sample Result Verification and Project Quantitation Limit

All isotopes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 233415	All isotopes reported below the PQL.	J (all detects)	A

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.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Isotopic Uranium & Isotopic Thorium - Data Qualification Summary - SDG 233415

SDG	Sample	Isotope	Flag	A or P	Reason (Code)
233415	RSAM3-10BSPLP	Thorium-230 Uranium-233/234	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (Difference) (ld)
233415	RSAM3-10BSPLP	Thorium-228 Thorium-230 Thorium-232 Uranium-233/234 Uranium-235/236 Uranium-238	None None None None None None	P	Minimum detectable activity (PQL)
233415	SA166-10BSPLP	Thorium-228 Thorium-230	None None	P	Minimum detectable activity (PQL)
233415	SA56-10BSPLP SA182-10BSPLP	Thorium-228 Thorium-230 Uranium-233/234	None None None	P	Minimum detectable activity (PQL)
233415	RSAL6-0.5BSPLP RSAU4-50BSPLP RSAJ3-29BSPLP RSAU5-0.5BSPLP	Thorium-228	None	P	Minimum detectable activity (PQL)
233415	RSAL6-28BSPLP	Thorium-228 Uranium-233/234 Uranium-238	None None None	P	Minimum detectable activity (PQL)
233415	RSAU4-20BSPLP RSAJ3-10BSPLP	Thorium-228 Uranium-233/234	None None	P	Minimum detectable activity (PQL)
233415	RSAM3-10BSPLP SA166-10BSPLP SA56-10BSPLP SA182-10BSPLP RSAL6-0.5BSPLP RSAL6-28BSPLP RSAU4-20BSPLP RSAU4-50BSPLP RSAJ3-10BSPLP RSAJ3-29BSPLP RSAU5-0.5BSPLP	All isotopes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Isotopic Uranium & Isotopic Thorium - Laboratory Blank Data Qualification Summary - SDG 233415

SDG	Sample	Isotope	Modified Final Activity	A or P	Code
233415	SA166-10BSPLP	Uranium-235/236	0.03U pCi/L	A	bl
233415	SA56-10BSPLP	Uranium-235/236	0.03U pCi/L	A	bl
233415	SA182-10BSPLP	Uranium-235/236	0.03U pCi/L	A	bl
233415	RSAJ3-29BSPLP	Uranium-235/236	0.03U pCi/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Isotopic Uranium & Isotopic Thorium - Field Blank Data Qualification Summary - SDG 233415

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21666H59
SDG #: 233415
Laboratory: GEL Laboratories LLC

Date: 10-13-09
Page: 1 of 1
Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Isotopic Uranium (DOE EML HASL-300, U-02-RC Modified),Isotopic Thorium (DOE EML HASL-300, Th-01-RC Modified)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7-13-09 through 8-5-09
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	SW	
IVa.	Matrix Spike/(Matrix Spike) Duplicates	SW	MS/DUP
IVa.	Laboratory control samples	A	LCS
V.	Tracer Recovery	A	
VI.	Minimum Detectable Activity (MDA)	SW	
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	N	

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

Validated Samples:
Th U All Soil Th U

1	RSAM3-10BSPLP	11	RSAU5-0.5BSPLP	21		31	
2	SA166-10BSPLP	12	RSAM3-10BSPLPMS U Th	22		32	
3	SA56-10BSPLP	13	RSAM3-10BSPLPDUP U Th	23		33	
4	SA182-10BSPLP	14	SA166-10BSPLPMS Th	24		34	
5	RSAL6-0.5BSPLP	15	SA166-10BSPLPDUP Th	25		35	
6	RSAL6-28BSPLP	16	PBW1	26		36	
7	RSAU4-20BSPLP	17	PB SPLP1	27		37	
8	RSAU4-50BSPLP	18	PBW2	28		38	
9	RSAJ3-10BSPLP	19	PBSPLP2	29		39	
10	RSAJ3-29BSPLP	20		30		40	

Notes:

LDC #: 21666H59
SDG #: 233415

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: MG
2nd Reviewer: [signature]

METHOD: Radiochemistry (Method: See cover)

(Y) N N/A 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.

Units: pCi/L Associated Samples: 1

	Isotope	Blank ID	Blank Action Level	Sample Identification									
		PBSPLP1		—	—	No sample was	qualified	—	—	—	—	—	—
<RL	U-238	0.0247											

Units: pCi/L Associated Samples: 2 → 11

	Isotope	Blank ID	Blank Action Level	Sample Identification									
		PBSPLP2		2	3	4	10						
<RL	U-235/236	0.00713		0.026/0.03	0.0125/0.03	0.0158/0.03	0.0225/0.03						

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 #: 21666H59
SDG #: 23345

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Radiochemistry (Method: see cover)

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

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

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

LEVEL IV ONLY:

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

#	Duplicate ID	Matrix	Isotope	by difference ~~DER~~ (Limits)	Associated Samples	Qualifications
1	13	SPLP	Th-230	0.0547 pCi/L (≤0.03)	1	J/UJ/A 1d
	↓	↓	U-233/234	0.116 ↓ (↓)	↓	↓ ↓

Comments: _____

LDC #: 21666459
SDG #: 233415

VALIDATION FINDINGS WORKSHEET
Minimum Detectable Activities

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Radiochemistry (Method: see cover)

The following sample MDAs are above the RDL:

#	Sample ID	Isotope	QAPP PQL RDL (units)	Lab DL MDA (units)	Finding	Qualifications
1	1	Th-228	0.03 (pCi/L)	0.163 (pCi/L)	Lab DL > QAPP PQL	None / P
	↓	Th-230	↓	0.104 ( )	↓	↓
		Th-232		0.0592 ( )		
		U-233/234		0.0635 ( )		
		U-235/236		0.0983 ( )		
		U-238		0.111 ( )		
2	2	Th-228		0.0312 ( )		
	↓	Th-230		0.0314 ( )		
3	3	Th-228		0.0373 ( )		
	↓	Th-230		0.0306 ( )		
		U-233/234		0.0322 ( )		
4	4	Th-228		0.057 ( )		
	↓	Th-230		0.0304 ( )		
		U-233/234		0.0307 ( )		
5	5	Th-228		0.0572 ( )		
6	6	Th-228		0.0646 ( )		
	↓	U-233/234		0.0329 ( )		
		U-238		0.0358 ( )		
7	7	Th-228		0.036 ( )		
	↓	U-233/234		0.0308 ( )		
				~~0~~		
8	8	Th-228	↓	0.0358 ( )	↓	↓

Comments:

LDC #: 21666459
SDG #: 233415

VALIDATION FINDINGS WORKSHEET
Minimum Detectable Activities

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Radiochemistry (Method: see cover)

The following sample MDAs are above the RDL:

#	Sample ID	Isotope	QAPP PQL RDL (units)	Lab DL MDA (units)	Finding	Qualifications
9	9	Th-228	0.03 (pCi/L)	0.041 (pCi/L)	Lab DL > QAPP PQL	None / P
	↓	U-233/234	↓	0.0318 ( )	↓	↓
10	10	Th-228		0.0465 ( )		
11	11	Th-228	↓	0.0481 ( )	↓	↓

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: August 24 through August 26, 2009

LDC Report Date: October 14, 2009

Matrix: Soil

Parameters: Isotopic Uranium & Isotopic Thorium

Validation Level: Stage 2B

Laboratory: GEL Laboratories, LLC.

Sample Delivery Group (SDG): 235926

Sample Identification

SA150-10B	RSAT3-10BMS
SA150-30B	RSAT3-10BDUP
SA154-0.5B	
SA154-10B	
SA154-20B	
SA154-33B	
SA64-10B	
SA64-23B	
SA60-10B	
SA60-20B	
SA60009-20B	
SA60-33B	
RSAN5-10B	
RSAN5-20B	
RSAN5-33B	
SA94-0.5B	
SA94-10B	
SA94-29B	
RSAT3-10B	
RSAT3-25B	

Introduction

This data review covers 22 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.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and the Multi-Agency Radiological Laboratory Analytical Protocols Manual (MARLAP) 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.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

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 FB072909-SO (from SDG 234267) was identified as a field blank. No isotopic uranium or isotopic thorium was found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Isotope	Concentration	Associated Samples
FB072909-SO	7/29/09	Thorium-228	0.0321 pCi/L	SA150-10B SA150-30B SA154-0.5B SA154-10B SA154-20B SA154-33B SA64-10B SA64-23B SA60-10B SA60-20B SA60009-20B SA60-33B RSAN5-10B RSAN5-20B RSAN5-33B SA94-0.5B SA94-10B SA94-29B

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

IV. Accuracy and Precision Data

a. Matrix Spike/(Matrix Spike) Duplicate

Matrix spike (MS) samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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)	Isotope	RPD (Limits)	Flag	A or P
RSAT3-10BDUP (RSAT3-10B RSAT3-25B)	Uranium-233/234	21.5 (≤20)	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) and relative percent differences (RPD) 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 PQLs with the following exceptions:

Sample	Isotope	Lab DL (pCi/g)	PQL (pCi/g)	Flag	A or P
SA150-10B	Thorium-228 Thorium-230	0.198 0.0926	0.05 0.05	None None	P
SA150-30B	Thorium-228 Thorium-230 Uranium-233/234	0.138 0.0915 0.0686	0.05 0.05 0.04	None None None	P
SA154-0.5B	Thorium-228 Thorium-230	0.158 0.111	0.05 0.05	None None	P
SA154-10B	Thorium-228 Thorium-230 Thorium-232 Uranium-233/234	0.166 0.0952 0.122 0.0533	0.05 0.05 0.10 0.04	None None None None	P

Sample	Isotope	Lab DL (pCi/g)	PQL (pCi/g)	Flag	A or P
SA154-20B	Thorium-228 Thorium-230 Thorium-232 Uranium-233/234	0.332 0.190 0.1520 0.0421	0.05 0.05 0.10 0.04	None None None None	P
SA154-33B	Thorium-228 Thorium-230 Uranium-233/234 Uranium-238	0.194 0.137 0.053 0.0486	0.05 0.05 0.04 0.04	None None None None	P
SA64-10B	Thorium-228 Thorium-230 Uranium-233/234	0.176 0.0683 0.0438	0.05 0.05 0.04	None None None	P
SA64-23B	Thorium-228 Thorium-230 Uranium-233/234	0.128 0.062 0.0549	0.05 0.05 0.04	None None None	P
SA60-10B	Thorium-228 Thorium-230	0.203 0.0631	0.05 0.05	None None	P
SA60-20B	Thorium-228 Uranium-233/234	0.188 0.0418	0.05 0.04	None None	P
SA60009-20B	Thorium-228 Thorium-230	0.142 0.171	0.05 0.05	None None	P
SA60-33B	Thorium-228 Thorium-230	0.147 0.0804	0.05 0.05	None None	P
RSAN5-10B	Thorium-228 Thorium-230 Uranium-233/234 Uranium-238	0.140 0.119 0.0404 0.0495	0.05 0.05 0.04 0.04	None None None None	P
RSAN5-20B	Thorium-228 Thorium-230	0.130 0.141	0.05 0.05	None None	P
RSAN5-33B	Thorium-228 Thorium-230	0.0963 0.0646	0.05 0.05	None None	P
SA94-0.5B	Thorium-228 Thorium-230	0.101 0.0845	0.05 0.05	None None	P
SA94-10B	Thorium-228 Thorium-230	0.229 0.0784	0.05 0.05	None None	P

Sample	Isotope	Lab DL (pCi/g)	PQL (pCi/g)	Flag	A or P
SA94-29B	Thorium-228 Thorium-230 Uranium-233/234 Uranium-238	0.108 0.0619 0.0419 0.0505	0.05 0.05 0.04 0.04	None None None None	P
RSAT3-10B	Thorium-228 Thorium-230	0.109 0.0924	0.05 0.05	None None	P
RSAT3-25B	Thorium-228 Thorium-230	0.144 0.0934	0.05 0.05	None None	P

The MDA was greater than the PQL as listed above.

VI. Sample Result Verification and Project Quantitation Limit

All isotopes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 235926	All isotopes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VII. Overall Assessment of Data

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

VIII. Field Duplicates

Samples SA60-20B and SA60009-20B were identified as field duplicates. No isotopic uranium or isotopic thorium was detected in any of the samples with the following exceptions:

Analyte	Concentration (pCi/g)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA60-20B	SA60009-20B				
Thorium-228	1.94	1.86	4 (≤50)	-	-	-
Thorium-230	2.44	2.25	8 (≤50)	-	-	-
Thorium-232	2.11	1.78	17 (≤50)	-	-	-

Analyte	Concentration (pCi/g)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA60-20B	SA60009-20B				
Uranium-233/234	0.304	0.344	12 (≤50)	-	-	-
Uranium-235/236	0.0187U	0.0356	-	0.0169 (≤0.04)	-	-
Uranium-238	0.397	0.396	0 (≤50)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Isotopic Uranium & Isotopic Thorium - Data Qualification Summary - SDG 235926

SDG	Sample	Isotope	Flag	A or P	Reason (Code)
235926	RSAT3-10B RSAT3-25B	Uranium-233/234	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)
235926	SA150-10B SA154-0.5B SA60-10B SA60009-20B SA60-33B RSAN5-20B RSAN5-33B SA94-0.5B SA94-10B RSAT3-10B RSAT3-25B	Thorium-228 Thorium-230	None None	P	Minimum detectable activity (PQL)
235926	SA150-30B SA64-10B SA64-23B	Thorium-228 Thorium-230 Uranium-233/234	None None None	P	Minimum detectable activity (PQL)
235926	SA154-10B SA154-20B	Thorium-228 Thorium-230 Thorium-232 Uranium-233/234	None None None None	P	Minimum detectable activity (PQL)
235926	SA154-33B RSAN5-10B SA94-29B	Thorium-228 Thorium-230 Uranium-233/234 Uranium-238	None None None None	P	Minimum detectable activity (PQL)
235926	SA60-20B	Thorium-228 Uranium-233/234	None None	P	Minimum detectable activity (PQL)
235926	SA150-10B SA150-30B SA154-0.5B SA154-10B SA154-20B SA154-33B SA64-10B SA64-23B SA60-10B SA60-20B SA60009-20B SA60-33B RSAN5-10B RSAN5-20B RSAN5-33B SA94-0.5B SA94-10B SA94-29B RSAT3-10B RSAT3-25B	All isotopes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Isotopic Uranium & Isotopic Thorium - Laboratory Blank Data Qualification Summary - SDG 235926

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Isotopic Uranium & Isotopic Thorium - Field Blank Data Qualification Summary - SDG 235926

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21666I59
SDG #: 235926
Laboratory: GEL Laboratories LLC

Date: 10-13-09
Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Isotopic Uranium (DOE EML HASL-300, U-02-RC Modified),Isotopic Thorium (DOE EML HASL-300, Th-01-RC Modified)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8-24-09 through 8-26-09
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IVa.	Matrix Spike/(Matrix Spike) Duplicates	SW	MS/DUP
IVa.	Laboratory control samples	A	LCS
V.	Tracer Recovery	A	
VI.	Minimum Detectable Activity (MDA)	SW	
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D = 10 + 11
X	Field blanks	SW	FB = FB072909-SO (SDG: 234967)

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

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

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: all soil

1	SA150-10B	11	SA60009-20B	21	RSAT3-10BMS U Th	31	
2	SA150-30B	12	SA60-33B	22	RSAT3-10BDUP U Th	32	
3	SA154-0.5B	13	RSAN5-10B	23	PBS	33	
4	SA154-10B	14	RSAN5-20B	24		34	
5	SA154-20B	15	RSAN5-33B	25		35	
6	SA154-33B	16	SA94-0.5B	26		36	
7	SA64-10B	17	SA94-10B	27		37	
8	SA64-23B	18	SA94-29B	28		38	
9	SA60-10B	19	RSAT3-10B	29		39	
10	SA60-20B	20	RSAT3-25B	30		40	

Notes:

LDC #: 21666I59
SDG #: 235926

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Radiochemistry (Method: See cover)

(Y) N 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: 7-29-09
Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: 1 → 18

Analyte	Blank ID	Blank Action Limit	Sample Identification									
FB07	2909-SO		—	—	No samples were qualified				—	—	—	
>RL Th-228	0.0321	0.0003										

Blank units: _____ **Associated sample units:** _____
Sampling date: _____
Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: _____

Analyte	Blank ID	Blank Action Limit	Sample Identification									

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

LDC #: 21666I59
SDG #: 235926

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Page: 1 of 1
Reviewer: MG
2nd Reviewer: 8

METHOD: Radiochemistry (Method: See cover)

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

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

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

LEVEL IV ONLY:

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

#	Duplicate ID	Matrix	Isotope	RPD ~~DER~~ (Limits)	Associated Samples	Qualifications
1	22	Soil	U-233/234	21.5 (≤20)	~~all~~ 19, 20	J/UJ/A id

Comments: _____

LDC #: 21666I59
SDG #: 235926

VALIDATION FINDINGS WORKSHEET
Minimum Detectable Activities

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Radiochemistry (Method: see cover)

The following sample MDAs are above the RDL:

#	Sample ID	Isotope	QAPP PQL RDL (units)	Lab DL MDA (units)	Finding	Qualifications
1	1	Th-228	0.05 (pCi/g)	0.198 (pCi/g)	Lab DL > QAPP PQL	None / P
	↓	Th-230	0.05 ( )	0.0926 ( )		
2	2	Th-228	0.05 ( )	0.138 ( )		
	↓	Th-230	0.05 ( )	0.0915 ( )		
	↓	U-233/234	0.04 ( )	0.0686 ( )		
3	3	Th-228	0.05 ( )	0.158 ( )		
	↓	Th-230	0.05 ( )	0.111 ( )		
4	4	Th-228	0.05 ( )	0.166 ( )		
	↓	Th-230	0.05 ( )	0.0952 ( )		
	↓	Th-232	0.10 ( )	0.122 ( )		
	↓	U-233/234	0.04 ( )	0.0533 ( )		
5	5	Th-228	0.05 ( )	0.332 ( )		
	↓	Th-230	0.05 ( )	0.190 ( )		
	↓	Th-232	0.10 ( )	0.152 ( )		
	↓	U-233/234	0.04 ( )	0.0421 ( )		
6	6	Th-228	0.05 ( )	0.194 ( )		
	↓	Th-230	0.05 ( )	0.137 ( )		
	↓	U-233/234	0.04 ( )	0.053 ( )		
	↓	U-238	0.04 ( )	0.0486 ( )		
7	7	Th-228	0.05 ( )	0.176 ( )		
	↓	Th-230	0.05 ( )	0.0683 ( )		
	↓	U-233/234	0.04 ( )	0.0438 ( )	↓	↓

Comments:

LDC #: 21666I59
SDG #: 235926

VALIDATION FINDINGS WORKSHEET
Minimum Detectable Activities

Reviewer: MG
2nd Reviewer: 8

METHOD: Radiochemistry (Method: see cover)

The following sample MDAs are above the RDL:

#	Sample ID	Isotope	QAPP PQL RDL (units)	Lab DL MDA (units)	Finding	Qualifications
8	8	Th-228	0.05 (pCi/g)	0.128 (pCi/g)	Lab DL > QAPP PQL	None / P
	↓	Th-230	0.05 ( )	0.062 ( )		
	↓	U-233/234	0.04 ( )	0.0549 ( )		
9	9	Th-228	0.05 ( )	0.203 ( )		
	↓	Th-230	0.05 ( )	0.0631 ( )		
10	10	Th-228	0.05 ( )	0.188 ( )		
	↓	U-233/234	0.04 ( )	0.0418 ( )		
11	11	Th-228	0.05 ( )	0.142 ( )		
	↓	Th-230	0.05 ( )	0.171 ( )		
12	12	Th-228	0.05 ( )	0.147 ( )		
	↓	Th-230	0.05 ( )	0.0804 ( )		
13	13	Th-228	0.05 ( )	0.140 ( )		
	↓	Th-230	0.05 ( )	0.119 ( )		
	↓	U-233/234	0.04 ( )	0.0404 ( )		
	↓	U-238	0.04 ( )	0.0495 ( )		
14	14	Th-228	0.05 ( )	0.130 ( )		
	↓	Th-230	0.05 ( )	0.141 ( )		
15	15	Th-228	0.05 ( )	0.0963 ( )		
	↓	Th-230	0.05 (↓)	0.0646 (↓)	↓	↓

Comments:

LDC #: 21666I59
SDG #: 235926

VALIDATION FINDINGS WORKSHEET
Minimum Detectable Activities

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: Radiochemistry (Method: see cover)

The following sample MDAs are above the RDL:

#	Sample ID	Isotope	QAPP PQL RDL (units)	Lab DL MDA (units)	Finding	Qualifications
16	16	Th-228	0.05 (pCi/g)	0.101 (pCi/g)	Lab DL > QAPP PQL	None / P
	↓	Th-230	0.05 ( )	0.0845 ( )		
17	17	Th-228	0.05 ( )	0.229 ( )		
	↓	Th-230	0.05 ( )	0.0784 ( )		
18	18	Th-228	0.05 ( )	0.108 ( )		
	↓	Th-230	0.05 ( )	0.0619 ( )		
		U-233/234	0.04 ( )	0.0419 ( )		
		U-238	0.04 ( )	0.0505 ( )		
19	19	Th-228	0.05 ( )	0.109 ( )		
	↓	Th-230	0.05 ( )	0.0924 ( )		
20	20	Th-228	0.05 ( )	0.144 ( )		
	↓	Th-230	0.05 ( )	0.0934 ( )		

Comments:

LDC #: 21666I59
SDG #: 235926

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

METHOD: Radiochemistry (Method: see cover)

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

Isotopes	Activity (pCi/g) 10	Activity (pCi/g) 11	RPD
Th-228	1.94	1.86	4 (≤50)
Th-230	2.44	2.25	8 ( )
Th-232	2.11	1.78	17 ( )

Isotopes	Activity (pCi/g) 10	Activity (pCi/g) 11	diff / RPD
U-233/234	0.304	0.344	RPD 12 (≤50)
U-235/236	0.0187 U	0.0356	difference 0.0169 (≤0.04)
U-238	0.397	0.396	RPD 0 (≤50)

Isotopes	Activity ( )	Activity ( )	RPD

Isotopes	Activity ( )	Activity ( )	RPD