



LABORATORY DATA CONSULTANTS, INC.

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

ERM

2525 Natomas Park Drive, Suite 350

Sacramento, CA 95833

ATTN: Ms. Maria Barajas-Albalawi

August 11, 2008

SUBJECT: BRC Tronox Parcel G, Data Validation

Dear Ms. Barajas-Albalawi

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on July 11, 2008. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 19097:

SDG #

Fraction

F8F120137,	Volatiles, Semivolatiles, Chlorinated Pesticides, Polychlorinated
F8F120167	Biphenyls, Metals, Wet Chemistry, Gasoline Range Organics, Diesel Range Organics, Polynuclear Aromatic Hydrocarbons, Dioxins/Dibenzofurans

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

- USEPA, Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

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

Sincerely,

Erlinda T. Rauto

Operations Manager/Senior Chemist

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

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

Project/Site Name: BRC Tronox Parcel G

Collection Date: June 11, 2008

LDC Report Date: July 22, 2008

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: EPA Level III & IV

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): F8F120167

TSB-GJ-08-10
TSB-GJ-08-20**
TSB-GJ-08-30**
TSB-GJ-08-40
TB-1 6/11/08
TSB-GJ-08-10MS
TSB-GJ-08-10MSD

**Indicates sample underwent EPA Level IV review

Introduction

This data review covers 6 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 8260B for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) 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.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UU Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. 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
6/9/08	Ethanol	0.00221 (≥ 0.05)	All soil samples in SDG F8F120167	J (all detects) UJ (all non-detects)	A

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
6/19/08 (LCAL0317)	Iodomethane	67.71684	All water samples in SDG F8F120167	J+ (all detects)	A

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
5/28/08 (LICV9881)	Iodomethane	31.67513	All water samples in SDG F8F120167	J+ (all detects)	A
5/28/08 (LICV9881)	2-Hexanone	25.04476	All water samples in SDG F8F120167	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
6/16/08	Ethanol	0.00209 (≥0.05)	All soil samples in SDG F8F120167	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.

Sample TB-1 6/11/08 was identified as a trip blank. No volatile contaminants were found in this blank with the following exceptions:

Trip Blank ID	Sampling Date	Compound	Concentration	Associated Samples
TB-1 6/11/08	6/11/08	Acetone	1.1 ug/L	All soil samples in SDG F8F120167

Sample "RINSATE 1" (from SDG F8F120137) was identified as a rinsate. No volatile contaminants were found in this blank with the following exceptions:

Rinsate Blank ID	Sampling Date	Compound	Concentration	Associated Samples
RINSATE 1	6/11/08	Dichloromethane	3.3 ug/L	All soil samples in SDG F8F120167

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks.

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	Surrogate	%R (Limits)	Compound	Flag	A or P
F8F200000-125	Bromofluorobenzene	117 (79-115)	All TCL compounds	J+ (all detects)	P

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Although the MS/MSD percent recovery (%R) for one compound and relative percent difference (RPD) for one compound were not within QC limits, the MS/MSD percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Although the relative percent differences (RPD) for one compound and the percent recoveries for some compounds in the LCS/LCSD were not within QC limits, the LCSD and MS/MSD percent recoveries (%R) were within QC limits and no data were qualified.

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

All target compound identifications were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Tentatively Identified Compounds (TICs)

All tentatively identified compounds were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XIV. System Performance

The system performance was acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XV. Overall Assessment of Data

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

**BRC Tronox Parcel G
Volatiles - Data Qualification Summary - SDG F8F120167**

SDG	Sample	Compound	Flag	A or P	Reason
F8F120167	TSB-GJ-08-10 TSB-GJ-08-20** TSB-GJ-08-30** TSB-GJ-08-40	Ethanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF)
F8F120167	TB-1 6/11/08	Iodomethane	J+ (all detects)	A	Continuing calibration (%D)
F8F120167	TB-1 6/11/08	Iodomethane	J+ (all detects)	A	Continuing calibration (ICV %D)
F8F120167	TB-1 6/11/08	2-Hexanone	J- (all detects) UJ (all non-detects)	A	Continuing calibration (ICV %D)
F8F120167	TSB-GJ-08-10 TSB-GJ-08-20** TSB-GJ-08-30** TSB-GJ-08-40	Ethanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF)

**BRC Tronox Parcel G
Volatiles - Laboratory Blank Data Qualification Summary - SDG F8F120167**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel G
Volatiles - Field Blank Data Qualification Summary - SDG F8F120167**

No Sample Data Qualified in this SDG

LDC #: 19097B1
 SDG #: F8F120167
 Laboratory: Test America

VALIDATION COMPLETENESS WORKSHEET
 Level III/IV

Date: 7/21/08
 Page: 1 of 7
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

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	A	Sampling dates: 6/11/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	% RSD, 1 ² 20.990
IV.	Continuing calibration/ICV	SW	ICV ≤ 25
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	Rmsate 2
VIII.	Laboratory control samples	SW	LES IP
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation/CRQLs	A	Not reviewed for Level III validation.
XIII.	Tentatively identified compounds (TICs)	A	Not reviewed for Level III validation.
XIV.	System performance	A	Not reviewed for Level III validation.
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	TB = 5 R = Rmsate 1.

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

SDG # F8F120137

Validated Samples: ^{**} Indicates sample underwent Level IV validation

SOIL + water

1	TSB-GJ-08-10	11	F8 F18 0000-291	21	8170291	31	
2	TSB-GJ-08-20**	12	F8 F2 00000-125	22	8172125	32	
3	TSB-GJ-08-30**	13	F8 F2 00000-361	23	8172361	33	
4	TSB-GJ-08-40	14		24		34	
5	TB-1 6/11/08 ^{B = nonanal} W	15		25		35	
6	TSB-GJ-08-10MS	16		26		36	
7	TSB-GJ-08-10MSD	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 19097B
 SDG #: pu cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
 Reviewer: F7
 2nd Reviewer: Q

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooler temperature criteria was met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
II. GC/MS instrument performance checks				
Were the BFB performance results reviewed and found to be within the specified criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all samples analyzed within the 12 hour clock criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) > 0.05?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
V. Blank				
Was a method blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a method blank analyzed at least once every 12 hours for each matrix and concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a MS/MSD analyzed every 20 samples of each matrix?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

LDC #: 1909781
 SDG #: pu cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: P7
 2nd Reviewer: A

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per analytical batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were the performance evaluation (PE) samples within the acceptance limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
X. Internal Standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were retention times within + 30 seconds of the associated calibration standard?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XI. Target Compound Identification				
Were relative retention times (RRT's) within + 0.06 RRT units of the standard?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were chromatogram peaks verified and accounted for?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XII. Compound Quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XIII. Relative Intensity Comparisons (RIS)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were relative intensities of the major ions within \pm 20% between the sample and the reference spectra?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XIV. System Performance				
System performance was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XV. Overall Assessment of Data				
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XVI. Field Duplicates				
Field duplicate pairs were identified in this SDG.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Target compounds were detected in the field duplicates.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
XVII. Field Blanks				
Field blanks were identified in this SDG.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Target compounds were detected in the field blanks.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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 chloride**	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	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.
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.

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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".
- 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?
 - 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 $\leq 30\%$ %RSD and ≥ 0.05 RRF?

#	Date	Standard ID	Compound	Finding %RSD (Limit: $\leq 30.0\%$)	Finding RRF (Limit: ≥ 0.05)	Associated Samples	Qualifications
	6/9/08	FKAL-BRC	www		0.00221	FBF180000-291 + All soils	J/W/A

VALIDATION FINDINGS WORKSHEET

Continuing Calibration

LDC #: 1909781
 SDG #: see cover

Page: 1 of 1
 Reviewer: [Signature]
 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 $\leq 25\%$ %D and ≥ 0.05 RRF?

#	Date	Standard ID	Compound	Finding %D (Limit: $\leq 25.0\%$)	Finding RRF (Limit: ≥ 0.05)	Associated Samples	Qualifications
+	5/22/08	L1CV 9881	Iodomethane	31.67513		All water	J+/A det
-			Z	25.04476		F8F20000-125	J-/UJ/A
+	6/19/08	L1CAL0317	Iodomethane	67.71684		↓	J+/Adet
	6/16/08	F1CAL1777BRC	www		0.00209	All soil	J/UJ/A
						F8F180000-291	

VALIDATION FINDINGS WORKSHEET
Field Blanks

LDC #: 19097B1

SDG #: Lee Conroy

Page: 1 of 1

Reviewer: B

2nd Reviewer: R

METHOD: GC/MS VOA (EPA SW846 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/kg

Sampling date: 6/11/08

Field blank type: (circle one) Field Blank / Trip Blank / Other: TB Associated Samples: A11801/s (CMD)

Compound	Blank ID	Sample Identification
	5	
Methylene chloride	1.1	
Acetone		
Chloroform		
CRQL		

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

REVISIONS: 12
 Reviewer: LR
 2nd Reviewer: LR

Field Blanks

SDG #: per cover

All soils (ND)

R = Rinsate / Associated Samples:

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

Compound	Blank ID	Blank ID	Sample Identification
<i>Dichloroethane</i>	6/11/08		
<i>Methylene chloride</i>	3.3		
<i>Acetone</i>			
<i>Chloroform</i>			
CRQL			

Blank units: _____ Associated sample units: _____
 Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other:

Compound	Blank ID	Blank ID	Sample Identification
<i>Methylene chloride</i>			
<i>Acetone</i>			
<i>Chloroform</i>			
CRQL			

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
 Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 19097B1
 SDG #: see cones

VALIDATION FINDINGS WORKSHEET

Surrogate Spikes

Page: 1 of 1
 Reviewer: [Signature]
 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
 Were all surrogate %R within QC limits?
 Y N N/A
 If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R out of outside of criteria?

#	Date	Sample ID	Surrogate	%Recovery (Limits)	Qualifications
		F8F200000-125	BFB	117 (79-115)	J+ / P-act
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- | | | |
|------------------------------------|------------------|-------------------|
| SMC1 (TOL) = Toluene-d8 | QC Limits (Soil) | QC Limits (Water) |
| SMC2 (BFB) = Bromofluorobenzene | 81-117 | 88-110 |
| SMC3 (DCE) = 1,2-Dichloroethane-d4 | 74-121 | 86-115 |
| SMC4 (DFM) = Dibromofluoromethane | 80-120 | 80-120 |
| | 80-120 | 86-118 |

LDC #: 19097131 Page: 1 of 1
SDG #: file only Reviewer: [Signature]
2nd Reviewer: [Signature]
VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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 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.

Y/N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		<u>647</u>	<u>AA</u>	() ()	<u>5 / (33-15D)</u>	() ()	<u># 1</u>	<u>no qual MS/SD</u>
			<u>HH</u>	() ()	() ()	<u>28 (20)</u>	<u>v</u>	<u>MS/SD in</u>
				() ()	() ()	() ()		
				() ()	() ()	() ()		
				() ()	() ()	() ()		
				() ()	() ()	() ()		
		<u>Pinsati 2MS/SD</u>		() ()	() ()	<u>22 (20)</u>	<u>MS</u>	<u>no qual</u>
				() ()	() ()	() ()		
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Compound				QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)	
H.		1,1-Dichloroethene	39-172%	≤ 22%	61-145%	≤ 14%		
S.		Trichloroethene	42%	≤ 24%	71-120%	≤ 14%		
V.		Benzene	33-131%	≤ 21%	76-127%	≤ 14%		
CC.		Toluene	35-115%	≤ 21%	61-125%	≤ 14%		
DC.		Chlorobenzene	21%	≤ 21%	18-100%	≤ 18%		

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

LCS #: 1706612/
 SDG #: mu cover
 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".
 Was a LCS required?
 Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?
Y N / N/A
Y N / N/A

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		<u>8172125 LCS/D</u>	<u>γ</u>	<u>893 (42-140)</u>	<u>()</u>	<u>112 (20)</u>	<u>All water</u>	<u>no qual CS/D</u>
			<u>Iodomethan</u>	<u>166 (45-140)</u>	<u>181 (45-140)</u>	<u>()</u>	<u>18F 2000-125</u>	<u>MS/D/n</u>
				()	()	()		
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VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x/C_x)/(A_b/C_b)$
 average RRF = sum of the RRFs/number of standards
 $\%RSD = 100 * (S/X)$

A_x = Area of compound,
 C_x = Concentration of compound,
 S = Standard deviation of the RRFs
 X = Mean of the RRFs

A_b = Area of associated internal standard
 C_b = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported		Recalculated		Reported		Recalculated	
				RRF (SD std)	RRF (SD std)	RRF (SD std)	Average RRF (Initial)	Average RRF (Initial)	%RSD	%RSD	
1	ICAL-F	6/9/08	vinyl acetate (1st internal standard)	0.38029	0.38029	0.38029	0.40678	13.8779	13.27		
			EE (2nd internal standard)	2.03630	2.0363	1.97703	1.97703	9.6757	9.6770		
			JJ (3rd internal standard)	1.42758	1.42758	1.42751	1.42511	5.17835			
2			(1st internal standard)								
			(2nd internal standard)								
			(3rd internal standard)								
3			(1st internal standard)								
			(2nd internal standard)								
			(3rd internal standard)								
4			(1st internal standard)								
			(2nd internal standard)								
			(3rd internal standard)								

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

LDC #: 19097B
 SDG #: per coner

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
 Reviewer: RS
 2nd Reviewer: RS

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

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

% Difference = $100 * (\text{ave. RRF} - \text{RRF}) / \text{ave. RRF}$
 $\text{RRF} = (A_x)(C_b) / (A_b)(C_x)$

Where: ave. RRF = initial calibration average RRF
 RRF = continuing calibration RRF
 A_x = Area of compound,
 A_b = Area of associated internal standard
 C_x = Concentration of compound,
 C_b = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported		Recalculated	
					RRF (CC)	%D	RRF (CC)	%D
1	FCAL1778	6/16/08	C	0.40678	0.38255	5.95695	0.38255	6.95695
			EE	1.97703	2.10886	6.66813	2.10886	6.66813
			VJJ	1.42574	1.44262	1.22825	1.44262	1.22825
2	FCAL1777 BRC	6/16/08	2,2-Dimethylpentane	0.73871	0.72154	2.32412	0.72154	2.32412
			(1st internal standard)					
			(2nd internal standard)					
3			(3rd internal standard)					
			(1st internal standard)					
			(2nd internal standard)					
4			(3rd internal standard)					
			(1st internal standard)					
			(2nd internal standard)					

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 #: 19097B1
 SDG #: pu cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
 Reviewer: AF
 2nd reviewer: J

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

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
 SS = Surrogate Spiked

Sample ID: 2

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8	50.0	46.9579	94	94	0
Bromofluorobenzene	↓	46.9877	94	94	↓
1,2-Dichloroethane-d4	↓	47.6177	95	95	↓
Dibromofluoromethane	↓	47.0909	94	94	↓

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

LDC #: 19097B/
 SDG #: per cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

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

The percent recoveries (%R) and Relative Percent Difference (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 = $100 * MSC - MSC1 * 2 / (MSC + MSC1)$ MSC = Matrix spike percent recovery MSC1 = Matrix spike duplicate percent recovery

MS/MSD sample: 6 + 7

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)		Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	MS	MSD	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	53.3	53.9			46.3	47.3	87	87	88	88	2.0	2.0
Trichloroethene					55.5	58.7	104	104	109	109	5.6	5.6
Benzene					49.7	50.8	93	93	94	94	2.2	2.2
Toluene					50.3	51.2	94	94	95	95	1.7	1.7
Chlorobenzene					49.7	51.3	93	93	95	95	3.2	3.2

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 #: 19097B/
 SDG #: per control

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

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

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

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

% Recovery = $100 \cdot \text{SSC}/\text{SA}$ Where: SSC = Spiked sample concentration
 SA = Spike added

RPD = $100 \cdot \text{LCS} - \text{LCSD} / (\text{LCS} + \text{LCSD})$

LCS = Laboratory control sample percent recovery
 LCSD = Laboratory control sample duplicate percent recovery

LCS ID: 8170291-1C2

Compound	Spike Added (ug/kg)		Spiked Sample Concentration		LCS		LCSD		Percent Recovery		Percent Recovery		RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalc	Reported	Recalc	Reported	Recalc
	1,1-Dichloroethene	SD	SD NA	47.8	NA	96	96	96	96					
Trichloroethene			49.5		99	99	99	99						
Benzene			49.6		99	99	99	99						
Toluene			50.2		100	100	100	100						
Chlorobenzene			49.9		100	100	100	100						

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

LDC #: 17097B1
 SDG #: pl cover

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

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

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

Y N N/A
Y N N/A

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

$$\text{Concentration} = \frac{A_x(I_s)(DF)}{A_{is}(RRF)(V_o)(\%S)}$$

- A_x = Area of the characteristic ion (EICP) for the compound to be measured
- A_{is} = Area of the characteristic ion (EICP) for the specific internal standard
- I_s = Amount of internal standard added in nanograms (ng)
- RRF = Relative response factor of the calibration standard.
- V_o = Volume or weight of sample pruced in milliliters (ml) or grams (g).
- Df = Dilution factor.
- %S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. _____, _____:

$$\text{Conc.} = \frac{(\quad)(\quad)(\quad)}{(\quad)(\quad)(\quad)(\quad)}$$

= ND

#	Sample ID	Compound	Reported Concentration ()	Calculated Concentration ()	Qualification

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

Project/Site Name: BRC Tronox Parcel G

Collection Date: June 11, 2008

LDC Report Date: July 23, 2008

Matrix: Soil

Parameters: Semivolatiles

Validation Level: EPA Level III & IV

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): F8F120167

Sample Identification

TSB-GJ-08-10

TSB-GJ-08-20**

TSB-GJ-08-30**

TSB-GJ-08-40

TSB-GJ-08-10MS

TSB-GJ-08-10MSD

**Indicates sample underwent EPA Level IV review

Introduction

This data review covers 6 soil 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 a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) 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.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UU Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. 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 semivolatiles target compounds and system performance check compounds (SPCCs) were greater than or equal to 0.05 as required with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
6/18/08	Phthalic acid	0.01422 (≥ 0.05)	All samples in SDG F8F120167	J (all detects)	A
	n-(Hydroxymethyl)phthalimide	0.04408 (≥ 0.05)		UJ (all non-detects)	
				J (all detects)	
				UJ (all non-detects)	

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
6/19/08	Phthalic acid	25.06818	TSB-GJ-08-30** TSB-GJ-08-40	J- (all detects) UJ (all non-detects)	A

The percent difference (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

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
6/18/08	Phthalic acid	0.01330 (≥ 0.05)	TSB-GJ-08-10	J (all detects)	A
	n-(Hydroxymethyl)phthalimide	0.04331 (≥ 0.05)	TSB-GJ-08-20** TSB-GJ-08-10MS TSB-GJ-08-10MSD F8F160000-439	UJ (all non-detects) J (all detects) UJ (all non-detects)	
6/19/08	Phthalic acid	0.01066 (≥ 0.05)	TSB-GJ-08-30**	J (all detects)	A
	n-(Hydroxymethyl)phthalimide	0.04523 (≥ 0.05)	TSB-GJ-08-40	UJ (all non-detects) J (all detects) UJ (all non-detects)	

V. Blanks

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

Sample "RINSATE 1" (from SDG F8F120137) was identified as a rinsate. No semivolatile contaminants were found in this blank.

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

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.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Although the LCS percent recovery (%R) was not within QC limits for one compound, the MS/MSD percent recovery (%R) was within QC limits and no data were qualified.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
TSB-GJ-08-30**	1,4-Dichlorobenzene-d4 Perylene-d12 Naphthalene-d8 Acenaphthene-d10 Phenanthrene-d10 Chrysene-d12	53781 (82431-329724) 25394 (281395-1125580) 201776 (303781-1215124) 101990 (159543-638172) 150470 (271508-1086030) 72798 (268054-1072214)	All TCL compounds	J (all detects) UJ (all non-detects)	A
TSB-GJ-08-40	Perylene-d12	197078 (281395-1125580)	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) UJ (all non-detects)	A

XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Tentatively Identified Compounds (TICs)

All tentatively identified compounds were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XIV. System Performance

The system performance was acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XV. Overall Assessment of Data

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

**BRC Tronox Parcel G
Semivolatiles - Data Qualification Summary - SDG F8F120167**

SDG	Sample	Compound	Flag	A or P	Reason
F8F120167	TSB-GJ-08-10 TSB-GJ-08-20** TSB-GJ-08-30** TSB-GJ-08-40	Phthalic acid n-(Hydroxymethyl)phthalimide	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Initial calibration (RRF)
F8F120167	TSB-GJ-08-30** TSB-GJ-08-40	Phthalic acid	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
F8F120167	TSB-GJ-08-10 TSB-GJ-08-20** TSB-GJ-08-30** TSB-GJ-08-40	Phthalic acid n-(Hydroxymethyl)phthalimide	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF)
F8F120167	TSB-GJ-08-30**	All TCL compounds	J (all detects) UJ (all non-detects)	A	Internal standards (area)
F8F120167	TSB-GJ-08-40	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) UJ (all non-detects)	A	Internal standards (area)

**BRC Tronox Parcel G
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG F8F120167**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel G
Semivolatiles - Field Blank Data Qualification Summary - SDG F8F120167**

No Sample Data Qualified in this SDG

LDC #: 19097B2
 SDG #: F8F120167
 Laboratory: Test America

VALIDATION COMPLETENESS WORKSHEET
 Level III/IV

Date: 7/2/08
 Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

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: 6/11/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	% RSD, r ² 20.990
IV.	Continuing calibration/ICV	SW	
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation/CRQLs	A	Not reviewed for Level III validation.
XIII.	Tentatively identified compounds (TICs)	A	Not reviewed for Level III validation.
XIV.	System performance	A	Not reviewed for Level III validation.
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	ND	R = Rinsate 1 SDG F8F120137

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: ** Indicates sample underwent Level IV validation

SOIL

1	TSB-GJ-08-10	11		21		31	
2	TSB-GJ-08-20**	12		22		32	
3	TSB-GJ-08-30**	13		23		33	
4	TSB-GJ-08-40	14		24		34	
5	TSB-GJ-08-10MS	15		25		35	
6	TSB-GJ-08-10MSD	16		26		36	
7	F8F160000-439	17	8168439	27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 19097B2
 SDG #: MS COVER

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
 Reviewer: AF
 2nd Reviewer: g

Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
All technical holding times were met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooler temperature criteria was met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the DFTPP performance results reviewed and found to be within the specified criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all samples analyzed within the 12 hour clock criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Did the laboratory perform a 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) > 0.05?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Was a method blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a method blank analyzed for each matrix and concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all surrogate %R within QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a MS/MSD analyzed every 20 samples of each matrix?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

LDC #: 19097B2
 SDG #: PC cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: R
 2nd Reviewer: g

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were performance evaluation (PE) samples performed?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were the performance evaluation (PE) samples within the acceptance limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were internal standard area counts within -50% or +100% of the associated calibration standard?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were retention times within + 30 seconds from the associated calibration standard?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were relative retention times (RRT's) within + 0.06 RRT units of the standard?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were chromatogram peaks verified and accounted for?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were relative intensities of the major ions within \pm 20% between the sample and the reference spectra?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
System performance was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Field duplicate pairs were identified in this SDG.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Target compounds were detected in the field duplicates.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Field blanks were identified in this SDG.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Target compounds were detected in the field blanks.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

VALIDATION FINDINGS WORKSHEET PRY

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

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.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	UUU
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 #: 17097B2

SDG #: Lee Coner

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

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

Y/N N/A

Y/N N/A

Y/N N/A

Y/N N/A

Y/N N/A

VALIDATION FINDINGS WORKSHEET

Initial Calibration

Did the laboratory conduct an acceptable 5 point calibration prior to sample analysis?

Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?

Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation?

Did the initial calibration meet the acceptance criteria?

Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF ?

Page: 1 of 1

Reviewer: PC

2nd Reviewer: SC

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	6/18/08	JICAL.SPEC	Phthalic Acid		0.01472	A11 + B1K	J/U/A
			N-(Hydroxymethyl)		0.04408	↓	
			Phthalimide				

LDC #: 19097B2
SDG #: pu eover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

METHOD: GC/MS BNA (EPA SW 846 Method 8270)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument?
Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
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
	6/18/08	JCAL5197	Phthalic Acid	0.01330		F 8F160000-439	
			N-(Hydroxymethyl) phthalic acid	0.04331		1, 2, 5, 6	J/W/A ↓
	6/19/08	JCAL5229	↓ Phthalic Acid		0.01066 0.04523	3, 4 ↓	J/W/A ↓ J/W/A

VALIDATION FINDINGS WORKSHEET
Internal Standards

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

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

X N N/A Were all internal standard area counts within -50 to +100 of the associated calibration standard?

Y N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		3	DCB	53781 (82431 - 329724)		J/US/A OUAL A11 TEL
			PRY	197078 (25394 (281395 - 1125580))		
			NPT	201776 (203781 - 1215124)		
			ANT	101990 (159543 - 638172)		
			PHN	150470 (271508 - 1086030)		
		X	CRY	72798 (268054 - 1072214)		
		4	PRY	197078 (281395 - 1125580)		J/US/A OUAL

* QC limits are advisory
 IS1 (DCB) = 1,4-Dichlorobenzene-d4
 IS2 (NPT) = Naphthalene-d8
 IS3 (ANT) = Acenaphthene-d10
 IS4 (PHN) = Phenanthrene-d10
 IS5 (CRY) = Chrysene-d12
 IS6 (PRY) = Perylene-d12

VALIDATION FINDINGS WORKSHEET
 Initial Calibration Calculation Verification

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

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_s)(C_{is}) / (A_{is})(C_s)$
 average RRF = sum of the RRFs/number of standards
 $\%RSD = 100 * (S/X)$
 A_s = Area of compound,
 C_s = Concentration of compound,
 S = Standard deviation of the RRFs,
 A_{is} = Area of associated internal standard
 C_{is} = Concentration of internal standard
 X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported		Recalculated		Reported		Recalculated	
				RRF (std)	RRF (std)	RRF (std)	RRF (std)	Average RRF (initial)	Average RRF (initial)	%RSD	%RSD
1	ICAL-J	6/2/08	Phenol (1st internal standard)	1.87853	1.87853	1.8537	1.8537	1.070	1.070		
			Naphthalene (2nd internal standard)	1.09438	1.09438	1.1090	1.1090	1.328	1.328		
			Fluorene (3rd internal standard)	1.41778	1.41778	1.41229	1.41229	0.573	0.573		
			Pentachlorophenol (4th internal standard)	0.20260	0.20260	0.19634	0.19634	10.255	10.255		
			Bis(2-ethylhexyl)phthalate (5th internal standard)	0.90763	0.90763	0.86343	0.86343	9.524	9.524		
			Benzo(a)pyrene (6th internal standard)	1.13808	1.13808	1.1182	1.1182	6.486	6.486		
2	ICAL-J APPX	6/18/08	Azobenzene Phenol (4th internal standard)	0.51976	0.51976	0.51274	0.51274	0.715	0.715		
			Naphthalene (2nd internal standard)								
			Fluorene (3rd internal standard)								
			Pentachlorophenol (4th internal standard)								
			Bis(2-ethylhexyl)phthalate (5th internal standard)								
			Benzo(a)pyrene (6th internal standard)								
3	ICAL-J SPEC		N-(methoxymercapto)phthalimide Phenol (1st internal standard)	0.04162		0.04408		8.41339			
			Naphthalene (2nd internal standard)								
			Fluorene (3rd internal standard)								
			Pentachlorophenol (4th internal standard)								
			Bis(2-ethylhexyl)phthalate (5th internal standard)								
			Benzo(a)pyrene (6th internal standard)								

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

LDC #: 1909182

SDG #: see cover

VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: PA
2nd Reviewer: SR

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

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

$$\% \text{ Difference} = 100 \times (\text{ave. RRF} - \text{RRF}) / \text{ave. RRF}$$
$$\text{RRF} = (A_x)(C_b) / (A_b)(C_x)$$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF

A_x = Area of compound,
C_x = Concentration of compound,

A_b = Area of associated internal standard
C_b = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (Initial)	Reported		Recalculated	
					RRF (CC)	%D	RRF (CC)	%D
1	JCAL5195	6/18/08	Phenol (1st internal standard)	1.85537	1.87174	0.88210	1.8717	0.8821
			Naphthalene (2nd internal standard)	1.10901	1.10135	0.69070	1.101	0.6907
			Fluorene (3rd internal standard)	1.41227	1.39801	1.01058	1.398	1.0106
			Pentachlorophenol (4th internal standard)	0.19634	0.20370	3.74980	0.2037	3.749
			Bis(2-ethylhexyl)phthalate (5th internal standard)	0.86343	0.87088	0.86222	0.87088	0.8622
			Benzo(a)pyrene (6th internal standard)	1.11182	1.11507	0.29280	1.1151	0.2928
2	JCAL5196	6/18/08	Phenol (1st internal standard)	0.51274	0.52185	1.77632	0.52185	1.77632
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Naphthalene (2nd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
3	JCAL5197	6/18/08	Phenol (1st internal standard)	0.04408	0.04331	1.73819	0.04331	1.73819
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					

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.

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

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

% Difference = $100 \times (\text{ave. RRF} - \text{RRF}) / \text{ave. RRF}$ Where: ave. RRF = initial calibration average RRF
 RRF = $(A_x)(C_b) / (A_b)(C_x)$ RRF = continuing calibration RRF
 A_x = Area of compound, A_b = Area of associated internal standard
 C_x = Concentration of compound, C_b = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported		Recalculated	
					RRF (CC)	%D	RRF (CC)	%D
1	JCAL5227	6/19/08	Phenol (1st internal standard)	1.85537	1.80162	2.87721	1.8016	2.897
			Naphthalene (2nd internal standard)	1.10901	1.09712	1.97399	1.087	1.974
			Fluorene (3rd internal standard)	1.41229	1.40878	0.24855	1.4088	0.24886
			Pentachlorophenol (4th internal standard)	0.19634	0.20730	5.58529	0.2073	5.585
			Bis(2-ethylhexyl)phthalate (5th internal standard)	0.86343	0.87184	0.97842	0.8719	0.978
			Benzo(a)pyrene (6th internal standard)	1.11182	1.12694	1.36062	1.1269	1.361
2	JCAL5228	6/19/08	Acetophenone Phenol (1st internal standard)	0.51274	0.51326	0.10062	0.5133	0.1006
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard) Phthalimide	0.04408	0.04523	0.61460	0.0452	0.615
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
3	JCAL5229	6/19/08	Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					

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 #: 19097B2

SDG #: *see cover*

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page: 1 of 1

Reviewer: *B*

2nd reviewer: *A*

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

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #2

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	60	33.3103	67	67	0
2-Fluorobiphenyl	↓	34.9043	70	70	
Terphenyl-d14	↓	33.6734	67	67	
Phenol-d5	75	48.9853	65	65	
2-Fluorophenol	↓	48.52	65	65	↓
2,4,6-Tribromophenol	↓	50.6613	68	68	↓
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

LDC #: 19097B2
 SDG #: per cover

VALIDATION FINDINGS WORKSHEET
 Matrix Spike/Matrix Spike Duplicates Results Verification

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

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

The percent recoveries (%R) and Relative Percent Difference (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
 SA = Spike added

SC = Sample concentration

RPD = $100 * |MS - MSD| / (MS + MSD)$

MS = Matrix spike percent recovery

MSD = Matrix spike duplicate percent recovery

MS/MSD samples: 5 + 6

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD		MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol	3570	2630	ND	2490	2450	70	70	69	69	1.7	1.7
N-Nitroso-di-n-propylamine				2730	2670	77	77	75	75	2.2	2.2
4-Chloro-3-methylphenol				2760	2690	77	77	75	75	2.8	2.8
Acenaphthene				2680	2620	74	74	73	73	1.0	1.0
Pentachlorophenol				2300	2230	64	64	62	62	3.0	3.0
Pyrene				2460	2390	69	69	67	67	2.7	2.7

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 #: 19091B2
 SDG #: per coner

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

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

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

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 = $100 * (SC/SA)$

Where: SSC = Spike concentration
 SA = Spike added

RPD = $100 * (LCS - LCSD) / (LCS + LCSD)$

LCS = Laboratory control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 8168439-LCS

Compound	Spike Added (ug/kg)		Spike Concentration (ug/kg)		LCS		LCSD		Percent Recovery		Percent Recovery		LCS/LCSD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Phenol	3330	NA	2360	NA	71	77	77	77						
N-Nitroso-di-n-propylamine			2570		77	77								
4-Chloro-3-methylphenol			2560		77	77								
Acenaphthene			2510		75	75								
Pentachlorophenol			2240		67	67								
Pyrene			2350		70	70								

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

LDC #: 19097B2
 SDG #: fu cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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

Y N N/A
Y N N/A

Were all reported results recalculated and verified for all level IV samples?
 Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

$$\text{Concentration} = \frac{(A_x)(I_s)(V_i)(DF)(2.0)}{(A_s)(RRF)(V_o)(V_i)(\%S)}$$

- A_x = Area of the characteristic ion (EICP) for the compound to be measured
- A_s = Area of the characteristic ion (EICP) for the specific internal standard
- I_s = Amount of internal standard added in nanograms (ng)
- V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).
- V_i = Volume of extract injected in microliters (ul)
- V_i = Volume of the concentrated extract in microliters (ul)
- Df = Dilution Factor.
- %S = Percent solids, applicable to soil and solid matrices only.
- 2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. _____, _____:

Conc. = (_____) (_____) (_____) (_____) (_____)

= **ND**

#	Sample ID	Compound	Reported Concentration ()	Calculated Concentration ()	Qualification

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

Project/Site Name: BRC Tronox Parcel G
Collection Date: June 11, 2008
LDC Report Date: August 11, 2008
Matrix: Soil
Parameters: Chlorinated Pesticides
Validation Level: EPA Level III & IV
Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): F8F120167

Sample Identification

TSB-GJ-08-10
TSB-GJ-08-20**
TSB-GJ-08-30**
TSB-GJ-08-40
TSB-GJ-08-10MS
TSB-GJ-08-10MSD

**Indicates sample underwent EPA Level IV review

Introduction

This data review covers 6 soil 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 a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) 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.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. 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 and multicomponent 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 all compounds.

Retention time windows were evaluated and considered technically acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

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

Retention times (RT) of all compounds in the calibration standards were within QC limits for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

V. Blanks

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

Sample "RINSATE 1" (from SDG F8F120137) was identified as a rinsate. No chlorinated pesticide contaminants were found in this blank.

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

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.

VIII. Laboratory Control Samples (LCS)

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

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

All target compound identifications were within validation criteria for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and Reported CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

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.

**BRC Tronox Parcel G
Chlorinated Pesticides - Data Qualification Summary - SDG F8F120167**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel G
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG
F8F120167**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel G
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG
F8F120167**

No Sample Data Qualified in this SDG

LDC #: 19097B3a
 SDG #: F8F120167
 Laboratory: Test America

VALIDATION COMPLETENESS WORKSHEET
 Level III/IV

Date: 7/21/08
 Page: 1 of 1
 Reviewer: [Signature]
 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	A	Sampling dates: 6/11/08
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	SW	ICV ≤ 15
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
Xa.	Florisol cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation and reported CRQLs	A	Not reviewed for Level III validation.
XIII.	Overall assessment of data	N	
XIV.	Field duplicates	N	
XV.	Field blanks	ND	R = Rinsate / SDG # F8F120137

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

Validated Samples: ** Indicates sample underwent Level IV validation

SOIL

1	TSB-GJ-08-10	11		21		31	
2	TSB-GJ-08-20**	12		22		32	
3	TSB-GJ-08-30**	13		23		33	
4	TSB-GJ-08-40	14		24		34	
5	TSB-GJ-08-10MS	15		25		35	
6	TSB-GJ-08-10MSD	16		26		36	
7	F8F160000-164	17	8168164	27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 190971B 3a
 SDG #: pu cones

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
 Reviewer: F7
 2nd Reviewer: [Signature]

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

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. GC/ECD instrument performance check				
Was the instrument performance found to be acceptable?	/			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	/			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) \leq 20%?	/			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		/		
Did the initial calibration meet the curve fit acceptance criteria?			/	
Were the RT windows properly established?	/			
Were the required standard concentrations analyzed in the initial calibration?	/			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ___%D or ___%R	/			
Were Evaluation mix standards analyzed prior to the initial calibration and sample analysis?	/			
Were endrin and 4,4'-DDT breakdowns \leq 15%.0 for individual breakdown in the Evaluation mix standards?	/			
Was a continuing calibration analyzed daily?	/			
Were all percent differences (%D) \leq 15%.0 or percent recoveries 85-115%?		/		
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?	/			
Were extract cleanup blanks analyzed with every batch requiring clean-up?			/	
Was there contamination in the method blanks or clean-up 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) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			/	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			/	

LDC #: 19097B3a
 SDG #: pu cones

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

Validation Area	Yes	No	NA	Findings/Comments
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?			/	
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, dry weight factors, and clean-up activities 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.		/		

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 #: 19097133
 SDG #: mu con

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

METHOD: GC HPLC

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

- CF = A/C
- average CF = sum of the CF/number of standards
- %RSD = $100 * (S/X)$
- A = Area of compound,
- C = Concentration of compound,
- S = Standard deviation of the CF
- X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported		Recalculated		Reported		Recalculated	
				CF (μX std)	CF PO2 std	Average CF (Initial)	Average CF (Initial)	%RSD	%RSD	%RSD	%RSD
1	ICAL	6/16/08	endosulfan / ne thoxychlor	28500170	28500170	27353342	27353342	2.96584	2.96584	2.96	2.96
				44217640	44217640	42222360	42222360	6.07863	6.07863	6.02	6.02
2	ICAL	6/16/08	ch e(A)	530216040	530216040	51099540	51099540	3.14887	3.14887	3.14887	3.14887
				161496680	161496680	152272620	152272620	6.25515	6.25515	6.25515	6.25515
3											
4											

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

LDC #: 19097B32
 SDG #: pu covn

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

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 = $100 * (\text{ave. CF} - \text{CF}) / \text{ave. CF}$ Where: ave. CF = initial calibration average CF
 CF = A/C CF = continuing calibration CF
 A = Area of compound
 C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(ical)/ CCV Conc.	Reported		Recalculated	
					CF/Conc. CCV	%D	CF/Conc. CCV	%D
1	KCAL064	6/18/08	endosulfan / methoxychlor	0.0259 ↓ 0.0252	3.7 0.8	0.0259 0.0252	3.7 0.8	
2	KCAL080	6/18/08	↓	0.0252 ↓ 0.0257	1.0 2.7	0.0252 0.0257	1.0 2.7	
3								
4								

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 #: 19097B3
 SDG #: pu cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
 SS = Surrogate Spiked

Sample ID: #2

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene	ch A	0.02	0.01676	84	84	0
Decachlorobiphenyl	↓	↓	0.01750	87	87	↓
Decachlorobiphenyl						

Sample ID: _____

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Sample ID: _____

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Sample ID: _____

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Notes: _____

LDC #: 1909703a
 SDG #: per card

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

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

The percent recoveries (%R) and Relative Percent difference (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 = Concentration
 SA = Spike added

RPD = $|MS - MSD| * 2 / (MS + MSD)$ MS = Matrix spike percent recovery MSD = Matrix spike duplicate percent recovery

MS/MSD samples: 5 + 6

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD		MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
gamma-BHC	17.7	17.5	ND	15.6	15.3	88	88	87	87	2.0	2.0
4,4'-DDT	↓	↓		15.6	16.3	88	88	93	93	4.4	4.4

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 #: 19097B32

SDG #: am cont

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Page: 6 of 7
Reviewer: [Signature]
2nd Reviewer: [Signature]

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

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 = $100 * (SSC-SC)/SA$

Where: SSC = Spiked sample concentration
SA = Spike added

SC = Concentration

RPD = $1 LCS - LCSD \div 2 \div (LCS + LCSD)$

LCS = Laboratory control sample percent recovery

LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 8168164-105

Compound	Spike Added (ug/kg)		Spiked Sample Concentration (ug/kg)		LCS		LCSD		LCSD		RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	16.7	NA	15.0	NA	90	90	NA	NA				
4,4'-DDT	↓	↓	16.8	↓	101	101	NA	NA				

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 #: 19097B3~
SDG #: pu cover

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page: / of /
Reviewer: _____
2nd reviewer: [Signature]

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

Y N N/A
Y N N/A

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Example:

Sample I.D. _____:

Conc. = (_____)
(_____)

= ND

#	Sample ID	Compound	Reported Concentration ()	Calculated Concentration ()	Qualification

Note: _____

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

Project/Site Name: BRC Tronox Parcel G
Collection Date: June 11, 2008
LDC Report Date: July 22, 2008
Matrix: Soil
Parameters: Polychlorinated Biphenyls
Validation Level: EPA Level III & IV
Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): F8F120167

Sample Identification

TSB-GJ-08-10
TSB-GJ-08-20**
TSB-GJ-08-30**
TSB-GJ-08-40
TSB-GJ-08-10MS
TSB-GJ-08-10MSD

**Indicates sample underwent EPA Level IV review

Introduction

This data review covers 6 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) 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.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UU Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. 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 multicomponent compounds was performed for the primary (quantitation) column as required by the method.

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

Retention time windows were evaluated and considered technically acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

V. Blanks

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

Sample "RINSATE 1" (from SDG F8F120137) was identified as a rinsate. No polychlorinated biphenyl contaminants were found in this blank.

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

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.

VIII. Laboratory Control Samples (LCS)

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

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

All target compound identifications were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and Reported CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

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.

**BRC Tronox Parcel G
Polychlorinated Biphenyls - Data Qualification Summary - SDG F8F120167**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel G
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG
F8F120167**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel G
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG
F8F120167**

No Sample Data Qualified in this SDG

LDC #: 19097B3b
 SDG #: F8F120167
 Laboratory: Test America

VALIDATION COMPLETENESS WORKSHEET
 Level III/IV

Date: 7/21/08
 Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

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: <u>6/11/08</u>
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	<u>ICV = 15</u>
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	<u>LCS</u>
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation and reported CRQLs	A	Not reviewed for Level III validation.
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	A	
XV.	Field blanks	ND	<u>R = Rinsate / SDG # F8F120137</u>

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: ** Indicates sample underwent Level IV validation

<u>1</u>	TSB-GJ-08-10	11		21		31	
<u>2</u>	TSB-GJ-08-20**	12		22		32	
<u>3</u>	TSB-GJ-08-30**	13		23		33	
<u>4</u>	TSB-GJ-08-40	14		24		34	
5	TSB-GJ-08-10MS	15		25		35	
6	TSB-GJ-08-10MSD	16		26		36	
7	<u>F8F160000-162</u>	17	<u>8168162</u>	27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 19097B3b
 SDG #: pu cover

VALIDATION FINDINGS CHECKLIST

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

Method: GC HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooler temperature criteria was met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) < 20%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Did the initial calibration meet the curve fit acceptance criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were the RT windows properly established?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
III. Continuing calibration				
What type of continuing calibration calculation was performed? ___%D or %R	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a continuing calibration analyzed daily?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) < 15% or percent recoveries 85-115%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all the retention times within the acceptance windows?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IV. Blanks				
Was a method blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a method blank analyzed for each matrix and concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
V. Surrogate spikes				
Were all surrogate %R within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
VI. 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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a MS/MSD analyzed every 20 samples of each matrix?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
VII. Laboratory control samples				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was an LCS analyzed per extraction batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

LDC #: 19097B36
 SDG #: su cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

Validation Area	Yes	No	NA	Findings/Comments
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?			/	
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 #: 17097836
 SDG #: su comb

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

METHOD: GC ✓ HPLC _____

The calibration factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
 average CF = sum of the CF/number of standards
 %RSD = $100 \cdot (S/X)$
 A = Area of compound,
 C = Concentration of compound,
 S = Standard deviation of the CF
 X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported		Recalculated		Reported		Recalculated	
				CF (SD/std)	CF (SD/std)	Average CF (Initial)	Average CF (Initial)	%RSD	%RSD		
1	ICAL	5/21/08	1260-1 ch A	28576	28576	27977	27977	12.0	12.0	9.582	9.582
			1260-1 ch B	39248	39248	39164	39164				
2											
3											
4											

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

LDC #: 19097836
 SDG #: Lu coner

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

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 = $100 \cdot (\text{ave. CF} - \text{CF}) / \text{ave. CF}$ 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 (cal) / CCV Conc.	Reported		Recalculated	
					CF/Conc. CCV	%D	CF/Conc. CCV	%D
1	PCA1087	6/18/08	Aroclor 1260	10000	952.1902	4.8	952.19	4.8
2	PCA1100	6/18/08	↓	↓	937.3342	6.3	937.33	6.3
3								
4								

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.

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

DC #: 19097B3b
 SDG #: pu canon
 METHOD: GC HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

Where: SF = Surrogate Found
 SS = Surrogate Spiked

% Recovery: SF/SS * 100
 Sample ID: #2

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
PCB	Ch A	20	16.0769	80	80	0

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

LDC #: 19097B36
 SDG #: ju cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

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: S + G

Compound	Spike Added		Sample Conc.		Spike Sample Concentration		Matrix spike		Matrix Spike Duplicate		MS/MSD	
	MS	MSD	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)												
<u>Aroclor 1260</u>	<u>177</u>	<u>178</u>	<u>ND</u>		<u>181</u>	<u>194</u>	<u>102</u>	<u>102</u>	<u>109</u>	<u>109</u>	<u>7.4</u>	<u>7.4</u>

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.

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

2nd Reviewer: [Signature]

METHOD: GC HPLC

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

%Recovery = $100 * ((SC - SA) / SA)$ Where SSC = Spiked concentration SC = Sample concentration
 SA = Spike added

RPD = $(((SSCLCS - SSCLCSD) * 2) / ((SSCLCS + SSCLCSD))) * 100$

LCS = Laboratory Control Sample percent recovery LCS = Laboratory Control Sample duplicate percent recovery

LCS/LCSD samples: 8168162 - LC2

Compound	Spike Added (<u>ug/kg</u>)		Sample Cong. (<u>ug/kg</u>)		Spike Sample Concentration (<u>ug/kg</u>)		LCS		LCS		LCS		LCS/LCSD	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	Reported	Recalc.	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)														
<u>Propyl 1260</u>	<u>167</u>	<u>NA</u>	<u>0</u>	<u>NA</u>	<u>171</u>	<u>NA</u>	<u>103</u>	<u>103</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>

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 #: 19097103b
 SDG #: Lee Coney

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
 Reviewer: _____
 2nd Reviewer: _____

METHOD: GC HPLC

Y N N/A
Y N N/A

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

Concentration = $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$
 Example: _____
 Sample ID: _____ Compound Name _____

Concentration = _____

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

#	Sample ID	Compound	Reported Concentrations	Recalculated Results Concentrations	Qualifications

Comments: _____

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

Project/Site Name: BRC Tronox Parcel G
Collection Date: June 11, 2008
LDC Report Date: July 24, 2008
Matrix: Soil
Parameters: Metals
Validation Level: EPA Level III & IV
Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): F8F120167

Sample Identification

TSB-GJ-08-10
TSB-GJ-08-20**
TSB-GJ-08-30**
TSB-GJ-08-40
TSB-GJ-08-10MS
TSB-GJ-08-10MSD

**Indicates sample underwent EPA Level IV review

Introduction

This data review covers 6 soil 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, Lithium, Magnesium, Manganese, Molybdenum, Mercury, Nickel, Niobium, Palladium, Phosphorus, Platinum, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Sulfur, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc, and Zirconium.

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

Field duplicates are summarized in Section XIII.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

An initial calibration was performed.

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

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	Maximum Concentration	Associated Samples
ICB/CCB	Antimony Thallium Tungsten Vanadium Lithium Mercury	1.3 ug/L 1.1 ug/L 1.4 ug/L 2.7 ug/L 8.0 ug/L 0.1 ug/L	All samples in SDG F8F120167

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
TSB-GJ-08-10	Mercury	19.1 ug/Kg	35.7U ug/Kg
TSB-GJ-08-20**	Thallium Tungsten	0.40 mg/Kg 0.70 mg/Kg	0.48U mg/Kg 1.2U mg/Kg
TSB-GJ-08-30**	Lithium	65.0 mg/Kg	180U mg/Kg

Sample "RINSATE 1" (from SDG F8F120137) was identified as a rinsate. No metal contaminants were found in this blank with the following exceptions:

Rinsate ID	Sampling Date	Analyte	Concentration	Associated Samples
RINSATE 1	6/11/08	Calcium Iron Magnesium Manganese Silicon Sodium Strontium	131 ug/L 154 ug/L 17.9 ug/L 0.84 ug/L 38.6 ug/L 39.2 ug/L 1.5 ug/L	All samples in SDG F8F120167

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

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

V. Matrix Spike Analysis

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 with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
TSB-GJ-08-10MS/MSD (All samples in SDG F8F120167)	Sulfur Phosphorus	140.1 (75-125) 134.8 (75-125)	135.4 (75-125) -	- -	J+ (all detects) J+ (all detects)	A
TSB-GJ-08-10MS/MSD (All samples in SDG F8F120167)	Antimony Copper Silicon Vanadium Lithium Nickel Tungsten Zinc	55.2 (75-125) 72.5 (75-125) 65.4 (75-125) 68.4 (75-125) - - - -	39.4 (75-125) 60.9 (75-125) 44.6 (75-125) 56.0 (75-125) 69.8 (75-125) 71.1 (75-125) 60.6 (75-125) 62.2 (75-125)	- - - - - - - -	J- (all detects) UJ (all non-detects)	A
TSB-GJ-08-10MS/MSD (All samples in SDG F8F120167)	Niobium	40.6 (75-125)	29.7 (75-125)	-	J- (all detects) R (all non-detects)	A

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

VII. Laboratory Control Samples (LCS)

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

VIII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits for samples on which an EPA Level IV review was performed with the following exceptions:

Sample	Internal Standard	%R (Limits)	Analyte	Flag	A or P
TSB-GJ-08-20**	Scandium-45	127.557 (30-120)	Silicon Strontium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A
TSB-GJ-08-30**	Scandium-45	129.653 (30-120)	Silicon Strontium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

Raw data were not evaluated for the samples reviewed by Level III criteria.

IX. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

X. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
TSB-GJ-08-10L	Iron	10.4 (≤ 10)	All samples in SDG F8F120167	J (all detects)	A

XI. Sample Result Verification

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

XII. Overall Assessment of Data

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

XIII. Field Duplicates

No field duplicates were identified in this SDG.

**BRC Tronox Parcel G
Metals - Data Qualification Summary - SDG F8F120167**

SDG	Sample	Analyte	Flag	A or P	Reason
F8F120167	TSB-GJ-08-10 TSB-GJ-08-20** TSB-GJ-08-30** TSB-GJ-08-40	Sulfur Phosphorus	J+ (all detects) J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)
F8F120167	TSB-GJ-08-10 TSB-GJ-08-20** TSB-GJ-08-30** TSB-GJ-08-40	Antimony Copper Silicon Vanadium Lithium Nickel Tungsten Zinc	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)
F8F120167	TSB-GJ-08-10 TSB-GJ-08-20** TSB-GJ-08-30** TSB-GJ-08-40	Niobium	J- (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)
F8F120167	TSB-GJ-08-20** TSB-GJ-08-30**	Silicon Strontium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Internal standards (%R)
F8F120167	TSB-GJ-08-10 TSB-GJ-08-20** TSB-GJ-08-30** TSB-GJ-08-40	Iron	J (all detects)	A	ICP serial dilution (%D)

**BRC Tronox Parcel G
Metals - Laboratory Blank Data Qualification Summary - SDG F8F120167**

SDG	Sample	Analyte	Modified Final Concentration	A or P
F8F120167	TSB-GJ-08-10	Mercury	35.7U ug/Kg	A
F8F120167	TSB-GJ-08-20**	Thallium Tungsten	0.48U mg/Kg 1.2U mg/Kg	A
F8F120167	TSB-GJ-08-30**	Lithium	180U mg/Kg	A

**BRC Tronox Parcel G
Metals - Field Blank Data Qualification Summary - SDG F8F120167**

No Sample Data Qualified in this SDG

LDC #: 19097B4
 SDG #: F8F120167
 Laboratory: Test America

VALIDATION COMPLETENESS WORKSHEET
 Level III/IV

Date: 7/24/08
 Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

METHOD: Metals (EPA SW 846 Method 6020/6010B/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: 6/11/08
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	MS/MSD
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	SW	not reviewed for level 3
IX.	Furnace Atomic Absorption QC	N	not utilized
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	A	Not reviewed for Level III validation.
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	SW	R = RINSATE 1 (F8F120137)

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

Validated Samples: ** Indicates sample underwent Level IV validation

1	TSB-GJ-08-10	11		21		31	
2	TSB-GJ-08-20**	12		22		32	
3	TSB-GJ-08-30**	13		23		33	
4	TSB-GJ-08-40	14		24		34	
5	TSB-GJ-08-10MS	15		25		35	
6	TSB-GJ-08-10MSD	16		26		36	
7	PB	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 1909704
 SDG #: Set over

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
 Reviewer: MLH
 2nd Reviewer: g

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

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury and 85-115% for cyanide) QC limits?	/			
Were all initial calibration correlation coefficients > 0.995? (Level IV only)	/			
III. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	/			
IV. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	/			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	/			
IV. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL (+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were < 5X the RL.	/			
V. 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 80-120% QC limits for water samples and laboratory established QC limits for soils?	/			
VI. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			/	
Do all applicable analyses have duplicate injections? (Level IV only)			/	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			/	
Were analytical spike recoveries within the 85-115% QC limits?			/	

LDC #: 19097B4
 SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: MM
 2nd Reviewer: GA

Validation Area	Yes	No	NA	Findings/Comments
VII. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	✓			760X MUL for 20/10/15
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
VIII. Internal Standards (EPA SW-846 Method 6020)				
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?		✓		
If the %Rs were outside the criteria, was a reanalysis performed?		✓		
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XIII. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: 19097B4
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4	Soil	(Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si)
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si
ms6	Soil	(Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si)
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si
1-4	Soil	(Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr)
		Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr
ms6	Soil	(Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr)
		Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr
		Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr
		Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr
		Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr
		Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr
		Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr
		Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr
		Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr
		Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr
		Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr
		Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr
		Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr
		Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr
		Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr
		Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr
		Analysis Method
ICP		(Li, S)
ICP-MS		(Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si)
ICP-MS		(Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Zr)
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN

Comments: Mercury by CVAA if performed
Nb: Niobium, Pd: Palladium, P: Phosphorus, Pt: Platinum, S: Sulfur, W: Tungsten, U: Uranium, Zr: Zirconium

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 2
 Reviewer: _____
 2nd Reviewer: _____

LDC #: 19097B4
 SDG #: See Cover
 METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)
 Sample Concentration units, unless otherwise noted: mg/Kg except Hg: ug/Kg Associated Samples: All

Soil preparation factor applied: _____

Sample Identification										
Analyte	Maximum PB ^a (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Blank Action Limit	1	2	3			
Sb			1.3							
Tl			1.1	0.22		0.40 / 0.48				
W			1.4			0.70 / 1.2				
V			2.7							
Li			8.0				65.0 / 180			
Hg			0.1		19.1 / 35.7					

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U"
 Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

METHOD: Trace metals (EPA SW 846 Method 6010/7000)

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

- N N/A Was a matrix spike analyzed for each matrix in this SDG?
- N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.
- N N/A Were all duplicate sample relative percent differences (RPD) \leq 20% for water samples and \leq 35% for soil samples?

LEVEL IV ONLY:

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

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
1	5/b	Soil	S	140.1	135.4		A11	J-F/JT/A
			Sb	55.2	39.4	38		J-/MJ/A
			Cu	72.5	60.9			J-/MJ/A
			Nb	40.6	29.7			J-/R/A
			P	134.8	44.6			J-F/JT/A
			Si	65.4	56.0			J-/MJ/A
			V	68.4	56.0			J-/MJ/A
			Li		69.8			J-/MJ/A
			Ni		71.1			
			W		60.6			
			Zn		62.2			
			Li			20.9		N. good (LCSIA)
			Sb			33.1		
			Ba			20.3		
			Ca			29.7		
			Co			26.0		
			Ti			20.9		
			W			18.0		
			U			22.6		

Comments: Al, Ca, Fe, Mg, Mn, Sr, Ti, Zn

VALIDATION FINDINGS WORKSHEET
Internal Standards (ICP-MS)

LDC #: 19097B4
SDG #: See cover

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

METHOD: Metals (EPA SW 846 Method 6020)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "NA".
Y N N/A Were all internal standard percent recoveries within 30-120% of the intensity of the internal standard in the initial calibration standard ?

Y N N/A If the response to either of the above questions is no, were the samples reanalyzed as required ?

#	Internal Standard	Associated Metals	%R (Limits)	Associated Samples	Qualifications
1	Sc ⁴⁵	Si, Sr, ↓	123.557	2	U/MS/A ↓
2	Sc ⁴⁵		129.653	3	

LDC #: 19097BY
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

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

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

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Q N N/A If analyte concentrations were > 50X the MDL (ICP), or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

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

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
1		1	Soil	Fe	1004	A11	JLT/A

Comments: No, Y < 100X MDL

LDC #: 19097B4
 SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
 Reviewer: ML
 2nd Reviewer: [Signature]

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

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

$\%R = \frac{\text{Found}}{\text{True}} \times 100$ Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
 True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated		Reported		Acceptable (Y/N)
					%R	%R	%R	%R	
ICV	ICP (Initial calibration)	S	42700	40000	106.8	106.9	106.9	106.9	Y
	GFAA (Initial calibration)								
ICV	CVAA (Initial calibration)	Hg	2.33	2.5	93.2	93.2	93.2	93.2	Y
CCV	ICP (Continuing calibration)	Li	4920	5000	98.4	98.4	98.4	98.4	↓
	GFAA (Continuing calibration)								
CCV	CVAA (Continuing calibration)	Hg	4.98	5.0	99.6	99.6	99.6	99.6	Y
ICV	ICP/MS (Initial calibration)	Co	1011.8	1000	101.2	101.2	101.2	101.2	↓
CCV	ICP/MS (Continuing calibration)	W	1068.8	1000	106.9	106.9	106.9	106.9	↓

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

LDC #: 19097B4

SDG #: See cover

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

VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

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

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

$$\%R = \frac{\text{Found} - \text{True}}{\text{True}} \times 100$$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

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

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

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

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$$\%D = \frac{|I-SDR|}{I} \times 100$$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated		Reported		Acceptable (Y/N)
					%R / RPD / %D	%R / RPD / %D			
JESAD	ICP interference check	As	95.605	100	95.6	95.6	95.6	95.6	Y
LC9	Laboratory control sample	Nb	26.87	250	107.5	107.5	107.5	107.5	Y
5	Matrix spike	K (SSR-SR)	110.3	1338.6	82.3	82.3	82.3	82.3	Y
5/6	Duplicate	Pb	31.85	34.9	9.2	9.2	9.0	9.0	Y
1	ICP serial dilution	Mn	413.81	438.56	5.6	5.6	5.6	5.6	Y

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

LDC #: 19097B4
 SDG #: See con

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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

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

- N N/A Have results been reported and calculated correctly?
- N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
- N N/A Are all detection limits below the CRDL?

Detected analyte results for 2 were recalculated and verified using the following equation:

$$\text{Concentration} = \frac{(\text{RD})(\text{FV})(\text{Dil})}{(\text{In. Vol.})(\%S)}$$

Recalculation:

- RD = Raw data concentration
- FV = Final volume (ml)
- In. Vol. = Initial volume (ml) or weight (G)
- Dil = Dilution factor
- %S = Decimal percent solids

$$\text{Mg} = \frac{52418.7 \text{ ug/L} \times 0.12 \times 2}{0.5g \times 0.8379} = 25023 \text{ mg/kg}$$

Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
2	Li	73.5	73.5	Y
	S	6030	6030	Y
	Al	11900	11900	
	As	24.4	24.4	
	Ba	43.4	43.2	
	Be	0.54	0.54	
	B	22.1	22.1	
	Ca	9510	9510	
	Cr	30.3	30.3	
	Co	4.8	4.8	
	Cu	11.4	11.4	
	Fe	11200	11200	
	Pb	7.8	7.8	
	Mg	25000	25000	
	Mn	153	152	
	Mo	0.56	0.56	
	Ni	11.6	11.6	
	Pd	0.24	0.24	
	P	484	483	
	K	3190	3190	
	Si	323	323	
	Ag	0.17	0.17	Y

LDC #: 19097B4
 SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 2 of 2
 Reviewer: MH
 2nd reviewer: [Signature]

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

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Zn were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In. Vol.)(\%S)}$ Recalculation:

- RD = Raw data concentration
- FV = Final volume (ml)
- In. Vol. = Initial volume (ml) or weight (G)
- Dil = Dilution factor
- %S = Decimal percent solids

Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	Na	986	986	Y
	Sr	106	106	Y
	Tr	0.40	0.40	Y
	Sn	0.51	0.51	Y
	Ti	528	528	Y
	W	0.90	0.90	Y
	U	5.4	5.4	Y
	V	42.3	42.3	Y
	Zn	32.8	32.7	Y
	Zr	29.8	29.8	Y

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: BRC Tronox Parcel G

Collection Date: June 11, 2008

LDC Report Date: July 23, 2008

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: EPA Level III & IV

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): F8F120167

Sample Identification

TSB-GJ-08-10
TSB-GJ-08-20**
TSB-GJ-08-30**
TSB-GJ-08-40
TSB-GJ-08-10MS
TSB-GJ-08-10DUP

**Indicates sample underwent EPA Level IV review

Introduction

This data review covers 6 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 300.0 for Bromide, Bromine, Chlorate, Chloride, Chlorine, Fluoride, Nitrate as Nitrogen, Nitrite as Nitrogen, Orthophosphate as Phosphorus, and Sulfate and EPA SW 846 Method 9071B for Oil & Grease.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UU Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

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
CCB1	Orthophosphate as P	0.260 mg/L	TSB-GJ-08-10
CCB2	Orthophosphate as P	0.212 mg/L	TSB-GJ-08-20** TSB-GJ-08-30** TSB-GJ-08-40

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

Sample "RINSATE 1" (from SDG F8F120137) was identified as a rinsate. No contaminant concentrations were found in this blank with the following exceptions:

Rinsate ID	Sampling Date	Analyte	Concentration	Associated Samples
RINSATE 1	6/11/08	Sulfate	0.12 mg/L	All samples in SDG F8F120167

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

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

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

VI. Laboratory Control Samples

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

VII. Sample Result Verification

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

VIII. Overall Assessment of Data

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

**BRC Tronox Parcel G
Wet Chemistry - Data Qualification Summary - SDG F8F120167**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel G
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG F8F120167**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel G
Wet Chemistry - Field Blank Data Qualification Summary - SDG F8F120167**

No Sample Data Qualified in this SDG

LDC #: 19097B6
 SDG #: F8F120167
 Laboratory: Test America

VALIDATION COMPLETENESS WORKSHEET
 Level III/IV

Date: 7/23/08
 Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

METHOD: (Analyte) Bromide, Bromine, Chlorate, Chloride, Chlorine, Fluoride, Nitrate, Nitrite, Orthophosphate-P, Sulfate (EPA Method 300.0), O & G (EPA SW846 Method 9071B)

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: 6/11/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	SW	
IV	Matrix Spike/Matrix Spike Duplicates	A	3 MS / dup
V	Duplicates	A	
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	SW	R = RINSATE 1 (F8F120137)

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

Validated Samples: ** Indicates sample underwent Level IV validation
 So: [Handwritten]

1	TSB-GJ-08-10	11		21		31	
2	TSB-GJ-08-20**	12		22		32	
3	TSB-GJ-08-30**	13		23		33	
4	TSB-GJ-08-40	14		24		34	
5	TSB-GJ-08-10MS	15		25		35	
6	TSB-GJ-08-10DUP	16		26		36	
7	HB	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 19097B6
 SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
 Reviewer: WJ
 2nd Reviewer: _____

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical Holding Times				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial calibration correlation coefficients > 0.995?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	/			
Were titrant checks performed as required? (Level IV only)			/	
Were balance checks performed as required? (Level IV only)	/			
III. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
IV. Matrix Spike/Matrix Spike Duplicates and Duplicate Tests				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of < CRDL (< 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were < 5X the CRDL.	/			
V. 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 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

LDC #: 19097136
 SDG #: 5-11 cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: MM
 2nd Reviewer: J

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

LDC #: 19091B6
 SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

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

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-4	Soi)	Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
M5.6	Soi)	Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH

Comments: O+G M5/Sup from raw data

VALIDATION FINDINGS WORKSHEET

LDC #: 19097B6

Page: 1 of 1

SDG #: See cover

Reviewer: VS

Blanks

2nd Reviewer: [Signature]

METHOD: Inorganics, Method Lead cover

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

N N/A Were all samples associated with a given method blank?

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/kg Associated Samples: CCB1, CCB2 2-4 (ND)

Analyte	Blank ID	Maximum ICB/CCB Mg/L	Blank Action Limit	Sample Identification																
<u>CCB1</u> 0-Pg-P		<u>0.760</u>																		
<u>CCB2</u> 0-Pg-P		<u>0.712</u>																		

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT: All contaminants within five times the method blank concentration were qualified as not detected, "U".

VALIDATION FINDINGS WORKSHEET
Field Blanks

LDC #: 19097 Bb
SDG #: See cover

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

METHOD: Inorganics, EPA Method See cover

N/A Were field blanks identified in this SDG?

N/A Were target analytes detected in the field blanks?

Blank units: mg/L Associated sample units: mg/kg

Sampling date: 6/11/08 Soil factor applied

Field blank type: (circle one) Field Blank / Rinsate / Other: R Associated Samples: AT1 (> RL)

Analyte	Blank ID	Blank Action Limit	Sample Identification						
So ₄	RINSATE	1							
	0-12								

Blank units: _____ Associated sample units: _____

Sampling date: _____ Soil factor applied _____

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

Analyte	Blank ID	Blank Action Limit	Sample Identification						

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT: Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Method: Inorganics, Method See cover
 The correlation coefficient (r) for the calibration of NO₃-N was recalculated. Calibration date: 6/18/08

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

$\%R = \frac{\text{Found} \times 100}{\text{True}}$
 Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
 True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (ug/L)	Area	Recalculated		Reported		Acceptable (Y/N)
					r	r ²	r	r ²	
Initial calibration	NO ₃ -N	s1	20	0.01	0.99997	0.99990			Y
		s2	100	0.046					
		s3	200	0.087					
		s4	500	0.227					
		s5	1000	0.454					
Calibration verification	CO ₃	4000	3885.7		96.59	NR		Y	
Calibration verification	F	1000	945.5		94.55	94.55		Y	
Calibration verification	Cl	2000	1936.6		96.83	96.83		Y	

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

LDC #: 19097 Bb
 SDG #: See cover

VALIDATION FINDINGS WORKSHEET
 Level IV Recalculation Worksheet

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

METHOD: Inorganics, Method See cover

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

$$\%R = \frac{\text{Found}}{\text{True}} \times 100 \quad \text{Where: Found} = \text{concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found} = \text{SSR (spiked sample result) - SR (sample result).}$$

$$\text{True} = \text{concentration of each analyte in the source.}$$

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

$$RPD = \frac{S-D}{(S+D)/2} \times 100 \quad \text{Where, S} = \text{Original sample concentration}$$

$$D = \text{Duplicate sample concentration}$$

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated		Reported		Acceptable (Y/N)
					%R / RPD	%R / RPD			
LC9	Laboratory control sample	0-1004-P	79.14	80	99	99	99	99	Y
5	Matrix spike sample	BY	20.6 (SSR-SR)	21.4	96	96	96	96	Y
6	Duplicate sample	SO4	14.7	14.4	2.1	2.1	2.3	2.3	Y

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

LDC #: 19097B6
 SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
 Reviewer: MM
 2nd reviewer: J

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 Have results been reported and calculated correctly?
- N N/A Are results within the calibrated range of the instruments?
- N N/A Are all detection limits below the CRQL?

Compound (analyte) results for SO₄ reported with a positive detect were recalculated and verified using the following equation:

Concentration =

Recalculation:

$$SO_4 = \frac{\text{Area} \times DF}{0.000157}$$

$$SO_4 = \frac{0.374 \times 10 \times 0.0412}{0.000157 \times 4.8 \times 0.838} = 284 \text{ mg/kg}$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
1	2	chromite	1.0	1.0	Y
		Cl	14.6	14.6	Y
		Cl ₂	29.2	29.2	Y
		F	1.0	1.0	Y
		NO ₃ -N	1.3	1.3	Y
		SO ₄	285	284	Y

Note: _____

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

Project/Site Name: BRC Tronox Parcel G
Collection Date: June 11, 2008
LDC Report Date: July 22, 2008
Matrix: Soil
Parameters: Gasoline Range Organics
Validation Level: EPA Level III & IV
Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): F8F120167

Sample Identification

TSB-GJ-08-10
TSB-GJ-08-10RE
TSB-GJ-08-20**
TSB-GJ-08-30**
TSB-GJ-08-40
TSB-GJ-08-10MS
TSB-GJ-08-10DUP

**Indicates sample underwent EPA Level IV review

Introduction

This data review covers 7 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Gasoline Range Organics.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

III. Blanks

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

Sample "RINSATE 1" (from SDG F8F120137) was identified as a rinsate. No gasoline range organic 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. All surrogate recoveries (%R) were within QC limits.

b. Matrix Spike/Matrix Spike Duplicates

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.

c. 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.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

**BRC Tronox Parcel G
Gasoline Range Organics - Data Qualification Summary - SDG F8F120167**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel G
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG
F8F120167**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel G
Gasoline Range Organics - Field Blank Data Qualification Summary - SDG
F8F120167**

No Sample Data Qualified in this SDG

LDC #: 19097B7
 SDG #: F8F120167
 Laboratory: Test America

VALIDATION COMPLETENESS WORKSHEET
 Level III/IV

Date: 7/21/08
 Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

METHOD: GC Gasoline Range Organics (EPA SW846 Method 8015B)

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: 6/11/08
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	ICV ≤ 15
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates /DUP	A/A	NO MSD
IVc.	Laboratory control samples	A	LOS/D
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	R = Rinsate 1

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: **SO 12**
 ** Indicates sample underwent Level IV validation

1	1	TSB-GJ-08-10	11	F8F130000-269	21	1	8165269	31	6/14
2	1	TSB-GJ-08-10RE	12	F8F170000-178	22		8169178	32	6/17
3	1	TSB-GJ-08-20**	13		23			33	
4	1	TSB-GJ-08-30**	14		24			34	
5	2	TSB-GJ-08-40	15		25			35	
6	1	TSB-GJ-08-10MS	16		26			36	
7	1	TSB-GJ-08-10MSD	17		27			37	
8	1	TSB-GJ-08-10DUP	18		28			38	
9			19		29			39	
10			20		30			40	

Notes: _____

LDC #: 19097B7
 SDG #: su cover

VALIDATION FINDINGS CHECKLIST

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

Method: GC HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooler temperature criteria was met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) < 20%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Did the initial calibration meet the curve fit acceptance criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were the RT windows properly established?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
III. Continuing calibration				
What type of continuing calibration calculation was performed? ___ %D or %R	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a continuing calibration analyzed daily?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) < 15%.0 or percent recoveries 85-115%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all the retention times within the acceptance windows?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IV. Blanks				
Was a method blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a method blank analyzed for each matrix and concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
V. Surrogate spikes				
Were all surrogate %R within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
VI. 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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a MS/MSD analyzed every 20 samples of each matrix?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
VII. Laboratory control samples				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was an LCS analyzed per extraction batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

LDC #: 19097B7
 SDG #: su cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

Validation Area	Yes	No	NA	Findings/Comments
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			<input checked="" type="checkbox"/>	
Were the performance evaluation (PE) samples within the acceptance limits?			<input checked="" type="checkbox"/>	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?			<input checked="" type="checkbox"/>	
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	<input checked="" type="checkbox"/>			
XII. System performance				
System performance was found to be acceptable.	<input checked="" type="checkbox"/>			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		<input checked="" type="checkbox"/>		
Target compounds were detected in the field duplicates.			<input checked="" type="checkbox"/>	
XV. Field blanks				
Field blanks were identified in this SDG.	<input checked="" type="checkbox"/>			
Target compounds were detected in the field blanks.		<input checked="" type="checkbox"/>		

LDC #: 19097B7
 SDG #: su canth

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

METHOD: GC HPLC

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

- CF = A/C
- average CF = sum of the CF/number of standards
- %RSD = 100 * (S/X)
- A = Area of compound,
- C = Concentration of compound,
- S = Standard deviation of the CF
- X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported		Recalculated		Reported		Recalculated	
				CF (1-σ std)	CF (1-σ std)	Average CF (Initial)	Average CF (Initial)	%RSD	%RSD	%RSD	%RSD
1	10A L	5/27/08	GRL	17025649	17025649	17182732	17182732	3-715	3-715	3-515	3-515
2											
3											
4											

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

LDC #: 19097B7
 SDG #: fu coner

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

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 = $100 \times (\text{ave. CF} - \text{CF}) / \text{ave. CF}$ Where: ave. CF = initial calibration average CF
 CF = A/C CF = continuing calibration CF
 A = Area of compound
 C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF (cal)/ CCV Conc.	Reported		Recalculated	
					CF/Conc. CCV	%D	CF/Conc. CCV	%D
1	KAL396B	6/13/08	GRD	1.0	0.9982	0.2	0.2	0.2
2								
3								
4								

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.

DC #: 1909787
 SDG #: full cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

METHOD: GC / HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: $SF/SS * 100$
 Where: SF = Surrogate Found
 SS = Surrogate Spiked

Sample ID: # 3

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
TFT	not specified	0.04	0.0300	83	83	0

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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 = $100 * ((SSC - SSC/SA) / SSC) * 100$ Where SSC = Spiked sample concentration SC = Sample concentration
 RPD = $((SSCMS - SSCMSD) * 2) / (SSCMS + SSCMSD) * 100$ SA = Spike added MSD = Matrix spike duplicate
 MS/MSD samples: 6

Compound	Spike Added		Sample Conc.		Spike Sample Concentration		Matrix spike		Matrix Spike Duplicate		MS/MSD	
	MS	MSD	MS	MSD	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)	1.07	NA	0	NA	1.03	NA	96	96	NA	NA		
Diesel (8015)												
Benzene (8021B)												
Methane (RSK-175)												
2,4-D (8151)												
Dinoseb (8151)												
Naphthalene (8310)												
Anthracene (8310)												
HMX (8330)												
2,4,6-Trinitrotoluene (8330)												

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.

METHOD: GC HPLC

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

%Recovery = $100 \cdot (SSC - SC) / SA$ Where SSC = Spiked concentration
 SA = Spike added SC = Sample concentration

RPD = $\frac{((SSCLCS - SSCLCSD) \cdot 2) / ((SSCLCS + SSCLCSD)) \cdot 100}{LCS}$ LCS = Laboratory Control Sample percent recovery

LCS/LCSD samples: 8/6 5269 - 10310 LCS = Laboratory Control Sample duplicate percent recovery

Compound	Spike Added (mg/kg)		Sample Conc. (mg/kg)		Spike Sample Concentration (mg/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)	1.0	1.0	--	--	1.0	0.944	100	100	94	74	6.2	6.2
Diesel (8015)												
Benzene (8021B)												
Methane (RSK-175)												
2,4-D (8151)												
Dinoseb (8151)												
Naphthalene (8310)												
Anthracene (8310)												
HMX (8330)												
2,4,6-Trinitrotoluene (8330)												

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 #: 19097B7
SDG #: Lee Conner

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

METHOD: GC HPLC

Y N / N/A / N/A
Y N / N/A / N/A

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

Concentration = $\frac{A(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$ Example: _____ Compound Name _____
Sample ID: _____

- Concentration = _____
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
- ND*

#	Sample ID	Compound	Reported Concentrations	Recalculated Results Concentrations	Qualifications

Comments: _____

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

Project/Site Name: BRC Tronox Parcel G
Collection Date: June 11, 2008
LDC Report Date: July 22, 2008
Matrix: Soil
Parameters: Diesel Range Organics
Validation Level: EPA Level III & IV
Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): F8F120167

Sample Identification

TSB-GJ-08-10
TSB-GJ-08-20**
TSB-GJ-08-30**
TSB-GJ-08-40
TSB-GJ-08-10MS
TSB-GJ-08-10MSD

**Indicates sample underwent EPA Level IV review

Introduction

This data review covers 6 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Diesel Range Organics.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

III. Blanks

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

Sample "RINSATE 1" (from SDG F8F120137) was identified as a rinsate. No diesel range organic 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. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
TSB-GJ-08-20**	ortho-Terphenyl	41 (75-150)	Diesel range organics	J- (all detects) UJ (all non-detects)	P

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

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

**BRC Tronox Parcel G
 Diesel Range Organics - Data Qualification Summary - SDG F8F120167**

SDG	Sample	Compound	Flag	A or P	Reason
F8F120167	TSB-GJ-08-20**	Diesel range organics	J- (all detects) UJ (all non-detects)	P	Surrogate recovery (%R)

**BRC Tronox Parcel G
 Diesel Range Organics - Laboratory Blank Data Qualification Summary - SDG
 F8F120167**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel G
 Diesel Range Organics - Field Blank Data Qualification Summary - SDG
 F8F120167**

No Sample Data Qualified in this SDG

LDC #: 19097B8
 SDG #: F8F120167
 Laboratory: Test America

VALIDATION COMPLETENESS WORKSHEET
 Level III/IV

Date: 7/21/08
 Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

METHOD: GC Diesel Range Organics (EPA SW846 Method 8015B)

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: 6/11/08
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	ICV = 15
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	R = Rinsate / SDG # F8F120137

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

Validated Samples: ** Indicates sample underwent Level IV validation SOIL

1	TSB-GJ-08-10	11	.	21		31	
2	TSB-GJ-08-20**	12		22		32	
3	TSB-GJ-08-30**	13		23		33	
4	TSB-GJ-08-40	14		24		34	
5	TSB-GJ-08-10MS	15		25		35	
6	TSB-GJ-08-10MSD	16		26		36	
7	F8F130000-291	17	8165291	27		37	
8	F8F180000-312	18	8170312	28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 19097BS
 SDG #: pu cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
 Reviewer: PT
 2nd Reviewer: [Signature]

Method: GC HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical Holding Times				
All technical holding times were met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooler temperature criteria was met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
II. Initial Calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) < 20%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Did the initial calibration meet the curve fit acceptance criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were the RT windows properly established?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
III. Continuing Calibration				
What type of continuing calibration calculation was performed? ___ %D or %R	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a continuing calibration analyzed daily?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) < 15%.0 or percent recoveries 85-115%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all the retention times within the acceptance windows?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IV. Blanks				
Was a method blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a method blank analyzed for each matrix and concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
V. Surrogate spikes				
Were all surrogate %R within the QC limits?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
VI. 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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a MS/MSD analyzed every 20 samples of each matrix?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
VII. Laboratory control samples				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was an LCS analyzed per extraction batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

LDC #: 19097B8
 SDG #: see cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

Validation Area	Yes	No	NA	Findings/Comments
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			<input checked="" type="checkbox"/>	
Were the performance evaluation (PE) samples within the acceptance limits?			<input checked="" type="checkbox"/>	
X. Target Compound Identification				
Were the retention times of reported detects within the RT windows?			<input checked="" type="checkbox"/>	
XI. Compound Quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	<input checked="" type="checkbox"/>			
XII. System Performance				
System performance was found to be acceptable.	<input checked="" type="checkbox"/>			
XIII. Overall Assessment of Data				
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>			
XIV. Field Duplicates				
Field duplicate pairs were identified in this SDG.		<input checked="" type="checkbox"/>		
Target compounds were detected in the field duplicates.			<input checked="" type="checkbox"/>	
XV. Field Blanks				
Field blanks were identified in this SDG.	<input checked="" type="checkbox"/>			
Target compounds were detected in the field blanks.		<input checked="" type="checkbox"/>		

VALIDATION FINDINGS WORKSHEET

Surrogate Recovery

LDC #: 1909708

SDG #: [Signature]

METHOD: GC HPLC

Are surrogates required by the method? Yes ___ or No ___

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

N N/A Were surrogates spiked into all samples and blanks?

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

#	Sample ID	Detector/ Column	Surrogate Compound	%R (Limits)	Qualifications
	2	<i>Not specified</i>	<i>H</i>	41 (75-150)	<i>J/US/P</i>

Surrogate Compound	Surrogate Compound	Surrogate Compound	Surrogate Compound	Surrogate Compound
A Chlorobenzene (CBZ)	G Octacosane	M	S Benzo(e)Pyrene	Tetrachloro-m-xylene
B 4-Bromofluorobenzene (BFB)	H Ortho-Terphenyl	N	T Terphenyl-D14	
C a,a-Trifluorotoluene	I Fluorobenzene (FBZ)	O	U Decachlorobiphenyl (DCB)	3,4-Dinitrotoluene
D Bromochlorobenzene	J n-Triacontane	P	V 1-methylvinylacetalene	Tripentyltin
E 1,4-Dichlorobutane	K Hexacosane	Q	W Dichlorophenyl Acetic Acid (DCAA)	Tri-n-propyltin
F 1,4-Difluorobenzene (DFB)	L Bromobenzene	R	X 4-Nitrophenol	Tributyl Phosphate
				Triphenyl Phosphate

LDC #: 19097B8
 SDG #: for control

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

METHOD: GC HPLC /

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

- CF = A/C
- average CF = sum of the CF/number of standards
- %RSD = $100 \cdot (S/X)$
- A = Area of compound,
- C = Concentration of compound,
- S = Standard deviation of the CF
- X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported		Recalculated		Reported		Recalculated	
				CF (100% std)	CF (100% std)	Average CF (Initial)	Average CF (Initial)	%RSD	%RSD		
1	1CAL	5/16/08	PRC	16236	16236	16003	16023	3.452	3.452	3.456	
2											
3											
4											

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

LDC #: 19097BS
 SDG #: Lu caney

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

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 = $100 \cdot (\text{ave. CF} - \text{CF}) / \text{ave. CF}$ 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		Recalculated	
					CF/Conc. CCV	%D	CF/Conc. CCV	%D
1	EA1525	6/17/08	PRO	10000	976.53	0.3	976.53	0.3
2	EA1527	6/17/08	↓	✓	1034.562/	3.5	1034.562/	3.5
3								
4								

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.

DC #: 1909788
 SDG #: full cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: ___ of ___
 Reviewer: [Signature]
 2nd reviewer: [Signature]

METHOD: GC HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/ISS * 100
 Where: SF = Surrogate Found
 SS = Surrogate Spiked

Sample ID: #2

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
0 Terphenyl	not spiked	25	10.2	41	41	0

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

LDC #: 19097B8
 SDG #: fw cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

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, SA = Spike added, MS = Matrix spike
 RPD = $(((SSCMS - SSCMSD) * 2) / (SSCMS + SSCMSD)) * 100$ SC = Sample concentration, MSD = Matrix spike duplicate

MS/MSD samples: 5 + 6

Compound	Spike Added (mg/kg)		Sample Conc. (mg/kg)		Spike Sample Concentration (mg/kg)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	MS	MSD	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)												
Diesel (8015)	87.2	85.8	ND		74.5	76.1	85	85	89	89	5.2	5.2
Benzene (8021B)												
Methane (RSK-175)												
2,4-D (8151)												
Dinoseb (8151)												
Naphthalene (8310)												
Anthracene (8310)												
HMX (8330)												
2,4,6-Trinitrotoluene (8330)												

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.

METHOD: GC HPLC

The percent recoveries (%R) and relative percent differences (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 Where SSC = Spiked concentration SA = Spike added SC = Sample concentration

RPD = ((SSCLCS - SSCLCD) * 2) / ((SSCLCS + SSCLCD)) * 100 LCS = Laboratory Control Sample percent recovery LCS = Laboratory Control Sample duplicate percent recovery

LCS/LCSD samples: 8/6 529/ - LCS

Table with columns: Compound, Spike Added (mg/kg), Sample Conc. (mg/kg), Spike Sample Concentration (mg/kg), LCS Percent Recovery, LCSD Percent Recovery, RPD. Rows include Gasoline, Diesel, Benzene, Methane, 2,4-D, Dinoseb, Naphthalene, Anthracene, HMX, 2,4,6-Trinitrotoluene.

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 #: 1909712X
SDG #: *See cover*

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

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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 = $\frac{(A)(FV)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$ Example: _____
Sample ID: _____ Compound Name: _____

Concentration = _____
[Signature]

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

#	Sample ID	Compound	Reported Concentrations	Recalculated Results Concentrations	Qualifications

Comments: _____

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

Project/Site Name: BRC Tronox Parcel G
Collection Date: June 11, 2008
LDC Report Date: July 22, 2008
Matrix: Soil
Parameters: Polynuclear Aromatic Hydrocarbons
Validation Level: EPA Level III & IV
Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): F8F120167

Sample Identification

TSB-GJ-08-10
TSB-GJ-08-20**
TSB-GJ-08-30**
TSB-GJ-08-40
TSB-GJ-08-10MS
TSB-GJ-08-10MSD

**Indicates sample underwent EPA Level IV review

Introduction

This data review covers 6 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8310 for Polynuclear Aromatic Hydrocarbons.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UU Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

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

Retention time windows were evaluated and considered technically acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

b. Calibration Verification

Calibration verification was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 15.0% QC limits with the following exceptions:

Date	Detector	Compound	%D	Associated Samples	Flag	A or P
6/16/08	Not specified	Benzo(g,h,i)perylene	15.2	All samples in SDG F8F120167	J+ (all detects)	A

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds with the following exceptions:

Date	Detector	Compound	%D	Associated Samples	Flag	A or P
6/4/08	Not specified	Benzo(k)fluoranthene	16.6	All samples in SDG F8F120167	J+ (all detects)	A

Retention time windows were evaluated and considered technically acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

III. Blanks

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

Sample "Rinsate 1" (from SDG F8F120137) was identified as a rinsate. No polynuclear aromatic hydrocarbon 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. All surrogate 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

All target compound identifications were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

**BRC Tronox Parcel G
 Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG F8F120167**

SDG	Sample	Compound	Flag	A or P	Reason
F8F120167	TSB-GJ-08-10 TSB-GJ-08-20** TSB-GJ-08-30** TSB-GJ-08-40	Benzo(g,h,i)perylene	J+ (all detects)	A	Continuing calibration (%D)
F8F120167	TSB-GJ-08-10 TSB-GJ-08-20** TSB-GJ-08-30** TSB-GJ-08-40	Benzo(k)fluoranthene	J+ (all detects)	A	Continuing calibration (ICV %D)

**BRC Tronox Parcel G
 Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary
 - SDG F8F120167**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel G
 Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary -
 SDG F8F120167**

No Sample Data Qualified in this SDG

LDC #: 19097B9
 SDG #: F8F120167
 Laboratory: Test America

VALIDATION COMPLETENESS WORKSHEET
 Level III/IV

Date: 7/21/08
 Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

METHOD: GC Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8310)

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: 6/11/08
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	SW	ICV = 15
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	R = Rinsate 1 SDG # F8F/20137

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: ** Indicates sample underwent Level IV validation

SOIL

1	TSB-GJ-08-10	11	F8F160000-15B	21	816 815B	31	
2	TSB-GJ-08-20**	12		22		32	
3	TSB-GJ-08-30**	13		23		33	
4	TSB-GJ-08-40	14		24		34	
5	TSB-GJ-08-10MS	15		25		35	
6	TSB-GJ-08-10MSD	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 19097B9
 SDG #: pu cover

VALIDATION FINDINGS CHECKLIST

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

Method: GC HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooler temperature criteria was met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) < 20%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Did the initial calibration meet the curve fit acceptance criteria?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were the RT windows properly established?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
III. Continuing calibration				
What type of continuing calibration calculation was performed? ___%D or %R	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a continuing calibration analyzed daily?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) < 15% or percent recoveries 85-115%?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were all the retention times within the acceptance windows?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IV. Blanks				
Was a method blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a method blank analyzed for each matrix and concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
V. Surrogate spikes				
Were all surrogate %R within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
VI. 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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a MS/MSD analyzed every 20 samples of each matrix?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
VII. Laboratory control samples				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was an LCS analyzed per extraction batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

LDC #: 19077B9
 SDG #: Full cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

Validation Area	Yes	No	NA	Findings/Comments
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?			/	
X. Retention Time 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?	/			
System Performance				
System performance was found to be acceptable.	/			
Overall Assessment of Data				
Overall assessment of data was found to be acceptable.	/			
Field Duplicates				
Field duplicate pairs were identified in this SDG.		/		
Target compounds were detected in the field duplicates.			/	
Field Blanks				
Field blanks were identified in this SDG.	/			
Target compounds were detected in the field blanks.		/		

LDC #: 1909789
 SDG #: su conch

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

METHOD: GC HPLC

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

- CF = A/C
- average CF = sum of the CF/number of standards
- %RSD = $100 \cdot (S/X)$
- A = Area of compound,
- C = Concentration of compound,
- S = Standard deviation of the CF
- X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported		Recalculated		Reported		Recalculated	
				CF (0.5 std)	CF (0.5 std)	Average CF (Initial)	Average CF (Initial)	%RSD	%RSD		
1	1CAL	6/4/08	Naphthalene	24206	24206	23507	23507	3.24	3.24		
			Anthracene	815734	815734	806710	806710	1.82	1.82		
2											
3											
4											

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

LDC #: 1909789
SDG #: J. J. Carver

VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification

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

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 = $100 \cdot (\text{ave. CF} - \text{CF}) / \text{ave. CF}$ 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(1cal)/ CCV Conc.	Reported		Recalculated	
					CF/Conc. CCV	%D	CF/Conc. CCV	%D
1	OCA 4873	6/16/08	naphthalene anthracene	5.0 0.507	8.0 6.1	5.3978 0.5307	8.0 6.1	
2								
3								
4								

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.

METHOD: GC HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

Where: SF = Surrogate Found
SS = Surrogate Spiked

% Recovery: SF/SS * 100

Sample ID: 2

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
P-terphenyl	not specified	25	21.3996	86	86	0

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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:

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

MS/MSD samples: 5 + 6

Compound	Spike Added		Sample Conc.	Spike Sample Concentration		Matrix spike		Matrix Spike Duplicate		MS/MSD	
	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)	67.8	70.9	ND	50.5	51.5	72	72	73	73	7.0	2.0
Anthracene (8310)	67.8	70.9		52.9	49.6	76	76	70	70	6.5	6.5
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

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.

METHOD: GC HPLC

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

$\% \text{Recovery} = 100 \cdot ((\text{SSC} \cdot \text{SC}) / \text{SA})$ Where $\text{SSC} = \text{Spiked concentration}$ $\text{SC} = \text{Sample concentration}$
 $\text{SA} = \text{Spike added}$

$\text{RPD} = (((\text{SSCLCS} - \text{SSCLCSD}) \cdot 2) / ((\text{SSCLCS} + \text{SSCLCSD}))) \cdot 100$

LCS/LCSD samples: 8/6 & 15B - LCS
 LCS = Laboratory Control Sample percent recovery
 LCSD = Laboratory Control Sample duplicate percent recovery

Compound	Spike Added (ug/kg)		Sample Conc. (ug/kg)		Spike Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		RPD	
	LCS	LCSD	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)	667	NA			484	NA	73	87				
Anthracene (8310)	667	L			51.2	L	77	77			NA	
HMX (8330)												
2,4,6-Trinitrotoluene (8330)												

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.

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

Project/Site Name: BRC Tronox Parcel G
Collection Date: June 11, 2008
LDC Report Date: July 23, 2008
Matrix: Soil
Parameters: Dioxins/Dibenzofurans
Validation Level: EPA Level III & IV
Laboratory: TestAmerica, Inc.
Sample Delivery Group (SDG): F8F120167

Sample Identification

TSB-GJ-08-10
TSB-GJ-08-20**
TSB-GJ-08-30**
TSB-GJ-08-40

**Indicates sample underwent EPA Level IV review

Introduction

This data review covers 4 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8290 for Polychlorinated Dioxins/Dibenzofurans.

This review follows USEPA Contract Laboratory Program National Functional Guidelines for Polychlorinated Dioxins/Dibenzofurans Data Review (September 2005) 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.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency.

Retention time windows were established for all homologues. The chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomer was less than or equal to 25% .

The exact mass of 380.9760 of PFK was verified. The static resolving power was at least 10,000 (10% valley definition) for samples on which EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by EPA Level III criteria.

III. Initial Calibration

A five point initial calibration was performed as required by the method.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for unlabeled compounds and less than or equal to 30.0% for labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The minimum S/N ratio for each target compound was greater than or equal to 2.5 and greater than or equal to 10 for each recovery and internal standard compound for samples on which EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by EPA Level III criteria.

IV. Routine Calibration (Continuing)

Routine calibration was performed at the required frequencies.

All of the routine calibration percent differences (%D) between the initial calibration RRF and the routine calibration RRF were less than or equal to 20.0% for unlabeled compounds and less than or equal to 30.0% for labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated dioxin/dibenzofuran contaminants were found in the method blanks.

Sample "RINSATE 1" (from SDG F8F120137) was identified as a rinsate. No polychlorinated dioxin/dibenzofuran contaminants were found in this blank.

VI. 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.

VII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
8170493LCS	1,2,3,7,8,9-HxCDD OCDD	137 (71-129) 154 (74-144)	All samples in SDG F8F120167	J+ (all detects) J+ (all detects)	P

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries were within QC limits with the following exceptions:

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
TSB-GJ-08-20**	¹³ C-OCDD ¹³ C-1,2,3,4,6,7,8-HpCDF	37 (40-135) 39 (40-135)	OCDD OCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF	J (all detects) UJ (all non-detects)	P
TSB-GJ-08-30**	¹³ C-OCDD	29 (40-135)	OCDD OCDF	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P
TSB-GJ-08-40	¹³ C-OCDD ¹³ C-1,2,3,4,6,7,8-HpCDF	26 (40-135) 33 (40-135)	OCDD OCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF	J (all detects) UJ (all non-detects)	P

X. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by EPA Level III criteria.

XI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by EPA Level III criteria.

XII. System Performance

The system performance was acceptable for samples on which EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by EPA Level III criteria.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

**BRC Tronox Parcel G
Dioxins/Dibenzofurans - Data Qualification Summary - SDG F8F120167**

SDG	Sample	Compound	Flag	A or P	Reason
F8F120167	TSB-GJ-08-10 TSB-GJ-08-20** TSB-GJ-08-30** TSB-GJ-08-40	1,2,3,7,8,9-HxCDD OCDD	J+ (all detects) J+ (all detects)	P	Laboratory control samples (%R)
F8F120167	TSB-GJ-08-20** TSB-GJ-08-40	OCDD OCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF	J (all detects) UJ (all non-detects)	P	Internal standards (%R)
F8F120167	TSB-GJ-08-30**	OCDD OCDF	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Internal standards (%R)

**BRC Tronox Parcel G
Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG
F8F120167**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel G
Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG F8F120167**

No Sample Data Qualified in this SDG

LDC #: 19097B21
 SDG #: F8F120167
 Laboratory: Test America

VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 7/19/08
 Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

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: <u>6/11/08</u>
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	
IV.	Routine calibration/ <u>IGV</u> <u>low</u>	A	
V.	Blanks	A	
VI.	Matrix spike/Matrix spike duplicates	N	<u>client specified</u>
VII.	Laboratory control samples	SW	<u>LLS</u>
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	SW	
X.	Target compound identifications	A	Not reviewed for Level III validation.
XI.	Compound quantitation and CRQLs	A	Not reviewed for Level III validation.
XII.	System performance	A	Not reviewed for Level III validation.
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	ND	<u>R = RINSATE 1 (F8F120137)</u>

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

Validated Samples: ** Indicates sample underwent Level IV validation

Soil

1	TSB-GJ-08-10	11	<u>8170493MB</u>	21		31	
2	TSB-GJ-08-20**	12		22		32	
3	TSB-GJ-08-30**	13		23		33	
4	TSB-GJ-08-40	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 19097B21
 SDG #: F8F120167

VALIDATION FINDINGS CHECKLIST

Page: 1 of 3
 Reviewer: u
 2nd Reviewer: f

Method: Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. GC/MS Instrument performance check				
Was PFK exact mass 380.9760 verified?	/			
Were the retention time windows established for all homologues?	/			
Was the chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomers $\leq 25\%$?	/			
Is the static resolving power at least 10,000 (10% valley definition)?	/			
Was the mass resolution adequately check with PFK?	/			
Was the presence of 1,2,8,9-TCDD and 1,3,4,6,8-PeCDF verified?	/			
III. Initial calibration				
Was the initial calibration performed at 5 concentration levels?	/			
Were all percent relative standard deviations (%RSD) $\leq 20\%$ for unlabeled standards and $\leq 30\%$ for labeled standards?	/			
Did all calibration standards meet the Ion Abundance Ratio criteria?	/			
Was the signal to noise ratio for each target compound ≥ 2.5 and for each recovery and internal standard ≥ 10 ?	/			
IV. Continuing calibration				
Was a routine calibration performed at the beginning and end of each 12 hour period?	/			
Were all percent differences (%D) $\leq 20\%$ for unlabeled standards and $\leq 30\%$ for labeled standards?	/			
Did all routine calibration standards meet the Ion Abundance Ratio criteria?	/			
V. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was a method blank performed for each matrix and concentration?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet?		/		
VI. 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.		/		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			/	
VII. Laboratory control samples				
Was an LCS analyzed for this SDG?	/			

LDC #: 19097B21
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VALIDATION FINDINGS CHECKLIST

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Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		/		
VIII. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?			/	
IX. Internal standards				
Were internal standard recoveries within the 40-135% criteria?		/		
Was the minimum S/N ratio of all internal standard peaks ≥ 10 ?	/			
X. Target compound identification				
For 2,3,7,8 substituted congeners with associated labeled standards, were the retention times of the two quantitation peaks within -1 to 3 sec. of the RT of the labeled standard?			/	
For 2,3,7,8 substituted congeners without associated labeled standards, were the relative retention times of the two quantitation peaks within 0.005 time units of the RRT measured in the routine calibration?			/	
For non-2,3,7,8 substituted congeners, were the retention times of the two quantitation peaks within RT established in the performance check solution?			/	
Did compound spectra contain all characteristic ions listed in the table attached?			/	
Was the Ion Abundance Ratio for the two quantitation ions within criteria?			/	
Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5 ?			/	
Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?			/	
For PCDF identification, was any signal ($S/N \geq 2.5$, at \pm seconds RT) detected in the corresponding PCDPE channel?			/	
Was an acceptable lock mass recorded and monitored?			/	
XI. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?			/	
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.		/		

LDC #: 19097B21
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VALIDATION FINDINGS CHECKLIST

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Validation Area	Yes	No	NA	Findings/Comments
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.			/	

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes: _____

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is}) / (A_{is})(C_x)$
 average RRF = sum of the RRFs/number of standards
 $\%RSD = 100 * (S/X)$
 A_x = Area of compound,
 C_x = Concentration of compound,
 S = Standard deviation of the RRFs,
 A_{is} = Area of associated internal standard
 C_{is} = Concentration of internal standard
 X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported		Recalculated		Reported		Recalculated	
				Average RRF (Initial)	Average RRF (Initial)	RRF (CS3 std)	RRF (CS3 std)	%RSD	%RSD	RRF (CS3 std)	%RSD
1	CAL	6/16/09	2,3,7,8-TCDF (¹³ C-2,3,7,8-TCDF)	0.798	0.798	0.82	0.82	2.5	2.5	0.82	2.7
			2,3,7,8-TCDD (¹³ C-2,3,7,8-TCDD)	0.913	0.912	0.93	0.93	10.2	10.2	0.93	10.3
			1,2,3,6,7,8-HxCDD (¹³ C-1,2,3,6,7,8-HxCDD)	0.821	0.820	0.87	0.87	13.9	13.9	0.87	14.1
			1,2,3,4,6,7,8-HpCDD (¹³ C-1,2,4,6,7,8-HpCDD)	0.844	0.844	0.88	0.88	12.8	12.8	0.88	12.7
			OCDF (¹³ C-OCDD)	1.721	1.722	1.86	1.86	16.2	16.2	1.86	16.2
2			2,3,7,8-TCDF (¹³ C-2,3,7,8-TCDF)								
			2,3,7,8-TCDD (¹³ C-2,3,7,8-TCDD)								
			1,2,3,6,7,8-HxCDD (¹³ C-1,2,3,6,7,8-HxCDD)								
			1,2,3,4,6,7,8-HpCDD (¹³ C-1,2,4,6,7,8-HpCDD)								
			OCDF (¹³ C-OCDD)								
3			2,3,7,8-TCDF (¹³ C-2,3,7,8-TCDF)								
			2,3,7,8-TCDD (¹³ C-2,3,7,8-TCDD)								
			1,2,3,6,7,8-HxCDD (¹³ C-1,2,3,6,7,8-HxCDD)								
			1,2,3,4,6,7,8-HpCDD (¹³ C-1,2,4,6,7,8-HpCDD)								
			OCDF (¹³ C-OCDD)								

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

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

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

% Difference = $100 * (\text{ave. RRF} - \text{RRF}) / \text{ave. RRF}$ Where: ave. RRF = initial calibration average RRF
 RRF = $(A_x)(C_s) / (A_s)(C_x)$ RRF = continuing calibration RRF
 A_x = Area of compound, A_s = Area of associated internal standard
 C_x = Concentration of compound, C_s = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (Initial)	Reported		Recalculated	
					RRF (CC)	%D	RRF (CC)	%D
1	ST0627B	6/28/08	2,3,7,8-TCDF (¹³ C-2,3,7,8-TCDF)	0.798	0.83	4.0	0.83	4.1
			2,3,7,8-TCDD (¹³ C-2,3,7,8-TCDD)	0.913	0.81	11.7	0.81	11.7
			1,2,3,6,7,8-HxCDD (¹³ C-1,2,3,6,7,8-HxCDD)	0.821	0.87	6.5	0.87	6.4
			1,2,3,4,6,7,8-HpCDD (¹³ C-1,2,4,6,7,8-HpCDD)	0.844	0.83	1.5	0.83	1.5
			OCDF (¹³ C-OCDD)	1.721	1.58	8.3	1.58	8.3
2	ST0630	6/29/08	2,3,7,8-TCDF (¹³ C-2,3,7,8-TCDF)	0.798	0.85	5.9	0.85	5.9
			2,3,7,8-TCDD (¹³ C-2,3,7,8-TCDD)	0.913	0.82	10.3	0.82	10.3
			1,2,3,6,7,8-HxCDD (¹³ C-1,2,3,6,7,8-HxCDD)	0.821	0.92	11.6	0.92	11.6
			1,2,3,4,6,7,8-HpCDD (¹³ C-1,2,4,6,7,8-HpCDD)	0.844	0.89	5.2	0.89	5.1
			OCDF (¹³ C-OCDD)	1.721	1.65	4.3	1.65	4.4
3			2,3,7,8-TCDF (¹³ C-2,3,7,8-TCDF)					
			2,3,7,8-TCDD (¹³ C-2,3,7,8-TCDD)					
			1,2,3,6,7,8-HxCDD (¹³ C-1,2,3,6,7,8-HxCDD)					
			1,2,3,4,6,7,8-HpCDD (¹³ C-1,2,4,6,7,8-HpCDD)					
			OCDF (¹³ C-OCDD)					

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

Ions Monitored for HRGC/HRMS Analysis of PCDDs/PCDFs

Descriptor	Accurate mass ^(a)	Ion ID	Elemental Composition	Analyte	Descriptor	Accurate Mass ^(a)	Ion ID	Elemental Composition	Analyte	
1	303.9016 305.8987 315.9419 317.9389 319.8965 321.8936 331.9368 333.9338 375.8964 [354.9792]	M M+2 M M+2 M M+2 M M+2 M+2 LOCK	C ₁₂ H ₄ ³⁵ Cl ₄ O C ₁₂ H ₄ ³⁵ Cl ₃ ³⁷ ClO C ₁₂ H ₄ ³⁵ Cl ₄ O C ₁₂ H ₂ ³⁵ Cl ₃ ³⁷ ClO C ₁₂ H ₄ ³⁵ Cl ₄ O C ₁₂ H ₂ ³⁵ Cl ₃ ³⁷ ClO ₂ C ₁₂ H ₄ ³⁵ Cl ₃ ³⁷ ClO ₂ C ₁₂ H ₂ ³⁵ Cl ₃ ³⁷ ClO ₂ C ₁₂ H ₄ ³⁵ Cl ₃ ³⁷ ClO C ₉ F ₁₃	TCDF TCDF TCDF (S) TCDF (S) TCDD TCDD TCDD (S) TCDD (S) HxCDFPE PFK	4	407.7818 409.7788 417.8250 419.8220 423.7767 425.7737 435.8169 437.8140 479.7165 [430.9728]	M+2 M+4 M M+2 M+2 M+4 M+2 M+4 M+4 LOCK	C ₁₂ H ₃ ³⁵ Cl ₃ ³⁷ ClO C ₁₂ H ₃ ³⁵ Cl ₃ ³⁷ ClO C ₁₂ H ₃ ³⁵ Cl ₃ ³⁷ ClO C ₁₂ H ₃ ³⁵ Cl ₃ ³⁷ ClO C ₁₂ H ₃ ³⁵ Cl ₃ ³⁷ ClO C ₁₂ H ₃ ³⁵ Cl ₃ ³⁷ ClO ₂ C ₁₂ H ₃ ³⁵ Cl ₃ ³⁷ ClO ₂ C ₁₂ H ₃ ³⁵ Cl ₃ ³⁷ ClO ₂ C ₁₂ H ₃ ³⁵ Cl ₃ ³⁷ ClO ₂ C ₉ F ₁₇	HpCDF HpCDF HpCDF (S) HpCDF HpCDD HpCDD HpCDD (S) HpCDD (S) HpCDD (S) NCDFE PFK	
2	339.8597 341.8567 351.9000 353.8970 355.8546 357.8516 367.8949 369.8919 409.7974 [354.9792]	M+2 M+4 M+2 M+4 M+2 M+4 M+2 M+4 M+2 LOCK	C ₁₂ H ₃ ³⁵ Cl ₃ ³⁷ ClO C ₁₂ H ₃ ³⁵ Cl ₃ ³⁷ ClO C ₁₂ H ₃ ³⁵ Cl ₃ ³⁷ ClO C ₁₂ H ₃ ³⁵ Cl ₃ ³⁷ ClO C ₁₂ H ₃ ³⁵ Cl ₃ ³⁷ ClO C ₁₂ H ₃ ³⁵ Cl ₃ ³⁷ ClO ₂ C ₁₂ H ₃ ³⁵ Cl ₃ ³⁷ ClO ₂ C ₁₂ H ₃ ³⁵ Cl ₃ ³⁷ ClO ₂ C ₁₂ H ₃ ³⁵ Cl ₃ ³⁷ ClO ₂ C ₉ F ₁₃	PeCDF PeCDF PeCDF (S) PeCDF (S) PeCDD PeCDD PeCDD (S) PeCDD (S) HxCDFPE PFK	5	441.7428 443.7399 457.7377 459.7348 469.7780 471.7750 513.6775 [422.9278]	M+2 M+4 M+2 M+4 M+2 M+4 M+4 M+4 LOCK	C ₁₂ H ₂ ³⁵ Cl ₂ ³⁷ ClO C ₁₂ H ₂ ³⁵ Cl ₂ ³⁷ ClO C ₁₂ H ₂ ³⁵ Cl ₂ ³⁷ ClO C ₁₂ H ₂ ³⁵ Cl ₂ ³⁷ ClO C ₁₂ H ₂ ³⁵ Cl ₂ ³⁷ ClO C ₁₂ H ₂ ³⁵ Cl ₂ ³⁷ ClO ₂ C ₁₂ H ₂ ³⁵ Cl ₂ ³⁷ ClO ₂ C ₁₂ H ₂ ³⁵ Cl ₂ ³⁷ ClO ₂ C ₁₂ H ₂ ³⁵ Cl ₂ ³⁷ ClO ₂ C ₁₀ F ₁₇	OCDF OCDF OCDF OCDD OCDD OCDD (S) OCDD (S) OCDD (S) DCDFE PFK	
3	373.8208 375.8178 383.8639 385.8610 389.8156 391.8127 401.8559 403.8529 445.7555 [430.9728]	M+2 M+4 M M+2 M+2 M+4 M+2 M+4 M+4 LOCK	C ₁₂ H ₂ ³⁵ Cl ₂ ³⁷ ClO C ₁₂ H ₂ ³⁵ Cl ₂ ³⁷ ClO C ₁₂ H ₂ ³⁵ Cl ₂ ³⁷ ClO C ₁₂ H ₂ ³⁵ Cl ₂ ³⁷ ClO C ₁₂ H ₂ ³⁵ Cl ₂ ³⁷ ClO C ₁₂ H ₂ ³⁵ Cl ₂ ³⁷ ClO ₂ C ₁₂ H ₂ ³⁵ Cl ₂ ³⁷ ClO ₂ C ₁₂ H ₂ ³⁵ Cl ₂ ³⁷ ClO ₂ C ₁₂ H ₂ ³⁵ Cl ₂ ³⁷ ClO ₂ C ₉ F ₁₇	HxCDF HxCDF HxCDF (S) HxCDF (S) HxCDD HxCDD HxCDD (S) HxCDD (S) HxCDD (S) OCDFE PFK						

(a) The following nuclidic masses were used:

- H = 1.007825
- C = 12.000000
- ¹³C = 13.003355
- F = 18.9984
- O = 15.994915
- ³⁵Cl = 34.968853
- ³⁷Cl = 36.965903

S = internal/recovery standard

