

LABORATORY DATA CONSULTANTS, INC.

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August 11, 2008

ERM 2525 Natomas Park Drive, Suite 350

Sacramento, CA 95833

ATTN: Ms. Maria Barajas-Albalawi

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#	<u>Fraction</u>
F8F120137, F8F120167	Volatiles, Semivolatiles, Chlorinated Pesticides, Polychlorinated 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

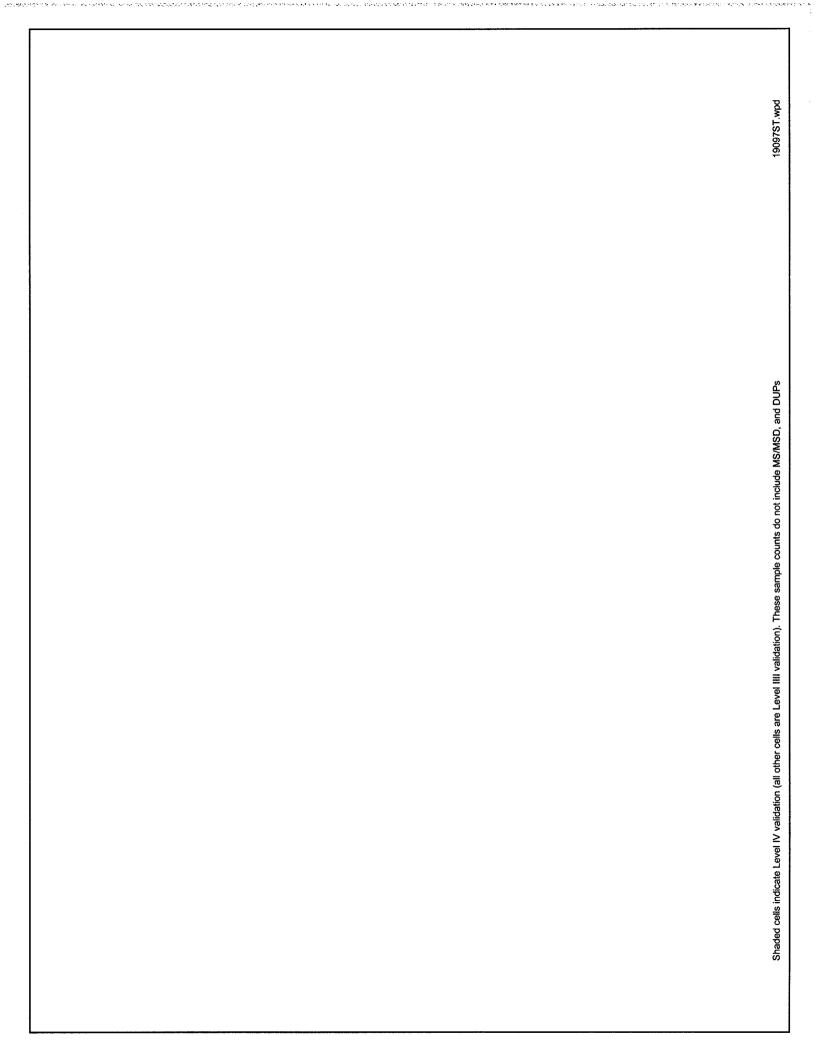
Please feel free to contact us if you have any questions.

Sincerely,

E/linda T. Rauto

Operations Manager/Senior Chemist

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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.
- 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/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)	А

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)	lodomethane	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)	А
5/28/08 (LICV9881)	2-Hexanone	25.04476	All water samples in SDG F8F120167	J- (all detects) UJ (all non-detects)	А

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)	А

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)	Р

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)	А	Initial calibration (RRF)
F8F120167	TB-1 6/11/08	lodomethane	J+ (all detects)	Α	Continuing calibration (%D)
F8F120167	TB-1 6/11/08	lodomethane	J+ (all detects)	А	Continuing calibration (ICV %D)
F8F120167	TB-1 6/11/08	2-Hexanone	J- (all detects) UJ (all non-detects)	А	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)	А	Continuing calibration (RRF)

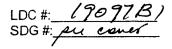
BRC Tronox Parcel G Volatiles - Laboratory Blank Data Qualification Summary - SDG F8F120167

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

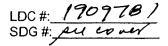
SDG Labo	#: 19097B1 #: F8F120167 ratory: Test America	_		VALIDATION COMPLETENESS WORKSHEET Level III/IV EPA SW 846 Method 8260B)								
The s	samples listed below were hed validation findings wo	e revie	ewed for eac		•	ng va	alidation	areas. Vali	dation fi	ndings	s are noted in	,
	Validation	Area				· · ·		Co	mment			
I.	Technical holding times			٨	Sampl	ling d	ates:		08			
II.	GC/MS Instrument performs	ance ch	eck	Ā								
111.	Initial calibration			SW	1/0	psD	, 12	Zo.9"	10			
IV.	Continuing calibration/ICV			SW	1		£ 75					
V.	Blanks			A								
VI.	Surrogate spikes			4								
VII.		plicates	3	SW		Pu	nsati	2				
VIII	. Laboratory control samples			20	L	<u>. </u>	IP					
IX.	Regional Quality Assurance	and Q	uality Control	N								
X.	Internal standards			Δ								
XI.	Target compound identification	ion		Δ	Not re	eview	ed for Leve	el III validation). ု			
XII.	Compound quantitation/CR	QLs		A	Not re	eview	ed for Leve	el III validation	۱.			
XIII	. Tentatively identified compo	unds (1	ΓICs)	A	Not re	eview	ed for Leve	el III validation	١.			
XIV	. System performance			Δ	Not re	eview	ed for Leve	el III validation	۱.			
XV.	Overall assessment of data			Δ								
XVI	. Field duplicates			N			,	,				
XVII	 			3W	TJ	B =	5	Ra	Rine	ati	. , ,	
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet ted Samples:		R = Rins FB = Fie	eld blank			TE EE	= Duplicate 3 = Trip blank 3 = Equipment	t blank	•	УФ # PSI	2/20/3 7
1	TSB-GJ-08-10	11 /		0000-2	29/	- 21 /	8 17	029/	3	T		
2/	TSB-GJ-08-20**	12	18 Fa t	10000-1	25	- 2		2/25	3:			
	TSB-GJ-08-30**	13	F8 F20	0000-3		23 3	<u>-</u>	236/	3:			
3 4	TSB-GJ-08-40 ,	14				24	4 - 1		34			
4 5 2	75-1000000 W	15				25			3:			
6	TSB-GJ-08-10MS	16				26			36			
7	TSB-GJ-08-10MSD	17				27			3			
8		18				28		<u> </u>	38			
9		19				29			39			



VALIDATION FINDINGS CHECKLIST

Method: Volatiles (EPA SW 846 Method 8260B)

Method: Volatiles (EPA SW 846 Method 8260B)				
Validation Area	Yes	No	NA	Findings/Comments
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All technical holding times were met.				
Cooler temperature criteria was met.				
il sons instriment cerements stack				
Were the BFB performance results reviewed and found to be within the specified criteria?				
Were all samples analyzed within the 12 hour clock criteria?				
Daniel-diseason				
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?		-		
Was a curve fit used for evaluation?				
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?				
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) > 0.05?				
IV a Goddinau o (Exilibration). Exile also constate de servicios de la constate de la constate de la constate				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?				
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Were all percent differences (%D) < 25% and relative response factors (RRF) > 0.05?			_	
VALUE (ASSESSMENT ASSESSMENT ASSE				
Was a method blank associated with every sample in this SDG?	4			
Was a method blank analyzed at least once every 12 hours for each matrix and concentration?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.				
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Were all surrogate %R within QC limits?	1			
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?			1	
Mili Malini spikenValinespika duprestest i				
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.	1	-		
Was a MS/MSD analyzed every 20 samples of each matrix?	4			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		_	-	
VIII neakoraloty.conirolsatriplesia.				4.00
Was an LCS analyzed for this SDG?	\perp	\bot	\perp	



VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 7
2nd Reviewer: 4

				
Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per analytical batch?		ļ		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
IX Regional Coality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				
XM/Jemalstatedares 1,3 ssq. 2004 A 20				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	_			
Were retention times within ± 30 seconds of the associated calibration standard?			00 mars y 1 Na 2012 20	
XIS-Englaced biodures dentifications				the state of the state of the state of
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?				
Did compound spectra meet specified EPA "Functional Guidelines" criteria?				
Were chromatogram peaks verified and accounted for?				
XII. Compound quaditation/CROLS To a service of the				
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?		_		·
(III.) janahyarakkaninagonjiganya (IIOS)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?	_	-		
Were relative intensities of the major ions within \pm 20% between the sample and the reference spectra?	/	-		
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?				
AVASCHORERORIO				
System performance was found to be acceptable.				
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e como como como como como como como com				
Overall assessment of data was found to be acceptable.				
AND TREBUIER BEST AND				
Field duplicate pairs were identified in this SDG.		_		
Target compounds were detected in the field duplicates.			1	·
VINERAL BEARS				
Field blanks were identified in this SDG.	1			
arget compounds were detected in the field blanks.				

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride**	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform*	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. Methylene chloride	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	000. 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	0000
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	ддд
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	a aaa.
P. Bromodichioromethane	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	ບນນນ.
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.

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VALIDATION FINDINGS WORKSHEET

Initial Calibration

Page: /of/ Reviewer: _____

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

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

Did the laboratory perform a 5 point calibration prior to sample analysis?

A/N N

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?

Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF? Did the initial calibration meet the acceptance criteria?

Qualifications	1/W/A													
Associated Samples	18c-000081484	SL:05/14 +												
Finding RRF (Limit: ≥0.05)	6.0022/													
Finding %RSD (Limit: <30.0%)														
Compound	mmm													
Standard ID	FKAL-BRC													
	89/6/9													
) #														

1806061 LDC #: SDG #:

VALIDATION FINDINGS WORKSHEET Continuing Calibration

2nd Reviewer: Page: Reviewer:

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

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

	N/A V	Vas a continuing calibr	N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument	d at least once every	12 hours for each instr	Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?		
XX	> > \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Nere percent difference Nere all %D and RRFs	Were percent differences (%D) and relative response factors (RRF) within methorowere all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF?	sponse factors (RRF) teria of ≤25 %D and) within method criteria ≥0.05 RRF ?	i for all CCC's and SPCC's	į	
) #	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications	
4	x0/x1/s	1836 1217	Iodo nothane	8/5/9-18		All water f	J+/A det	
			4	25. O4476		F8 F10000-12	J-/47/A	
4	X0/6//9	10460317	Iodomethane	18912.29		1	1+/AdeT	
	80/91/9	FCAL 1777 BRC	333		6.00000	41:05/14	1/NJ/A	Ī
						F8F180000-29	, , ,	
						ć		
								1
								T
								T
								T
								T

182606	te coro
LDC #: 19	SDG#:

VALIDATION FINDINGS WORKSHEET

Field Blanks

ANSHEEL

Page: of Reviewer: 2nd Reviewer:

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: MA Associated sample units: MA KA

Sampling date: (////e) & Field blank / Rinsate / Trip Blank / Other:

Associated Samples: /

4//20i/s (ND

	7						Total Control of the	
Compound	Blank ID		Sai	Sample Identification	lon			
	5							
Methytene chtoride								
Acetone	1.1							
Chlereform								
						,		
CROL								

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

101121112 SDG #:

Field Blanks

A DELEGITION I EXERTED TO TAKE THE PROPERTY OF THE PROPERTY OF

2nd Reviewer:__ Reviewer:

- DAB-

ther: // _ /// 37/ Associated Samp	0
D. Disc. K /	Blank units: Walk Associated sample units: Walka
•	Y N/A Were target compounds detected in the flekt blanks?
	Y N/N/A Were field blanks identified in this SDG?
	METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

N/A Were target compounds detected in the fit Blank units: va/L Associated sample units: va/L	compounds d	Were target compounds detected in the field (イル・Associated sample units: ソルド)	ZV.
Eleid blank type. (circle one) Field Blank / Rinsate / Trip Blan) Field Blank	/ Rinsate / Tri	k / Other: バデ K/ルSA/ Associated Samples:
Compound	Blank ID R	Blank ID	Sample identification
	80/11/9		
Vichlorome thank	3.3		
Acetone			
Chidroform			
CROL			

Blank units: Associated sample units: Field blank / Other:	Associated sample units:, e one) Field Blank / Rinsate	e units: Rinsate / Tri	p Blank / Other:	Associat	Associated Samples:		
Compound	Blank ID	Blank ID			Sample identification		
G.A. Marie Salaman							
Methylene chloride							
Acetone							
Chloroform							
CROL							

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 also qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

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VALIDATION FINDINGS WORKSHEET Surrogate Spikes

2nd Reviewer: Page: Reviewer:

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

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

YAN/A

Were all surrogate %R within QC limits?

If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R out of outside of criteria?

Qualifications	J+190th																				
mits)	(311-62)	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()
%Recovery (Limits)	117																				
Surrogate	BFB																			·	
Sample ID	-x/-00000 z 1 & J																				
Date																					
#																					

		QC LIMITS (SOII)	ပ္
SMC1 (TOL) = Toluene-d8	Toluene-d8	81-117	80
SMC2 (BFB) =	SMC2 (BFB) = Bromofluorobenzene	74-121	æ
SMC3 (DCE) =	SMC3 (DCE) = 1,2-Dichloroethane-d4	80-120	Ø
SMC4 (DFM) =	SMC4 (DFM) = Dibromofluoromethane	80-120	ά

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*	#
PC	SDG

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: / of / Reviewer: //

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

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

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?

ons	U 18/5W	ms/p:n					\ \ \												087	3.2				
Qualifications	no general	w 11					20 gr								-				RPD (W#'82)	% \$1 ∨	VI ₹	V . V	<u>, 1</u>	100 to 10
Associated Samples	/ #	1					M												QC Limits (Water)	61-145%	71-120%	76.127%	3.07.0	
RPD (Limits)	()	(0%) 8%)	()	()	((O2) 22	(()	()	()	()	()	()	()	()	()	()	RPD (Soll)	< 22%	< 24%	> 21%	2.04.9	The second secon
MSD %R (Limits)	(DS1-88) /S	()	()	()	()	()	()	()	()	()	(()	()	()	()	()	()	()	Limits (Soil)	59-172%				The state of the s
MS %R (Limits)	()	()	()	()	()	()	()	()	()	()	(()	()	()	()	()	() .	()		- 50				
Compound	AA	HH																	pur					
MS/MSD ID	1+9						Rinsah 2MSID												Compound	1,1-Dichloroethene	Trichloroethene	Benzene	Toluene	(T. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.
Date																				ī	Ś	٧.		C.
*																								L

SDG #: 170 110/

VALIDATION FINDINGS WORNSHEET Laboratory Control Samples (LCS)

rage: or Reviewer:

2nd Reviewer:

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

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

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

	2											_	- i			_		-				\neg	-	\neg
Qualifications	100 great (050)	UidISW 17			-																			
Associated Samples	Af watery	521-0000 t 181																	-					
RPD (Limits)	1/2 (2C)	. ()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()
LCSD %R (Limits)	()	(Ohl-sh) / 81	()	()	()	()	()	(()	()	()	()	()	()		())	())	()))		()
LCS %R (Limits)	893 (42-140)	Icobarthan 166 (45-140)	()	()	()	()	()	(()	()	())	()	()	())	()	())	())	()	()
Compound	X	Icolons than																						
TCS/TCSD ID	0/1301 SC/EL/8																							
Date																								
*															L						<u> </u>	_		

SDG#: 19097B/ SDG#: per cover

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 = $(A_x)(C_s)/(A_s)(C_x)$ 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
X = Mean of the RRFs

 $A_{\rm b}$ = Area of associated internal standard $C_{\rm b}$ = Concentration of internal standard

				Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
*	Standard ID	Calibration Date	Compound (Reference Internal Standard)	RRF (sひ std)	RRF (シン std)	Average RRF (initial)	Average RRF (initial)	%RSD	%RSD
-	1-7401	<i>30/6/</i> 9	ving (ch foriolk (1st internal standard)	8.38029	o.38029	0.40478	82704.0	13.8719	13.27
			き そ (2nd internal standard)	4.03630 2.0363	4.036>	80161	1.77703	9.67157	ľ
			ノノノ (3rd internal standard)	857 64.1 BST 64.1	1.42758	11861		5.1783	
7			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
m			(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.

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Continuing Calibration Results Verification VALIDATION FINDINGS WORKSHEET

ð Reviewer:_ 2nd Reviewer: Page:

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 * (ave. RRF - RRF)/ave. RRF RRF = $(A_x)(C_b)/(A_y)(C_x)$

Where: ave. RRF = initial calibration average RRF RRF = continuing calibration RRF $A_x = Area$ of compound, $A_y = Area$ of $A_y = Area$ of

 $A_{\rm ls}$ = Area of associated internal standard $C_{\rm ls}$ = Concentration of internal standard

					Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date	Compound (Reference internal Standard)	Average RRF (initial)	RRF (CC)	RRF (CC)	g%	Q %
-	FCALI718	80/91/9	(1st internal standard)	0.40478	0. 38 285	0.3825	569265	6.95.693
			をも (2nd internal standard)	1,97703	9.801.E	9.10886	6.668/3	
			√√√ (3rd internal standard)	1.425716	1.44262	1.44.62	1.22825	1
7	3	110/9	2, 2 - D; m = thy trunten e. (1st internal standard)	11361.0	45/220	12/2/0	2.324/2	2.324/2
	BRC		(2nd internal standard)			•		
			(3rd internal standard)					
ო			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
4			(1st internal standard)					
			(2nd internal standard)					
			(3rd 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.

VALIDATION FINDINGS WORKSHEET **Surrogate Results Verification**

Page:_	/_of/_
Reviewer:	17
2nd reviewer:	
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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	1	46.9877	94	94	1
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					

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Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

₹ 2nd Reviewer: Page: Reviewer:_

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

SSC = Spiked sample concentration Where:

SA = Spike added

SC = Sample concentration

RPD = I MSC - MSDC I * 2/(MSC + MSDC)

MSC = Matrix spike percent recovery

MSDC = Matrix spike duplicate percent recovery

MS/MSD sample:

7+9

	ďs	Spike	Sample	Spiked Sample	ample	Matrix Spike	Spike	Matrix Spike Duplicate	Duplicate	SW	MS/MSD
Compound	Ad O	Added	Concentration (17)	Concentration (7/1/2)	Tation T	Percent Recovery	ecovery	Percent Recovery	ecovery	<u>u</u>	RPD
	Ms	MSD	*****	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	533	533 53.9	,	16.3	47.3	Z¢.	18	%	Z	9.0	2.0
Trichloroethene				55.5	58.7	hol	401	601	601	5:6	3.6
Benzene				1.64	8:05	33	93	16	44	7.2	2,2
Toluene				50.3	2/5	he	16	56	56	1.7	64
Chlorobenzene				1.67	6./5	33	56	95	36	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.

826061 LDC #:

Laboratory Control Sample Results Verification VALIDATION FINDINGS WORKSHEET

Page: / of / 2nd Reviewer:__ Reviewer:

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

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

% Recovery = 100 * SSC/SA

Where: SSC = Spiked sample concentration SA = Spike added

RPD = ILCS - LCSD 1* 2/(LCS + LCSD)

LCS = Laboraotry control sample percent recovery

LCSD = Laboratory control sample duplicate percent recovery

CS ID: 817029/-LC>

		7	ī	T -	T	T	T		7	T	T	1	T	T
CS/I CSD	Q	Potelindend	\											
1 CS/I	RPD	Deported												
g	ecovery	Paralc												
LCSD	Percent Recovery	Reported					48	1						
8	ecovery	Recalc	36	8	66	00/	001							
SOT	Percent Recovery	Renorted	76	66	66	00/	001							
ample	ration	C I CSD	N.A	-		,	<i>*</i>							
Spiked S	Concentration (4%)	1.08	47.8	49.5	764	20.25	49.9				·			
æ.	Kr	LCSD	SONA.				1		1					
Spi	peppy (M9/18)	l Cs	es				1							
	Compound		1,1-Dichloroethene	Trichloroethene	Benzene	Toluene	Chlorobenzene							

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 #:_		709	78/
SDG #:	M	con	er

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	<u>of</u>	_/
Reviewer:_	PI	_
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ME	ETH	1 9 0:\
Υ	Ν	N/A
Y	N	N/A/

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

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? (\mathcal{T})

•			
Concen	tration	=	Example:
A _x	=	Area of the characteristic ion (EICP) for the compound to be measured	Sample f.D,:
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard	
Is	=	Amount of internal standard added in nanograms (ng)	Conc. = () () ()
RRF	=	Relative response factor of the calibration standard.	
V _o	=	Volume or weight of sample pruged in milliliters (ml) or grams (g).	=
Df	=	Dilution factor.	1 9
%S	=	Percent solids, applicable to soils and solid matrices	

	only.				
#	Sample ID	Compound	Reported Concentration ()	Calculated Concentration ()	Qualification
			 		
 	· · · · · · · · · · · · · · · · · · ·				
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			1	[

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.
- 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/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

Average relative response factors (RRF) for all semivolatile target compounds and system performance check compounds (SPCCs) were greater than or equal to 0.05 as required 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) UJ (all non-detects)	Α
	n-(Hydroxymethyl)phthalimide	0.04408 (≥0.05)		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)	А

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

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)	А	Initial calibration (RRF)
F8F120167	TSB-GJ-08-30** TSB-GJ-08-40	Phthalic acid	J- (all detects) UJ (all non-detects)	А	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)	А	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/ Page: _/of _ Reviewer: /			
		oo /E	 DA CIAL BAG	Mothad 9	2700	~ \					2n	d Revie		
	HOD: GC/MS Semivolatil	,				•								/
	samples listed below were hed validation findings wo			ch of the f	ollow	ing va	alidation are	eas. Val	idation	findir	ngs a	are note	d in	
<u> </u>	Validation Area			А	Sampling dates: 6/1/08									
<u>I.</u> 	Technical holding times GC/MS Instrument performance check			Α	Sam	piirig da	ates.	-///	108					
111.	Initial calibration			SW	0/0	psi	3 12	Z0.	99	$\overline{\mathcal{O}}$				
IV.	Continuing calibration/ICV			SW	•	1								
V.	Blanks) A										
VI.	Surrogate spikes			Δ										
VII.	Matrix spike/Matrix spike duplicates			A										
VIII.	Laboratory control samples			كىي	١	ح ٢								
IX.	Regional Quality Assurance and Quality Control			N										
Χ.	Internal standards	لىي												
XI.	Target compound identificat	4	Not reviewed for Level III validation.											
XII.	Compound quantitation/CRG	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	Á	? =	Rinsa	te	1	SD	G	F8F	120	137
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet		R = Rins FB = Fie	eld blank			TB = ` EB =	uplicate Trip blank Equipmer						
valida	ted Samples: المك	^^	ndicates samp	e underwen	ıı Leve	eriv va	iidation							
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	<u> </u>			34				
5	TSB-GJ-08-10MS	15			:	25				35				
6	TSB-GJ-08-10MSD	16				26				36				
7	F8F160000-439	17	81684	39		27				37				
8		18				28				38				

LDC #: 19097B2 SDG #: procour

VALIDATION FINDINGS CHECKLIST

Page: _/of _²_ Reviewer: _/___ 2nd Reviewer: _____

Method: Semivolatiles (EPA SW 846 Method 8270C)

Method: Semivolatiles (EPA SW 846 Method 8270C)	y			
Validation Area	Yes	No	NA	Findings/Comments
A COSTA COLOR DE LA COLOR DE L	war in the works			
All technical holding times were met.				
Cooler temperature criteria was met.	/	\		
DESTABLISHED SEAGURES SEE				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	_			
Were all samples analyzed within the 12 hour clock criteria?				
(lizadita) ealistà(ca				
Did the laboratory perform a 5 point calibration prior to sample analysis?	_			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	_			
Was a curve fit used for evaluation?				
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?		-		
Were all percent relative standard deviations (%RSD) \leq 30% and relative response factors (RRF) \geq 0.05?		_		
ix Commosassis				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?				
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?				
Was a method blank associated with every sample in this SDG?				•
Was a method blank analyzed for each matrix and concentration?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.				
Were all surrogate %R within QC limits?	_	-]		
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			1	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?				
A Deninstreaming sometimes				
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.	1			
Was a MS/MSD analyzed every 20 samples of each matrix?	1		\Box	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?				
Was an LCS analyzed for this SDG?	\leq		丄	

LDC#: 19097B2 SDG#: Lu coner

VALIDATION FINDINGS CHECKLIST

Page: 2of 2 Reviewer: 9 2nd Reviewer: 9

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?			٠	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		_	_	
Profesional Challe Asserting and Espain Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				
la didenti selarak da			an ar er e	
Were internal standard area counts within -50% or +100% of the associated calibration standard?	~			·
Were retention times within + 30 seconds from the associated calibration standard?		-		
es la geographic de lineare.				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?				
Did compound spectra meet specified EPA "Functional Guidelines" criteria?			4	
Were chromatogram peaks verified and accounted for?				tang kalung mendenggan bagai salah segaran penggan penggan dan penggan penggan segaran selah sebagai sebagai s
AN SCHEETT STEETINE WHISELE				and the second s
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?	+			
Mil. Terledika (Austrije de Comensus) (Pess				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?				
Were relative intensities of the major ions within \pm 20% between the sample and the reference spectra?	7			
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		-		
· 1982年 - 1984年 - 1985年 - 1984年 - 198				
System performance was found to be acceptable.				
A CONTRACTOR CONTRACTO				
Overall assessment of data was found to be acceptable.	_			the state of the s
Field duplicate pairs were identified in this SDG.			-	and the second s
Target compounds were detected in the field duplicates.			1	-
P.A. Premierus				
ield blanks were identified in this SDG.	12.12.12		22.2	dada al-ada da agrae da agrae Agrae da agrae da ag
arget compounds were detected in the field blanks.	1	7	\neg	

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-Dichlorophenoi**	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-butyiphthalate	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. Diethyiphthalate	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	00. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	III.
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	WW.
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.

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VALIDATION FINDINGS WORKSHEET Initial Calibration

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". METHOD: GC/MS BNA (EPA SW 846 Method 8270)

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?

N/A

AN NA

N/N/A N/A

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

Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF? Did the initial calibration meet the acceptance criteria?

ſ 				_			 7	 	 -	 	 7	 	 	 -	,	,	,		 ,
Qualifications	1/1/1/7	V																	
Associated Samples	A // +B/K																		
Finding RRF (Limit: ≥0.05)	0.01477	0. 0 4408														٠		•	
Finding %RSD (Limit: <30.0%)		(1)															•	•	
Compound	Ph thalic Acid	W-(Hydroxymothy	phthallaide	/															
Standard ID	JICA1.SPEC																		
Date	80/11/2																		
*																			

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VALIDATION FINDINGS WORKSHEET Continuing Calibration

2nd Reviewer: Reviewer:

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

Pease 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 ?

A N Z Y/A N/A

Qualifications		1/42/4	<i>y</i>				╢、	3/43/4		1-/43 A												
Associated Samples	F 8F160000-439,	7 5 67	7	**			/,	1	7													
Finding RRF (Limit: >0.05)			\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				0.01066	207700	6.07363													
Finding %D (Limit: <25.0%)		0.0/250	1/90.00/22/1						81074 36	0/800:50								-				
Compound	Ph Hall'c A.A	415/ 12. dia 11. 1	Manufacture of	An thall mids	7			1	Ph Halic And	Lacin Salining												
Standard ID	JCAL 5197						JeAL5229															
Date	80/57/9						80/61/9															_
*									-								_		T	T	I	

SDG #: per cona

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

Page: Reviewer: 2nd Reviewer:

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

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

| N | N/A | Was a LCS required? | Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the control of the co

Were the LCS/LCSD percent recoverles (%R) and the relative percent differences (RPD) within the QC limits?

	٦	Т	T-	1	T	T	Т	T	Ī	Т	7	7	T	Ť	T	T	T	Ŧ	-	7	-	-	7	- _T -		Ŧ
	Quajirications	dr. Profit	1.0/sw /2.12 CD	7 7	7									,												
Action S. Peter Jones A.		411+11/4																								
RPD (Limits)		()	())	())		()	-	()	-))	()	_	()))	()		
LCSD %R (Limits)		()	(()	()	()	^ _	(()	((^	<u></u>		()	^	()	())	^ _	())	^
LCS %R (Limits)	-	17 (54-90	()	()	()	()	()	()	(()	()	()	()	(()	(()	(()	()	()	()	^ ·	()	(
Compound	17.11	##																			-					
TCS/TCSD ID	10110110110	5-1-1-1-1-19																								
Date																										
*					1			\exists		╢	\dashv	\forall	7	1	1	1	7	1	1	1						

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LDC #:	SDG #:

VALIDATION FINDINGS WORKSHEET Internal Standards

Reviewer:

Page:

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

Were all internal standard area counts within -50 to +100 of the associated calibration standard? Please) see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". X (N/N/A

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

			Internal			
*	Date	Sample ID	Standard	Area (Limits)	RT (Limits)	Qualifications
		3	Въд	- 329	(KCL)	1/43/A out 4/1,
			PRY	E187) 16 ESC 810 Lbt	(08 S211 - S6E 187)	1
			NPF	4415161-181505) 711105	(42151)	
			ANT	1	(2118)	
			NHd	\sim	86030	*
			CRY		(1/224	
		*		ŀ		
		4	PRY	197078 (281395	-1/25580)	1/41/A BUA)
					1	1
\neg						
\Box						
П						
\Box						

ISI (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10 * QC limits are advisory

IS4 (PHN) = Phenanthrene-d10 IS5 (CRY) = Chrysene-d12 IS6 (PRY) = Perylene-d12

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to some 19091B2 SDG #:

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: /of 2nd Reviewer: Reviewer:__

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:

 $\label{eq:RRF} RRF = (A_{\star})(C_{\tt w})/(C_{\tt w})$ 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,

 $A_{\rm h}$ = Area of associated internal standard $G_{\rm h}$ = Concentration of internal standard X = Mean of the RRFs

				Reported	Recatculated	Reported	Recalculated	Renorted	Recalculated
#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	RRF SO std)	RRF (\$7.5 std)	Average RRF	Average RRF	%RSD	%RSD
-	1001 - 7	80/2/1	Phenol (1st internal standard)	1.87853	1.87853	1. 8xx3.7	/-XSS.37	()#0/	CK0.
\perp			Naphthalene (2nd internal standard)	1.09438	1.09438	1.10901	10801.1	7.27	1.326
$oldsymbol{\perp}$			Fluorene (3rd internal standard)	1.4/778	XCL/4.1	62714.1	1.41229	0.573	545.0
			Pentachlorophenol (4th internal standard)	0.20200	0.2006.0	0.19634	0-19634	0,287	10 255
			Bis(2-ethylhexyl)phthalate (5th internal standard)	a 90763	6.404.0	0.88343	0-86343	9.524	75.6
			Renzo(a)pyrene (6th internal standard)	1./3808	1.13808	1.1182	1.11182	6. 4810	
7	1041-14PM	20/811. Alde	August 19 Control of Phone (40 Mineral standard)	0.51976	22615.0	D.51274	0.51274	0.7/21/	
			Naphthalene (2nd internal standard)					11.211.2	
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(e)nyrene (6th internal standard)						
8	146-15PE	•)	Phenol (18 internal standard)	10.04162		0. 0440X		8.4/239	
			Naphthalene (2nd internal standard)					1221	
			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

LDC# 1909782 SDG# 244 consy

VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification

Page: /of/ Reviewer: //

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 * (ave. RRF - RRF)/ave. RRF RRF = $(A_x)(C_x)/(A_y)(C_x)$

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

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

 $A_{\rm b}$ = Area of associated internal standard $C_{\rm b}$ = Concentration of internal standard

Standard) standard) standard) standard)						Reported	Recalculated	Reported	Recalculated
Naphthalene (2nd internal standard) Naphthalene (2nd internal standard) Fluorene (3rd internal standard) Pentachlorophenol (4th internal standard) Bis(2-etty/thexyl)phthalate (5th internal standard) Act 15/96 (1/8/b/8) Phenol (1sf internal standard) Fluorene (3rd internal standard) Naphthalene (2rd internal standard) Fluorene (3rd internal standard) Bis(2-etty/thexyl)phthalate (5th internal standard) Phenol (1st internal standard) Bis(2-etty/thexyl)phthalate (5th internal standard) Bis(2-etty/thexyl)phthalate (5th internal standard)	#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	RRF (CC)	RRF (CC)	Φ%	0%
Naphthalene (2nd internal standard) Fluorene (3rd internal standard) Pentachlorophenol (4th internal standard) Bis(2-ethythexyl)phthalate (5th internal standard) Benzo(a)purene (5th internal standard) Phenol (1st internal standard) Phenol (1st internal standard) Phenol (1st internal standard) Phenol (1st internal standard) Bis(2-ethythexyl)phthalate (5th internal standard) Phenol (1st internal standard) Pentachlorophenol (4th internal standard) Pentachlorophenol (4th internal standard) Pentachlorophenol (4th internal standard) Pentachlorophenol (5th internal standard) Pentachlo	-	JCA L5195		Phenol (1st internal standard)	1. 855 37	1-87174	1-8717	O. 8×210	0.882/
Fluorene (3rd internal standard) Pentachlorophenol (4th internal standard) Bis(2-ethylhexyl)phthalate (5th internal standard) Act LS/96 (188 / b) Phenol (1st internal standard) Fluorene (3rd internal standard) Fluorene (3rd internal standard) Bis(2-ethylhexyl)phthalate (5th internal standard) Renzo(a)pyrene (5th internal standard) Renzo(a)pyrene (5th internal standard) Phenol (1st internal standard) Phenol (1st internal standard) Phenol (1st internal standard) Phenol (1st internal standard) Renzo(a)pyrene (3rd internal standard) Phenol (1st internal standard) Renzo(a)pyrene (3rd internal standard)				Naphthalene (2nd internal standard)	1.10901	1.10/35	1.101	0.63070	0.6907
Bis(2-ethylhexyl)phthalate (5th internal standard)				Fluorene (3rd internal standard)	1.41229	10865-1	86.1	1.0/05%	70/0.1
Bis(2-ethythexyl)phthalate (5th internal standard) Benzo(ahween (6th internal standard) Act for terminal standard) Naphthalene (2nd internal standard) Fluorene (3rd internal standard) Bis(2-ethythexyl)phthalate (5th internal standard) Bis(2-ethythexyl)phthalate (5th internal standard) Phenol (1st internal standard) Phenol (1st internal standard) Fluorene (3rd internal standard) Fluorene (3rd internal standard) Pentachlorophenol (4th internal standard) Bis(2-ethythexyl)phthalate (5th internal standard) Bis(2-ethythexyl)phthalate (5th internal standard) Bis(2-ethythexyl)phthalate (5th internal standard)				Pentachlorophenol (4th internal standard)	0.19634	020000	0.2037	3.74910	3.749
ACA LS/96 LIBS Phenol (1st Internal standard) ACA LS/97 LIBS Phenol (1st Internal standard) ACA LS/97 LIBS Phenol (1st Internal standard) Bis(2-ethythexyl)phthalate (5th internal standard) Renzo(a)purene (5th internal standard)				Bis(2-ethylhexyl)phthalate (5th internal standard)	0-86343	S 018.0	0.879	0.86222	0-8622
CAB LS Phenol (1st internal standard) Naphthalene (2nd internal standard) Naphthalene (2nd internal standard) Fluorene (3rd internal standard) Phenol (1st internal standard) Bis(2-ethylhexyl)phthalate (5th internal standard) Phenol (1st internal standard) Phenol (1st internal standard) Phenol (1st internal standard) Phenol (3rd internal standard) Phenol (3rd internal standard) Pentachlorophenol (4th internal standard) Pentachlorop				Renzo(a)pyrene (6th internal standard)	1.11182	1-11 507	1.511.1	0.29280	0.2728
30/81/9 /6/57 AVS	7	7615180	80/81/2	Phenol (1st internal standard)	121150	0.52/85	0.52/85	1.77632	(-777.7
30/8/19 [6/57 87				Naphthalene (2nd internal standard)					60111
20/8/19 /6/57 27				Fluorene (3rd internal standard)	7				
Bis(2-ethythexyl)phthalate (5th internal stand Standard) Phenol (1st internal standard) Naphthalene (2nd internal standard) Fluorene (3rd internal standard) Pentachlorophenol (4th internal standard) Bis(2-ethythexyl)phthalate (5th internal stand		16/5747	20/8/19	Rentachlorophenol (4tt/interhals/standard)	W 0.04408	0.04331	0.0433/	1.721/9	(.73819
Phenol (1st internal standard) Phenol (1st internal standard) Naphthalene (2nd internal standard) Fluorene (3rd internal standard) Pentachlorophenol (4th internal standard) Bis(2-ethythexyl)phthalate (5th internal standard)				Bis(2-ethylhexyl)phthalate (5th internal standard)					
Phenol (1st internal standard) Naphthalene (2nd internal standard) Fluorene (3rd internal standard) Pentachlorophenol (4th internal standard) Bis(2-ethythexyl)phthalate (5th internal standard)				Benzo(a)pyrene (6th internal standard)					
rd)	6			Phenol (1st internal standard)					
rd) stand				Naphthalene (2nd internal standard)					
rd) stand				Fluorene (3rd internal standard)					
stand				Pentachlorophenol (4th internal standard)					
				Bis(2-ethylhexyl)phthalate (5th internal standard)					
Control (a) pyrene (our interinal 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

SDG#: 19097B2

VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification

Page: /_of / Reviewer: //

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 * (ave. RRF - RRF)/ave. RRF 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,

 $A_{\rm k}$ = Area of associated internal standard $C_{\rm k}$ = Concentration of internal standard

C _{is} = Concentration of internal standard	
$C_x = Concentration of compound,$	

					Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	RRF (CC)	RRF (CC)	0%	0 %
-	72257 475	80/61/1	Phenol (1st internal standard)	1. 855.37	1.80/62	91081	2.8972/	2-897
			Naphthalene (2nd internal standard)	10601.1	712801	1.087	1.97399	1. 974
			Fluorene (3rd internal standard)	601111	8280h·1	P804.1	0.25855	28.87.0
			Pentachlorophenol (4th internal standard)	0.19634	0.2705.0	0.2073	623 85.5	585-5
			Bis(2-ethylhexyl)phthalate (5th internal standard)	0.86343	88/128-0	6128-0	0.97842	0.978
			Renzo(a)pyrene (6th internal standard)	1.11/82	1.12694	1.1267	1.36062	1.36/
2	JC4L5228	70/61/9	6/19/08 Act to phenone.	0.5/274	0.5/326	0.5733	69001.0	7001.0
			Naphthalene (2nd internal standard)					
	JC465229	20/61/9	Provemed 3rd interpal standard / phthallmid 0.0400	Bapho o 1	8.045a3	0.0452	09/19.0	2.6/1
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
٣			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#: 1909182

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:	_/of_/	
Reviewer:_	ß	
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

S	am	ple	ID:	#	2

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	50	33.3/03	67	67	0
2-Fluorobiphenyl		34.9043	70	70	
Terphenyl-d14	1	33.6734	67	67	1
Phenol-d5	75	48.9853	65	65	
2-Fluorophenol		48.52	65	65	
2,4,6-Tribromophenol	L	5D.6613	68	68	
2-Chlorophenol-d4					1
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-Fluorophenoi					
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					
Terphenyi-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4		***************************************			

LDC#: 1909782 SDG #: pu court

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

2nd Reviewer: Reviewer:

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

SSC = Spiked sample concentration SA = Spike added Where:

SC = Sample concentation

MSD = Matrix spike duplicate percent recovery

RPD = I MS - MSD I * 2/(MS + MSD) MS/MSD samples:

MS = Matrix spike percent recovery

و 4

	JS P	Spike	Sample	Spiked Sample	ample	Matrix Spike	Spike	Matrix Spike Duplicate	· Duplicate	USW/SW	CS
Compound	(A)	alks		Concentration (14)		Percent Recovery	ecovery	Percent Recovery	ACOVERV.	GGG	
	v N	7 %			Γ		,			Y.	
		T COM		MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol	3570	2630	UN	06ke	asse	10	R	69	69	7.7	17
N-Nitroso-di-n-propylamine				2730	25.70	77	17	52	K	2.2	(,,)
4-Chloro-3-methylphenol				2760	2690	77	77	52	75	7.4	12
Acenaphthene				2640	2620	75	2	47	13	8.7.	6/2
Pentachlorophenol				2300	2230	64	64	129	(,,		j ,
Pyrene	>	1			000	0,	10	, ,	,	0,5	5
		,	*		2570	0	67	/9	67	ار بد ا	5.7
						_					

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 # 1909782 SDG #: 42 color

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: /of/

2nd Reviewer: Reviewer:

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

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

% Recovery = 100 * (SC/SA

SSC = Spike concentration SA = Spike added Where:

RPD = ILCS - LCSD I * 2/(LCS + LCSD)

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

501-6848918 LCS/LCSD samples: _

	dS .	ike	Spike	ke	3.1	CS	וט	csp	1 CS/I	CS/I CSD
Compound	Ağ (Z, Ağ	Added (u.g./kg	Concentration	itration	Percent F	Percent Recovery	Percent Recovery	Recovery	RPD	Q
	831	ICSD	1.08	l CSD	Renorted	Banale	Donot			
Phenol	3330	ΨW	2360	ΑN	11	17	Dai 100 av	Keraic	керопед	Recalculated
N-Nitroso-di-n-propylamine			2670		77	77				
4-Chloro-3-methylphenol			250		77	77				
Acenaphthene			2012		75	75				
Pentachlorophenol			2740		67	19				
Pyrene	->	3	2330	1	7.0	(1/2				

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 #:_	1909	7B2
SDG #:	per co	res

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

<u>/</u> of_/
F

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

	-		١
Υ	Ν	N/A	١
Y	N	N/A	1
		1	/

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?

Conce	ntration	$a = \frac{(A_{x})(I_{x})(V_{t})(DF)(2.0)}{(A_{tx})(RRF)(V_{x})(V_{t})(\%S)}$	Example:
A _x	=	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard	
l _s	=	Amount of internal standard added in nanograms (ng)	Conc. = ()()()()()()
V _o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).	
V_{i}	=	Volume of extract injected in microliters (ul)	= , , , , \(\sum_{\chi} \)
V_{ι}	=	Volume of the concentrated extract in microliters (ul)	N / / /
Df	=	Dilution Factor.	NP
%S	=	Percent solids, applicable to soil and solid matrices only.	•

2.0	= Factor of 2 to accou	nt for GPC cleanup			
#	Sample ID	Compound	Reported Concentration	Calculated Concentration ()	Qualification
	7.00				
			V		

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

SDG Labor METH The s	#:19097B3a #:F8F120167 ratory:_Test America HOD: GC Chlorinated Per amples listed below were ation findings worksheets.	_ sticio		L V 846 Me	evel	III/IV 8081A)					Date: 1/2 Page:of Reviewer: d Reviewer: re noted in attache
	Validation				1				Comn			
I.	Technical holding times			A	Samp	oling da	ites:	6/11	108	12,114,3		
.	GC/ECD Instrument Perform	nance	Check	Δ					*			
111,	Initial calibration			A								
IV.	Continuing calibration/ICV			SIA		icr	4	17				
V.	Blanks			A								
VI.	Surrogate spikes			A								
VII.	Matrix spike/Matrix spike du	plicate	es	Δ								
VIII.	Laboratory control samples			A		105	>					
IX.	Regional quality assurance	and q	uality control	N								
Xa.	Florisil cartridge check			N								
Xb.	GPC Calibration			N								
XI.	Target compound identificat	ion		Δ	Not r	eviewe	d for Le	vel III vali	dation.			
XII.	Compound quantitation and	repor	ted CRQLs	A	Not r	eviewe	d for Le	vel III valid	dation.			
XIII.	Overall assessment of data			N		1						
XIV.	Field duplicates			N								
XV.	Field blanks			ND	1	R =	Pir	rsati	/	32	X #	F8F/2013
	A = Acceptable N = Not provided/applicable SW = See worksheet ed Samples: ** Indicates samp		R = Rins FB = Fig	eld blank		cted	7) = Duplic B = Trip t EB = Equip	ate blank oment blar			
- 1	TSB-GJ-08-10	11				21				31		
	TSB-GJ-08-20**	12				22				32		
	TSB-GJ-08-30**	13				23				33		
_	TSB-GJ-08-40	14				24				34		
	TSB-GJ-08-10MS	15				25				35		
6	TSB-GJ-08-10MSD	16				26				36		
7	F8F160000-164	17	816816	4		27				37		

LDC #: VALIDATION FINDINGS CHECKLIST SDG #: Nu comm

Page: /of 2
Reviewer: F7 2nd Reviewer:___

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

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	1	I	1	
All technical holding times were met.		-		
Cooler temperature criteria was met.				
II. GC/ECD Instrument performance check	1 -		l	
Was the instrument performance found to be acceptable?				
III. Initial calibration	1			
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) ≤ 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 recovieries 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 #:_	1	9097839	
SDG #:	su	cones	

VALIDATION FINDINGS CHECKLIST

	Page:_	2 of	<u>_</u>
	Reviewer:		<u> </u>
2nd	Reviewer:		

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. aipna-BHC	1. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	.99
B. beta-BHC	J. 4,4".DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH.
C. delta-BHC	K. Endrin	S. alpha-Chiordane	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	EF.	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF.	NN.

C:\docs\Work\Pesticides\COMPLST-3S.wpd

Notes:

190971334 SDG #: 11 contr LDC #: /

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: lof Reviewer: 2nd Reviewer:

METHOD: GC

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

				Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date	Compound	CF O(O25 std)	CE_ DO2\std)	Average CF (initial)	Average CF (initial)	%RSD	%RSD
-	1691	80/9//9	endosulgan / en D(B)	ah D(B) 285001700 285 00170		273533412 273533412	273533412	×.96584	2.96
			no thoxychlos	442/7640	Ch9L1Chh	07822224 098 22214 OH9L15H	42222360	598/0.7	6.01
2	1647	20/9//9	/ Ch C(A)	0,407/2085	5 302/6040	1 C(A) STUDY (010) S 302/6040 SID 995/40 5/0995/40 3.14887	5 10995HD	3.14827	3.1/8
	·		A	1614 96680	08996,1191	Descensi Oral 2527 1864/11 1864/1	02 76 76 51	6.25515	6.255/5
						,			
က									
		·							

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.

19097832 SDG #: ALL LDC #:

Continuing Calibration Results Verification VALIDATION FINDINGS WORKSHEET

Page: /of 2nd Reviewer: Reviewer:

> FLC METHOD: GC_

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

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

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

Calibration Date 6/18/08 C/18/08 C/18/08 C/18/08 C/18/08			-11	Reported	Recalculated	Reported	Recalculated
6/18/08 endosulpan (4 A nuthoxychler	ibration Date	Compound	Average CF(Ical)/ CCV Conc.	CF/Conc. CCV	CF/Conc. CCV	Q%	%D
80/18/08			02200	0.023	6300	3.7	3.7
		nu thoxy chlor	73	0,0252	75000	2.0	9.K
FCALOSO L/18/08							
A P	80/51/			25000	0.0352	0.1	01
		P	7	L sx0.0	C3200	2٠٧	2.7
						,	
	·						

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 #: 1909783~ SDG #: pu com

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:	/_of/
Reviewer:_	
2nd reviewer:_	<u> </u>

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

The percent recoveries	(%R) of surrogates were recalcul-	lated for the compounds identified belo	w using the following calculation:
The percent recoveries	(7011) or surrogates were recarea	lated for the compounds lacitatica bolo	ir denig the fellowing editation.

% 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	001676	84	84	0
Decachlorobiphenyl	1	V	0.01750	87	87	V
Decachlorobiphenyl						

Sample ID:

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

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	·
Tetrachloro-m-xylene						·
Tetrachioro-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:		

19097832 LDC #:

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

Page: Reviewer: 2nd Reviewer:_

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

SC = Concentration

RPD = I MS - MSD I * 2/(MS + MSD)

Where: SSC = Spiked sample concentration SA = Spike added

MSD = Matrix spike duplicate percent recovery

MS/MSD samples:

MS = Matrix spike percent recovery

		Spike Added/	Sample	Spiked	Spiked Sample	Matrix	Matrix Spike	Matrix Spik	Matrix Spike Duplicate	MS	MS/MSD
Compound	9	2///	1/8//8	2000))	Percent	Percent Recovery	Percent	Percent Recovery		RPD
	MS	MSD	•	MS	MSD	Reported	Recalc.	Reported	Racalc	Deported	
gamma-BHC	17.7	17.5	On	15.6	15.3	\$	XO	87	87	() - X	2.0
4,4'-DDT	1	1		9:51.	16.3	\$ 3	3	93	93	4.4	4.4
	-										

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

LDC#: 19097832 SDG #: per come

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

/0f /	٤,	
Page:	Reviewer:	•

2nd Reviewer: __

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

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

% Recovery = 100* (SSC-SC)/SA

SSC = Spiked sample concentration SA = Spike added Where:

SC = Concentration

RPD = I LCS - LCSD I * 2/(LCS + LCSD)

LCS = Laboratory control sample percent recovery

LCSD = Laboratory control sample duplicate percent recovery

-1918918 LCS/LCSD samples:__

Š

rcs/rcsd	uaa	
rcsD	Percent Recovery	
CS	Percent Recovery	
Spiked Sample	Concentration 2	
Spike	1/6n)	300
	Compound	

I	ī —	7	7		Т	T	 		T	T		T	T		-T-		
rcs/lcsd	RPD		Recalc.					_			_						
rcs				керопеа													
SD	LCSD Percent Recovery	21-2-0	кесаіс.														
רכ		Percent	Potrogo	reported		NA.											
rcs	Percent Recovery	Percent Recovery	Percent Recovery	oleved	הפנסוני.	90	/0/										
רכ				Percent	Percent	Percent l	Reported	nepolican	90	/01							
Sample	Concentration (28/25)	LCSD		M	1												
Spiked	Sonce Sonce	SOT		15.0	16.8												
Spike	7/A	TCSD		NA	7												
Ś	ž)	CS		16.7	1												
	Compound			gamma-BHC	4,4'-DDT										-		

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 #:_	1909783~
SDG #:_	en coner

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	<u>/</u> of <u>/</u>
Reviewer:_	P
2nd reviewer:	0
	Y

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

			1
Υ	Ν	/N/A	
Y	N	N/A	J
			_

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. = (_______)

=

		'			
#	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 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.
- 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 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	VALIDATION COMPLETENESS WORKSHEET
SDG #: F8F120167	Level III/IV
Laboratory: Test America	

Date: 7/21/08
Page: <u>/</u> of/
Reviewer:
2nd Reviewer:
1

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
1.	Technical holding times	Α	Sampling dates: 6/11/08
II.	GC/ECD Instrument Performance Check	A	· · · · · · · · · · · · · · · · · · ·
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	icr = 15
V.	Blanks	A	
VI.	Surrogate spikes	Α	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LC7
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	Δ	Not reviewed for Level III validation.
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	Α	
XV.	Field blanks	ND	R= Rinsate / SPG # P8F/20/3

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

** Indicates sample underwent Level IV validation

	30/6				
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	F8F160000-162	17	8168162	27	37
8		18		28	38
9		19		29	39
10		20		30	40

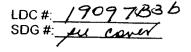
LDC #: 1909713315 SDG #: you coner

VALIDATION FINDINGS CHECKLIST

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

Method: GC HPLC

motifodGOTIFLO				
Validation Area	Yes	No	NA	Findings/Comments
Li rectinical noldingames			, Mil	
All technical holding times were met.		1		
Cooler temperature criteria was met.		<u> </u>		÷
Il initial calibration.				
Did the laboratory perform a 5 point calibration prior to sample analysis?	1-			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) < 20%?	-			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		V	<u> </u>	
Did the initial calibration meet the curve fit acceptance criteria?			-	
Were the RT windows properly established?]			
IV-scontinuing calibration				
What type of continuing calibration calculation was performed?%D or%R				
Was a continuing calibration analyzed daily?	/			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?				
Were all the retention times within the acceptance windows?				
V Blanks (XXIIII)			H.	
Was a method blank associated with every sample in this SDG?				
Was a method blank analyzed for each matrix and concentration?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.				
Mi Simogate spikes it				western best
Were all surrogate %R within the QC limits?				A Maria
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?			-	
VII. Maiūx spike/Matrix spike duplicatės 🚛 🔞 💮 💮				
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.	_			
Nas a MS/MSD analyzed every 20 samples of each matrix?			\neg	
Vere the MS/MSD percent recoveries (%R) and the relative percent differences RPD) within the QC limits?	-			
/III Laboratory control samples		10		
Vas an LCS analyzed for this SDG?		Ī		
Vas an LCS analyzed per extraction batch?			\neg	
Vere the LCS percent recoveries (%R) and relative percent difference (RPD) ithin the QC limits?				
				· · · · · · · · · · · · · · · · · · ·



VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 77
2nd Reviewer: 77

			- -	
Validation Area	Yes	No	NA	Findings/Comments
IX. Regional Quality Assurance and Quality Control :2	ne.			
Were performance evaluation (PE) samples performed?			-	
Were the performance evaluation (PE) samples within the acceptance limits?				
X Tange : Angoundademinication 2005 1905 1905 1905 1905 1905 1905 1905 1				
Were the retention times of reported detects within the RT windows?				
At Compound quantitation/CROLS				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
## Trace Committee Committ				
System performance was found to be acceptable.	1			
XUIX Social trassessing place data (Fig. 2)				
Overall assessment of data was found to be acceptable.				
XIV Fakkiupicaiss				
Field duplicate pairs were identified in this SDG.				TE .
Target compounds were detected in the field duplicates.			\supset	
W Heldplank - The Control of the Con				
rield blanks were identified in this SDG.	\mathcal{I}			
Target compounds were detected in the field blanks.		\dashv		

19097836 LDC #: SDG#:

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: Reviewer. 2nd Reviewer.

> HPLC METHOD: GC_

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

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

			Reported	Recalculated	Reported	Detaliniated		
# Standard ID	Calibration Date	Compound	PO.	CF CF	Average CF	<u> </u>	Reported	Recalculated
7 451	X0/17/5	1260-1 640	1 2 2 3 (0)	(s/C)std)	(initial)	(initial)	%RSD	%RSD
·) ` `		222	92sh	27977	27977	0.21	(2,0)
1		140-1-048	8/1668	3946	19/68	33/64	9.582	7.582
7								
-	-							
Т								
~~~								
1								
4		-						
1								

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

190972336 SDG#: LDC #:

### Continuing Calibration Results Verification VALIDATION FINDINGS WORKSHEET

Page: 2nd Reviewer:_ Reviewer.

> FPLC METHOD: GC_

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

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

Where:

ave. CF ≈ initial calibration average CF CF ≈ continuing calibration CF A ≈ Area of compound C ≈ Concentration of compound

					Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	CF/Conc.		۵%	<b>0</b> %
	680787	80/81/9	On sopraty	00001	459.1902	954.19	4-8	K.h
$\top$		<b>-</b>						0
1								
7	PC#1/00	90/81/9	7	7	937. 3342	937.33	6.3	6.3
$\exists$								
1								
6		-						
		•						
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

DC#: 19097836 SDG#: 414 com METHOD: CC HPLC

## VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page: __ot__ Reviewer: _____ 2nd reviewer: _____

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		SS = Surrogate Spiked				
Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Perc Differ
				Reported	Recalculated	
DCB	Ch A	380	16.0769	B	80	0

Sample ID:						
Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample 10:						
Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
1				Reported	Recalculated	
				·		

LDC#: 19097836 coner SDG#: 10

# VALIDATION FINDINGS WORKSHEET

Matrix Spike/Matrix Spike Duplicates Results Verification

2nd Reviewer:__ Reviewer:_

HPLC 30/

METHOD:

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

SC = Sample concentration

RPD =(((SSCMS - SSCMSD) * 2) / (SSCMS + SSCMSD))*100 و د

6

MS/MSD samples:__

MSD = Matrix spike duplicate

	Spike	9,5	Sample	Spike	Spike Sample	Matri	Matrix spike	Matrix Spike Duplicate	e Duplicate	MS/WSD	as
Compound	2	1/2/2	12/1/25		ntration						
一年の一年の日本の日本の日本の日本の日本の日本の日本の日本の日本の日本の日本の日本の日本の			0	7.1	*	Percent	Percent Recovery	Percent Recovery	Recovery	RPD	0
	MS	MSD	7***	MS	Gisp	Reported	Recalc.	Reported	Recalc.	Reported	Becelo
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)											
Arocler 1260	771	78	ON	181	194	101	70,	0		1	
				)		7		/ 0/	107	8.7	7:7
Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported recults do not consider the contract of the contrac	ike/Matrix S	pike Dupl	cates finding	s worksheet 1	or list of qualif	ications and a	Ssociated sar	rea when rea	ll sor bottoc		700 00
of the recalculated results.	:						מממומים ממון	ומוכס או ופו ו ב	on ten lesnits	do not agree	Within 10.0%

LDC# 19097836 SDG #: 40 comes

## VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: of Seviewer: 2nd Reviewer:

METHOD: CG 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

SSC = Spiked concentration SA = Spike added Where

SC = Sample concentration

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

LCS = Laboratory Control Sample percent recovery

LCSD = Laboratory Control Sample duplicate percent recovery

107 8168162 LCS/LCSD samples:

	lids	(e	Sample	Spike Sa	ımple	TCS	S	CCSD	٥	rcs/rcsD	asc
Compound	Added ( Mg//fx	RY I	Cong.	Concentration	Zion Zion	Percent Recovery	ecovery	Percent Recovery	ecovery	RPD	
	SOT	CCSD		rcs	CCSD	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)											
Moclos 140	167	NA.	C	///	24	E 0/	(03	· WW			
						-					
		٠									

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.

90971036	the const
# DC #	SDG#:

### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

2nd Reviewer: Page: Reviewer:

>		
`	your	
	ኢ	

METHOD:

HPLC

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?

(A)(Fv)(Df)	(RE)/Vs or Ws 1/% S/100)
Concentration≈	_

Example:

Sample ID.

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

Concentration =

Compound Name _

# Sample ID Compound Reported Recalculated Results Qualifications Concentrations						
Somments:	#		Compound	Reported Concentrations	Recalculated Results Concentrations	Qualifications
Somments:						
Somments:						
Somments:						
Somments:						
Comments:						
Somments:						
Somments:						
Somments:						
	mmo;	nents:				

### 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)	А
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)	А

### 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)	А
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)	Α

### 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)	А	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)	А	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)	А	Internal standards (%R)
F8F120167	TSB-GJ-08-10 TSB-GJ-08-20** TSB-GJ-08-30** TSB-GJ-08-40	Iron	J (all detects)	Α.	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	А
F8F120167	TSB-GJ-08-20**	Thallium Tungsten	0.48U mg/Kg 1.2U mg/Kg	А
F8F120167	TSB-GJ-08-30**	Lithium	180U mg/Kg	А

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

No Sample Data Qualified in this SDG

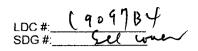
SDG	#: 19097B4 #: F8F120167 ratory: Test America	VALIDATION		PLETEN evel III/I\	ESS WORKS /	HEET	Date: 1/24.8  Page: 1 of 1  Reviewer: 144  2nd Reviewer: 2
MET	HOD: Metals (EPA SW 84	46 Method 6020/6	6010B/700	00)			Zild Neviewer.
	samples listed below were ation findings worksheets.		ch of the fo	ollowing v	alidation areas. \	Validation find	lings are noted in attached
	Validation	Area		·		Comments	
1.	Technical holding times		A-	Sampling o	lates: 6/11/48	,	
II.	Calibration		4				
III.	Blanks		4W				
IV.	ICP Interference Check San	nple (ICS) Analysis	A				
V.	Matrix Spike Analysis		SW	Msh	150		
VI.	Duplicate Sample Analysis		N	<i>J</i>			
VII.	Laboratory Control Samples	(LCS)	A	Lus			
VIII	Internal Standard (ICP-MS)		5W	put	veriend	for leu	(3
IX.	Furnace Atomic Absorption	QC	N	Mit	Wilia	,	
X.	ICP Serial Dilution		5W		σ		
XI.	Sample Result Verification		A	Not review	ed for Level III valid	ation.	
XII.	Overall Assessment of Data		A				
XIII	Field Duplicates		N				
XIV	Field Blanks		5W	R =	RINSATZ	1 (FAF)	20/37)
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet ted Samples: ** Indicates sam	R = Rins FB = Fie	eld blank	s detected	D = Duplica TB = Trip b EB = Equip	lank	
randa	So i	I I	· · · · · · · · · · · · · · · · · · ·		ı		
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	

### VALIDATION FINDINGS CHECKLIST

Page: __of ___ Reviewer: __wu 2nd Reviewer: _____

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

Validation Area	Yes	No	NA	Findings/Comments
li Technical holding times +		1410		
All technical holding times were met.	1			
Cooler temperature criteria was met.		1000.00.00		
II. Calibration				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/		<u> </u>	
Were all initial and continuing calibration verification %Rs within the 90-110% (80- 120% for mercury and 85-115% for cyanide) QC limits?	1			
Were all initial calibration correlation coefficients > 0.995? (Level IV only)				
III Blanks				
Was a method blank associated with every sample in this SDG?	1			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.				
IXI IGR Interference Check Sample:				
Were ICP interference check samples performed daily?	//			white the state of
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?		nik skon Reject	e le de la company	
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 anaylzed for this SDG?	1			
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?	<b> </b>		4	
Do all applicable analysies 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?	<u></u>			



### **VALIDATION FINDINGS CHECKLIST**

Page: 2 of 2
Reviewer: Mm
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. ICR Senal Dilution				A PARTY OF THE STATE OF THE STA
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	/	ļ		7 wax muc for zephy
Were all percent differences (%Ds) < 10%?		/	<b></b>	<u> </u>
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		/		
VIII. Imernat Standards (EPA/SW:846-Method 6020)				ilia di Santa
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?		/	-1	
IX. Regional Quality Assurance and Quality Control :				
Were performance evaluation (PE) samples performed?			<u> </u>	
Were the performance evaluation (PE) samples within the acceptance limits?			/	
X. Sample Result Verification: (SEE 2) 18 1745 22 22 22				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XI Overall assessment of data 113 11 11 11 11 11 11 11				
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. Hield blanks a Care				
Field blanks were identified in this SDG.	$\checkmark$			
Target analytes were detected in the field blanks.	_/			

LDC #: 19097 By SDG #: <u>See</u> com

### VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: ___of__/
Reviewer: _____/
2nd reviewer: _____/

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4	301	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, 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, Tl, V, Zn, Mo, B, Si,
w516	Soil	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, H, 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, Tl, 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, Tl, 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, Tl, 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, Tl, 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, Tl, 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, Tl, 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, Tl, 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, Tl, 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, Tl, V, Zn, Mo, B, Si,
,		
1-4	Coil	Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr, /
		Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Li, S, Zr,
m5.b	50:)	(Nb, Pd, P, Pt, Sn, Sr, Ti, W. U. Li, S, Z/,
		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,
	T	Analysis Method
ICP	<u> </u>	Li, <u>S</u> ) Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si
ICP-MS		
ICP-MS		Nb, Pd, P, Pt, Sn, Sr, Ti, W, U, Zr,)  Al, Sh, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN;
GFAA	<u> </u>	ILALSO, AS, Ba, Be, Co, Ca, Ci, Co, Co, Co, Co, Co, Co, Co, Co, Co, Co

Comments: Mercury by CVAA if performed

Nb: Niobium, Pd: Palladium, P: Phosphorus, Pt: Platinum, S: Sulfur, W: Tungsten, U: Uranium, Zr: Zirconium

SDG #: See Cover LDC #: 19097B4

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

VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES

2nd Reviewer:

Soil preparation factor applied:

₹ Sample Concentration units, unless otherwise noted: mg/Kg except Hg: ug/Kg_Associated Samples: Sample Identification 65.0 / 180 က 0.40 / 0.48 0.70/1.2 0 19.1 / 35.7 Blank Action imit 0.22 Maximum ICB/CCB^a (1/611) <del>د</del>. 8.0 7 2.7 0.1 Maximum (1/611) PB Maximum mg/Kg) **B**B Analyte 뫈 ≥ F

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.

SDG #: See Cover LDC #: 19097B4

### VALIDATION FINDINGS WORKSHEET Field Blanks

Page: / of / 2nd Reviewer: Reviewer._

METHOD: Trace Metals (EPA SW846 6010B/6020/7000)
(Y) N N/A Were field blanks identified in this SDG?

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

Blank units: ug/L Associated sample units: mg/Kg Sampling date: 6/11/08 Soil factor applied 200X

Soil factor applied 200X

Associated Samples: All (>10X or > RL) Field blank type: (circle one) Field Blank / Rinsate / Other:

		* <del></del>					-		 		· ·	 - 1	- 1	 -	Т	Ť	<del>-</del>	$\overline{}$
														•				
uc																		
Sample Identification																		
Samı																		
	Action Level	262	308															
Blank ID	RINSATE 1	131	154	17.9	0.84	38.6	39.2	1.5		,								
Analyte		Ca	Fe	Mg	Mn	Si	Na	స										

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".

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### VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

2nd Reviewer: Reviewer:

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/A | Was a matrix spike analyzed for each matrix in this SDG?

Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor N WA

Were all duplicate sample relative percent differences (RPD) < 20% for water samples and <35% for soil samples? of 4 or more, no action was taken.

Y N N/A WE LEVEL IV ONLY:

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

	_		MS	dsw	ac 7		
Matrix	An	Analyte	%Recovery	%Recovery	RP0 (Limits)	Associated Samples	Qualifications
195		\$	(401)	カ・581		411	T+ L+1A
	}	5 h	55,2	カ, 6く	*	,	J-/4/1/A
ł		3	12,5	409			T,
		ا ماکا	40,6	16.95			J-/R/A
•		9	134,8				T+ 1+/A
1	Ĺ	2,5	7.59	44.0			J-1/45/14
1			77:89	17 + Th	0		$\rightarrow$
		L; 1		8'69			J-/47/A
1		\ N		111			
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		4		4:29			À
ŧ I					<i>5</i> °%		No good (Lesson)
		95			33.1		
1		Bo			20,2		
1		ی			29,7		
		ક			0,3%		
ł		ŕ			6,97		
1		7			28-2		
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7	ر ا ا	Z	کر ک	メナト こ			
	0		, , ,				

SDG #: (909718+

## VALIDATION FINDINGS WORKSHEET Internal Standards (ICP-MS)

METHOD: Metals (EPA SW 846 Method 6020)

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

Y N/A Were all internal standard percent recoveries within 30-120% of the internal standard in the initial calibration standard?

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

Qualfications	D/\\\\		£											
Associated Samples	7		3											
%R (Limits)	127,587		129,663											
Associated Metals	S1, 5r.	, ,	<del> </del>											
Internal Standard	Sc45		5c45											
*			1	1										

LDC #: 19097 BJ SDG #:

### VALIDATION FINDINGS WORKSHEET **ICP Serial Dilution**

2nd Reviewer: Page: Reviewer:_

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".

If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed? Y W N/A

Were ICP serial dilution percent differences (%D) <10%? Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data. Y (N) N/A

LEVEL IV ONLY:

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

	Ş			- Comment of the Comm											
	Qualification	T1+/4											1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.	Associated Samples	411													
recalculation wor	%D (Limits)	40,4	1												
See Level IV I	Analyte	Fe													
is acceptable?	Matrix	503													
weie recalculated resul	Diluted Sample ID														
YN N/A	/ # Date														

Vem You V ر الم Comments:

SDG#: (9097184 SDG#: SEL CONTENT

# VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

Page: Of Reviewer: Wry

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 = Found × 100 True

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

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
Iw	ICP (initial calibration)	5	42900	02097	8~901	590)	λ
	GFAA (Initial calibration)						
ICM	CVAA (Initial calibration)	F	2.33	2.5	43.2	246	<b>&gt;</b>
col	ICP (Continuing calibration)	j	4920	2000	48.4	48.4	<b>→</b>
	GFAA (Continuing calibration)						
col	CVAA (Confinuing calibration)	1- 1-	4.98	2-0	776	9-66	λ
IW	ICP/MS (initial calibration)	, <i>d</i>	(011,8	(evo	10/01	て [。]	_
est	ICP/MS (Continuing calibation)	Μ	8-3901	0.01	8-90)	6,901	~

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.

SDG#: \ell Cover LDC # [4097184

### VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

2nd Reviewer:∠ Reviewer:

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 = Found × 100 True

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 = IS-DI × 100 (S+D)/2

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

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

%D = 1-SDRI x 100

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

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	%R/RPD/%D	%R/RPD/%D	Acceptable (Y/N)
IUAA	GP.	Æ	95,605	( ۵۰	95.6	95%	7
7.5	Laboratory control sample	Ş	18.87	stro	(07.5	107-5	
4	Matrix spike	~	(SSR-SR)	9-8581	82,3	82.3	
2/5	Duplicate	8	38'18	34.9	9,2	9.0	,
	ICP serial dilution	H	413.81	43856	3 - 5	2.5	<b>&gt;</b>

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 #:	9	0		131	f
SDG #:	$\zeta$	بع	7	Gu	

### **VALIDATION FINDINGS WORKSHEET** Sample Calculation Verification

Page:	1017
Reviewer:	My
2nd reviewer:	V
	7

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

Ę	સ્eas	e see	qualifications	below for a	l questions answered	"N". Not applicable	questions are identified as "N/A"

Y N N/A Have results been reported and calculated correctly?

$\frac{(N)}{(N)}$	N/A N/A	Are results within the calibrate Are all detection limits below		ents and within the linear range of the	ICP?
	ed analy ng equa	te results fortion:		were recalculated and	verified using the
Concent	tration =	<u>(RD)(FV)(Dil)</u> (In. Vol.)(%S)	Recalculation:		
RD FV In. Vol. Dil	=======================================	Raw data concentration Final volume (ml) Initial volume (ml) or weight (G) Dilution factor	Mg =	57418,7 of/LX0,(ex-	-= 15023 mg/kg

Sample ID	Analyte	Reported Concentration ( W 5 kg )	Calculated Concentration ( Wyly, )	Acceptable (Y/N)
7	L'	73.50	135	4
	5	6030	6030	
	AL	11900	11900	
	Aş	24,4	24.4	
	Ba	43.4	43,2	
	Be	0.54	0.64	
	В	221	22.1	
	Ca	9510	9170	
	Gr.	30, 3	30.3	
	4	4.8	4,8	
	Cu	144	4.4	
·	Fe	(1200	Moor	
	Pb	1.8	7.8	
	Mg	1200 N	25000	
	My	153	122	
	Mo	0.56	0.5%	
	V.`	11-6	11.6	
	pd	0.24	0.24	
	P	484	483	
	K	3190	3190	
	۶٬	323	323	/
	Ag	0-17	0.17	

LDC #:	19097	34
SDG #:		lover

### **VALIDATION FINDINGS WORKSHEET Sample Calculation Verification**

Page:_	1 or 1
Reviewer:	MH'
2nd reviewer:_	C
_	

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

Please see	qualifications	below for a	ul questions	answered "N".	. Not applicable	questions a	are identified a	s "N/A"

Have results been reported and calculated correctly?

Y N N/A 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		. >		were recalculated and verified using th
Concentration =	(RD)(FV)(Dil) (In. Vol.)(%S)		Recalculation:	

F۷ Final volume (ml) In. Vol. Initial volume (ml) or weight (G)

Raw data concentration

Dil Dilution factor **%**S Decimal percent solids

RD

Sample ID	Analyte	Reported Concentration ( Wy kg )	Calculated Concentration ( ) wy way )	Acceptable (Y/N)
	Na_	186	18%	7
	3r	106	1.6	
	Tl	0.40	0,40	
	SN	0.51	0.51	
		528	528	
	W	0.70	0.70	
	Ŋ	\$14	5.4	
·	V	42,3	42,3	
	<del>2</del> h	\$2.8	3217	
	- Zv	29-8	29.8	. у
			·	
-				

### 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, Chorine, 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.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

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

### I. Technical Holding Times

All technical holding time requirements were met.

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

### II. Calibration

### a. Initial Calibration

All criteria for the initial calibration 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

SDG #	: 19097B6 t: F8F120167 atory: Test America	VAL	.IDATIOI		PLETEN evel III/I		WORKSH	EET			Date: 7/23/ Page:of eviewer:oeviewer:oeviewer:
<b>METH</b> Metho	<b>OD: (Analyte)</b> <u>Bromide</u> d 300.0), O & G (EPA S	, Bromir SW846	ne, Chlorat Method 90	e, Chloride 71B)	e, Chorine	e, Fluc	oride, Nitrate, N	litrite	Orthon	ohosphate	e-P, Sulfate (EP
The sa validat	amples listed below wer ion findings worksheets	e reviev s.	ved for ead	ch of the fo	ollowing v	/alida	tion areas. Va	lidatio	on findi	ngs are r	oted in attache
	Validation	Area					C	omn	nents		
I.	Technical holding times			A	Sampling	dates:	6/11/08				
lla.	Initial calibration			A							
llb.	Calibration verification			A							
III.	Blanks			SW							
IV	Matrix Spike/Matrix Spike I	Duplicates	3	A	ZM	>/1	up				
٧	Duplicates			A			•				
VI.	Laboratory control samples	3		A	LCY						
VII.	Sample result verification			A	Not revie	wed for	Level III validati	on.			
VIII.	Overall assessment of dat	a		A							
IX.	Field duplicates			N							
	Field blanks			SW	R=	RZ	ISATE 1	+	F&F	12013	7)
Note:	A = Acceptable N = Not provided/applicab SW = See worksheet	le	R = Rin	o compound sate eld blank	ls detected		D = Duplicate TB = Trip blan EB = Equipme		nk		
√alidate	ed Samples: ** Indicates sar	nple unde	erwent Level	IV validation	l						
1	TSB-GJ-08-10	11			21				31		
2	TSB-GJ-08-20**	12			22				32		
3	TSB-GJ-08-30**	13			23				33		
2 3 4 5	TSB-GJ-08-40	14			24				34		
5	TSB-GJ-08-10MS	15			25				35		
ПП	TSB-GJ-08-10DUP	16			26	_			36		
7	MB	17			27				37		
8		18			28				38		
9		19			29				39		
10		20			30				40		
Notes		-									

## VALIDATION FINDINGS CHECKLIST

Page: 1 of 1
Reviewer: W7
2nd Reviewer:

Method:Inorganics (EPA Method See WHEN

Method:Inorganics (EPA Method 724 Couper	7	ı —	T	
Validation Area	Yes	No	NA	Findings/Comments
LiTectrifical holding times.		743		akari dilikika samuung
All technical holding times were met.	/			
Coolor temperature criteria was met.	1			
(Contration	74			
Were all instruments calibrated daily, each set-up time?	1		_	
Were the proper number of standards used?	1		<u> </u>	
Were all initial calibration correlation coefficients ≥ 0.995?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	/			
Were titrant checks performed as required? (Level IV only)			/	
Were balance checks performed as required? (Level IV only)				
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.		/		
WANADAS DE MANUSCHE WORLD SANT RODICHE SE PASSE POR PROPERTY OF				STREET, TRACTOR OF THE STREET,
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of $\leq$ CRDL( $\leq$ 2X CRDL for soil) was used for samples that were $\leq$ 5X the CRDL, including when only one of the duplicate sample values were $\leq$ 5X the CRDL.	/			
v Bakorano y Edinaria kampilan kan kan kan kan kan kan kan kan kan k				
Was an LCS anayized for this SDG?	/			
Was an LCS analyzed per extraction batch?	-/-	_		
Were the LCS percent recoverles (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?		- 70 -		
71. Regional Quality Assurance and Quality Control (17) (17) (18) (18) (18)				
Nere performance evaluation (PE) samples performed?				
Nere the performance evaluation (PF) samples within the acceptance limits?			1	

LDC #:_	19097136
SDG #:_	see wer

## VALIDATION FINDINGS CHECKLIST

Page: Yof Y Reviewer: WM 2nd Reviewer: 4

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification		ie de ir		
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	1			
Were detection limits < RL?	V			
				<b>THE STATE OF THE PARTY OF THE </b>
Overall assessment of data was found to be acceptable.	1			
				e de de la lación d
Field duplicate pairs were identified in this SDG.		_		
Target analytes were detected in the field duplicates.			J	
<b>网络哈纳特里</b> 化多型模型 化基本对象或指导摄影的				
Field blanks were identified in this SDG.	/			
Target analytes were detected in the field blanks.	/			

LDC #: 1 9097Bb SDG #: See cover

## VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page: ____of__/
Reviewer: _______
2nd reviewer: _______

All circled methods are applicable to each sample.

0 1 10	B4 -4-1-	Down-ston.
Sample ID	Matrix	Parameter Color Co
1-4	Goi)	Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+O/TPH
00.00 6	Soi)	Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
MSib	~1)	(Br) Bromine (C) Chlorine (F) (NO) (NO) (NO) (NO) (PO) Chlorate CIO, (0+9/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
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		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
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		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
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		Br Bromine Cl Chlorine F NO ₃ NO ₂ SO ₄ O-PO ₄ Chlorate ClO ₄ O+G/TPH
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		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:	0+4	195/	Jup	tron	now	Lite	•		
		,	,	1				 	 
		P.							

LDC #: (9097 Bb SDG #: See cone

# VALIDATION FINDINGS WORKSHEET

Blanks

of	)	1
Page:	Reviewer:	Reviewer:
		2nd
1		

METHOD: Inorganics, Method

Jak Core

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.

ケーてこてのつつ Sample Identification 1 73 Associated Samples: Blank Action Limit 6.7 Maximum ICB/CÇB Mall 040 Conc. units: Img / Kg Blank ID 9-204-0 d-pad-0 Analyte 252 3

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

LDC #: 19091 Bb SDG #: 5ex com

# VALIDATION FINDINGS WORKSHEET Field Blanks

Page: of A

METHOD: Inorganics, EPA Method

M N/A

Were field blanks identified in this SDG?

O N N/A

Were target analytes detected in the field blanks?

Blank units: were field blanks?

Associated sample units: Instruction applied

Sampling date: b / ll / o

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

	!	· ·		
Analyte	Elank ID	- 1	Sample Identification	
	17-1/5/17	l Action		
	KINTHE	ence II		
1,05	, < 1.0			
,	1			****
Blank units.		Associate	Associated sample upils:	_
Sampling d.	Sampling date:		Soll factor applied	
Field blank	type: (circle o	one) Field	Dineste / Other	
	31	nioi i forio	Associated Samples:	

Action Limit Action Action Action Limit Action Acti	Analyte	Blank ID	Blank	Samile Idantification
CHCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:			Action	
CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:			Cmit	
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CRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT: Samples with enalyte concentrations within five times the escondated find the disconditions of the escondated find the disconditions within five times the escondated find the disconditions within the end of the escondated find the e				
CHOLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:  Samples with analyte concentrations within five times the associated field to the concentrations within five times the associated field to the concentrations within five times the associated field to the concentrations within five times the associated field to the concentrations within five times the associated field to the concentrations within five times the associated field to the concentrations within five times the associated field to the concentrations within five times the associated field to the concentrations within five times the associated field to the concentration field to				
Samples with analyte concentrations within five times the associated first but in the POLLOWING STATEMENT:	CHCLED HES	CLIS WERE NO	it aualified.	ALL RESULTS NOT CIRCLED WEBE OF MATIBIES BY MIT TO A SHORT TO A SH
	Samples with	analyte concentra	etions within fi	is times the second of the control of the roll of the

100 #: (909 718)

## Initial and Continuing Calibration Calculation Verification Validatin Findings Worksheet

2nd Reviewer: Page: \ of \ Reviewer: MM

Method: Inorganics, Method <u>くきい</u> てかもこ

The correlation coefficient (r) for the calibration of  $\frac{\sqrt{0}2-\hbar}{2}$  was recalculated.Calibration date:  $\frac{6/15/0}{2}$ 

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

%R = Found X 100

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

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (ug/L)	Area	r or r²	r or r²	(Y/N)
Initial calibration		s1	20	0.01			
	NO3-N	s2	100	0.046	0.99997	0.99990	>
		s3	200	0.087			-
		84	500	0.227			
		s5	1000	0.454			
رمی Calibration verification	a s	الم صده	3865.7		65.96	MR	7
رسم Calibration verification	H	Q.e	5次6		94.55	9425	
$c\omega$ Calibration verification	J	2 000	9486)		68.85	28.96	

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._

(god) Bb LDC #: SDG #:

## VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

2nd Reviewer: Page: Reviewer:

> See cour METHOD: Inorganics, Method

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

%R = Found x 100 Where,

Found =

True =

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

concentration of each analyte in the source.

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

BPD # 12.01 × 100 Wh

uplicate sample concentration Original sample concentration

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	%R / RPD	%R / RPD	Acceptable (Y/N)
	Laboratory control sample						
LC5		d-pod-0	41.4	80	66	99	<del>)</del>
	Matrix spike sample		(SSR-SR)				
t		<u></u>	9-9%	ナンス	96	n	
7	Duplicate sample			1.1.1			>
Ž		20t	(ナ)	<i>&gt;</i>	7.	\$	5

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 #: 19097 Bb SDG #: Sel G	VALIDATION FINDINGS Sample Calculation V  Method See core		Page Reviewe 2nd reviewe	e:
Please see qualification  Y N N/A Have reserved  N N/A Are reserved  ON N/A Are all  Compound (analyte) recalculated and verification	ns below for all questions answered "N". Not esults been reported and calculated correct sults within the calibrated range of the instrudetection limits below the CRQL?	ly? ments?	re Identified as "	
Concentration =		0.374 × 10 × 6 0.000157 × 4  Reported	3 X°.838	284 mg
# Sample ID	Analyte	Concentration (Mg/x)	Concentration ( WS/W)	Acceptable (Y/N)
1 2	Analyto  Chlorati  Cl  Cl  T	(,3	1~2	4
	l	14.6	14.6	<u> </u>
	42	29.2	4,2	
	7	1-0	10	
	N03 -N	1,3	1,3	
	504	785	284	

## 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

SDG:	#:19097B7 #:F8F120167 atory:_Test America	<b>VA</b> -	LIDATIO			TENE    / \/		VORKSHE	ET	Date: 7/2, Page: / of_ Reviewer: /
	HOD: GC Gasoline Rang amples listed below were		•				,	n areas. Valid	lation fin	2nd Reviewer: 7 dings are noted in attache
valida	tion findings worksheets.				I	<del> </del>				
<u> </u>	<u>Validation</u>	Area		4	0			<u> </u>	mments	
<u></u>	Technical holding times				Sam	pling d	ates:	6/11/		
lla.	Initial calibration			<u> </u>	<u> </u>		<u> </u>			
Ilb.	Calibration verification/ICV				1	101	<u> </u>			
. 	Blanks			A						
IVa.	Surrogate recovery	-1:4-	- 10.0	A/A	l	۸,2	MSD			
IVb.	Matrix spike/Matrix spike du	plicate	s / pur	A	<b></b>		IP			
IVc.	Laboratory control samples	ion		<del></del>	Not					
V.	Target compound identificat			4				vel III validation.		<u> </u>
VI.	Compound Quantitation and	CRQ	_8	A				vel III validation.		
VII.	System Performance			A	NOL	reviewe	ed for Le	vel III validation.		
VIII. IX.	Overall assessment of data			N						
'^.   X.	Field duplicates Field blanks			NO		0 -	Pin	sate 1		
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet		R = Rir	o compounds sate eld blank		ected	[ ] E	D = Duplicate B = Trip blank EB = Equipment	blank	
<del></del>	TSB-GJ-08-10	T	F8 F13			1	8	165269	31	6/14
2/	TSB-GJ-08-10RE	12		7000-1		22		169178	32	6/07
3 1	TSB-GJ-08-20**	13	-			23	-		33	
4 /	TSB-GJ-08-30**	14				24			34	
<del>-</del> 2	TSB-GJ-08-40	15	:			25		······································	35	***************************************
6 /	TSB-GJ-08-10MS	16				26			36	
7 -	TSB-GJ-08-10MSD	17				27			37	
8 /	TSB-GJ-08-10DUP	18				28			38	

40

Notes:_

20

LDC #:_	19	097B7
SDG #:_	peu	coner

## **VALIDATION FINDINGS CHECKLIST**

Page: /of //
Reviewer: //
2nd Reviewer: //

Method: GC HPLC

Method:	GC	_HPLC								
	Validation Area			Yes	No	NA		Finding	gs/Commer	its
I Technical fielding times		- <b>3</b>								
All technical holding times were	met.			1		<del> </del>				
Cooler temperature criteria was	met.			1_	1			`.		
11 Antial Calibrations										
Did the laboratory perform a 5 p	oint calibration prio	r to sample ar	nalysis?							
Was a linear fit used for evaluat deviations (%RSD) < 20%?	tion? If yes, were all	percent relati	ive standard							
Was a curve fit used for evaluat used?	ion? If Yes, what w	as the accepta	ance criteria		_	-				
Did the initial calibration meet th	e curve fit acceptar	ce criteria?					_			
Were the RT windows properly	established?			_	<u> </u>					
IV-s Continuing Calibration (2)							i jir s			
What type of continuing calibrati %R	on calculation was	performed? _	%D or	/						
Was a continuing calibration and	lyzed daily?				-					
Were all percent differences (%E	D) ≤ 15%.0 or perce	nt recoveries	85-115%?							
Were all the retention times with	in the acceptance w	indows?								
V/Blanks				in e	P.	#.		ENG ye		
Was a method blank associated	with every sample i	n this SDG?								
Was a method blank analyzed fo	r each matrix and c	oncentration?		_	_					
Was there contamination in the ni validation completeness workshe	nethod blanks? If ye	es, please see	the Blanks			-				
M. Shuagate spikesi										
Were all surrogate %R within the	QC limits?									
if the percent recovery (%R) of or a reanalysis performed to confirm	ne or more surrogat	es was outsid	e QC limits, was							
If any %R was less than 10 perce	nt, was a reanalysis	s performed to	confirm %R?			1	-			
VII. Matux spike/Matux spike dup	icates or present								en spekt	
Were a matrix spike (MS) and ma matrix in this SDG? If no, indicate MS/MSD. Soil / Water.	trix spike duplicate which matrix does	(MSD) analyz not have an a	ed for each ssociated		-					
Was a MS/MSD analyzed every 2	0 samples of each	matrix?					<del></del>			
Were the MS/MSD percent recove (RPD) within the QC limits?			nt differences							
VIIIs Laboratory control samples a							Ţ			
Was an LCS analyzed for this SD	G?			1						
Was an LCS analyzed per extracti	on batch?			1						
Were the LCS percent recoveries within the QC limits?	(%R) and relative p	ercent differer	nce (RPD)	1						

LDC#: 19097B7 SDG#: Ju coned

## **VALIDATION FINDINGS CHECKLIST**

Page: 2 of 2
Reviewer: 7
2nd Reviewer: 1

Validation Area	Yes	No	NA	Findings/Comments
IX Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			1	
Were the performance evaluation (PE) samples within the acceptance limits?			0	
X Target compound identification 2 v.s. at 43 12 14 14 19 19 19 19 19 19 19 19 19 19 19 19 19				
Were the retention times of reported detects within the RT windows?				
A Compound quantitation/GRGIS V.5. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4. 4.				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
(1,5), Control (1,5),				
System performance was found to be acceptable.		-		
(ILES) ea llasses sigen pai data la propieta de la				
Overall assessment of data was found to be acceptable.			T	
V Fold (upicates) as a second of the second				
ield duplicate pairs were identified in this SDG.		_	-	
arget compounds were detected in the field duplicates.			1	-
V. Gleidoljaks				
eld blanks were identified in this SDG.				
arget compounds were detected in the field blanks.		<u> </u>	$\dashv$	

1808187 SDG#: LDC #:

## Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: 2nd Reviewer, Reviewer:

> HPLC METHOD: GC

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

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 Date Compound  ICA L S/27/08 CAL		CF Average CF	(/ Std) (initial) (initial) %RSD %RSD	17025649 17/82732 17/82732 3-715 3							
Standard ID (CA L			GR1 )								
			10/24/2						 		
# -   0   6   4		# Standard	7 601		1		<del>- T-</del>		 T		

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

182606 LDC #: SDG.#:

## Continuing Calibration Results Verification VALIDATION FINDINGS WORKSHEET

2nd Reviewer:__ Reviewer. Page:

> HPLC METHOD: GC_

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

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

Where:

ave. CF ≈ initial calibration average CF CF ≈ continuing calibration CF

A = Area of compound C = Concentration of compound

		-
		1
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		3
		0
	F	-
	_	
II		

					Reported	Recalculated	Reported	Recoloulated
anda	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	CF/Conc.	CF/Conc.	۵%	q%
76	3% B	80/8/19 8 1/3/08	GRU.	7.0	7866.0	0.2382	4.0	0.2
-								
		,						
		-						

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

_DC#: 1909787 SDG #: Let Con

## VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page: ot / 2nd reviewer: Reviewer:_

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

% Recovery; SF/SS * 100

Where: SF = Surrogate Found SS = Surrogate Spiked

6) # Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
747	Prificat ton	6.04	205500	8.3	83	0
	,					

Sample ID:		-					
Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference	
				Reported	Recalculated		

Sample IU:							
Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference	
				Reported	Recalculated		
							•
				·			

101240/1 #307 SDG #:

# VALIDATION FINDINGS WORKSHEET

Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: 2nd Reviewer:

> 900 METHOD:

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

RPD =(((SSCMS - SSCMSD) * 2) / (SSCMS + SSCMSD))*100

"Recovery = 100 * (SSC - SC)/SA

SSC = Spiked sample concentration SA = Spike added MS = Matrix spike

SC = Sample concentration

MSD = Matrix spike duplicate

MS/MSD samples:___

	Spike	ğ.	Sample	Shike Sample	olome						
•	Added	fed,	Conc.	Concentration	tration	Matrix	Matrix spike	Matrix Spike Duplicate	Duplicate	MS/MSD	SD
Compound	Ž	Z ZZ	1 mx 115x	( M)	1/9/	Percent	Percent Recovery	Percent Recovery	ecovery	RPD	
	MS	MSD	) . I	MS	MSD	Reported	Recalc.	Reported	Recelo		1
Gasoline (8015)	1.07	44	0	60.1	47	/0	16			palicia	Nacaic.
Diesel (8015)				)		9	9	22			
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 workshed for list of annual statements.	ke/Matrix 5	Spike Dupl	cates findings	Workshoot fo	210.000						

LDC # 19097.87 SDG #: LU COMEN

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

اُهر Page:

Reviewer: 2nd Reviewer:

GC HPLC METHOD:

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 - ssclcsD) * 2) / (ssclcs + ssclcsD))*100

LCS = Laboratory Control Sample percent recovery

LCSD = Laboratory Control Sample duplicate percent recovery

C11 car - 6025 9/8 LCS/LCSD samples:__

	Spir		Sample	Spike	Sample	77	rcs	rcsd	Q	TCS/TCSD	CSD
Compound	my/km	1683 	Conc.	Concer (A)	Concentration	Percent Recovery	Recovery	Percent Recovery	ecovery	RPD	Q
	SOT	CSD	) }	TCS	CCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)	7.0	1.0		0.1	776-0	001	001	76	74	19	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.

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님	SDG

## VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

2nd Reviewer: Reviewer: Page:

7	,
ar a	
2	`
3	
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4F	

GC HPLC METHOD: 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?

(RF)(Vs or Ws)(%S/100) (A)(Fv)(Df) Concentration≖

Example:

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.

Concentration =

Compound Name

Qualifications				
Recalculated Results Concentrations				
Reported Concentrations				
Compound				
Sample ID				
*				

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)	Р

## 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)	Р	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

SDG # _abor	t: 19097B8 t: F8F120167 atory: <u>Test America</u> IOD: GC Diesel Range C	- -	LIDATIOI	L	evel II	I/IV		VORI	NOHE	E I		2r	Re nd Re	Date Page viewe	e:/ e:/of er:/ er:/	
	amples listed below were tion findings worksheets.		ewed for eac	ch of the f	followin	g vali	datio	n area	s. Valid	lation	find	lings a	are no	oted in	attac	hed
	Validation	Area							<u>Co</u>	mme	nts					_
l.	Technical holding times			Δ	Sampli	ing dat	es:		6/11/	08						
IIa.	Initial calibration			Α	<u> </u>											
IIb.	Calibration verification/ICV			4	10	1 =	15									
III.	Blanks			A												
iVa.	Surrogate recovery			ىسى												
IVb.	Matrix spike/Matrix spike du	olicate	S	Δ												
IVc.	Laboratory control samples			A	L	c>										
V.	Target compound identificat	ion		Δ	Not re	viewed	for Le	vel III v	alidation							
VI.	Compound Quantitation and	CRQI	_S	A	Not re	viewed	for Le	vel III v	alidation							
VII.	System Performance			A	Not re	viewed	for Le	vel III v	alidation							
VIII.	Overall assessment of data			A												
IX.	Field duplicates			N												
X.	Field blanks			ND	Ã	?	Pa	nsa	te /	1	3	09	#	F81	F/2	0/3
Note: √alidate	A = Acceptable N = Not provided/applicable SW = See worksheet ed Samples: ** Indic		Rinsate	o compound eld blank ent Level IV		TB :	= Trip b	EB = Ec	plicate quipment	blank						
1	TSB-GJ-08-10	11	•		2	21				;	31					
2	TSB-GJ-08-20**	12			2	22				;	32					
_	TSB-GJ-08-30**	13			2	23				];	33					
<b>⊢</b> ∣	TSB-GJ-08-40	14			2	24				;	34					
	TSB-GJ-08-10MS	15			2	25				;	35					
	TSB-GJ-08-10MSD	16			2	26					36					
7	P8 F130000-29/	17	81652	91		27				;	37					
8	F8F180000-312	18	81703			28					38					

29

19097B8W.wpd

Notes:_

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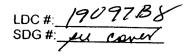
LDC #:_	19	709	788
SDG #:_	you	co	ner

## **VALIDATION FINDINGS CHECKLIST**

Page:_	_/of_	2
Reviewer:_		7
2nd Reviewer:	70.	
-		$\overline{}$

Method: GC HPLC

Method:GC	HPLC								
Valida	ition Area		Yes	No	NA		Findings/C	omments	
L Technical holding times									
All technical holding times were met.			/	1					
Cooler temperature criteria was met.			/	1					
Il Initial calibrations					2.5				
Did the laboratory perform a 5 point calit	oration prior to sample	e analysis?	/						
Was a linear fit used for evaluation? If ye deviations (%RSD) < 20%?	es, were all percent re	elative standard							
Was a curve fit used for evaluation? If You used?	es, what was the acc	eptance criteria		/					
Did the initial calibration meet the curve t	fit acceptance criteria	?							
Were the RT windows properly establish	ed?					<u>-</u>			
IV-Continuing calibration				108	100				
What type of continuing calibration calcu %R	lation was performed	?%D or	/						
Was a continuing calibration analyzed da	illy?								
Were all percent differences (%D) < 15%	.0 or percent recover	ies 85-115%?							
Were all the retention times within the ac	ceptance windows?								
V.Blanks				10				164-35-7	
Was a method blank associated with eve	ry sample in this SD0	G?							
Was a method blank analyzed for each m	natrix and concentrati	on?							
Was there contamination in the method b validation completeness worksheet.	lanks? If yes, please	see the Blanks							
VI Sumogate spikes					84				
Were all surrogate %R within the QC limit	s?								
If the percent recovery (%R) of one or mo a reanalysis performed to confirm %R?	re surrogates was ou	tside QC limits, was			+	-			
If any %R was less than 10 percent, was a	a reanalysis performe	ed to confirm %R?			-				
VII. Malinx spike Matrix spike duplicates	in the second of the second							Spirit.	
Were a matrix spike (MS) and matrix spike matrix in this SDG? If no, indicate which m MS/MSD. Soil / Water.	e duplicate (MSD) an natrix does not have a	alyzed for each an associated							
Was a MS/MSD analyzed every 20 sample	es of each matrix?		7	=	$\neg$				
Were the MS/MSD percent recoveries (%F		rcent differences		_	$\exists$				
(RPD) within the QC limits?									
VIII Laboratory control samples	Tringfless (A)				T				
Was an LCS analyzed for this SDG?									
Was an LCS analyzed per extraction batch	1?				_				
Were the LCS percent recoveries (%R) an within the QC limits?	d relative percent diff	erence (RPD)	1						



## VALIDATION FINDINGS CHECKLIST

Page: 20f 2
Reviewer: 7
2nd Reviewer: 1

	т—	<del></del>	<del></del>	The state of the s
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 compoundation that are all the second and the second are all				
Were the retention times of reported detects within the RT windows?				
XL Compound quantitation/cir(QL)				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
Market promine a section of the sect				
System performance was found to be acceptable.	-	-		
XIII ese allassessipental data (1997)				
Overall assessment of data was found to be acceptable.				
XIV Geod inducates				
Field duplicate pairs were identified in this SDG.		_	- [	
Target compounds were detected in the field duplicates.			7	
KV/hieldiplanks -				
Field blanks were identified in this SDG.	7			
Target compounds were detected in the field blanks.		1		

8826061 SDG #: AS LDC #:

# VALIDATION FINDINDS WORKSHEET

Surrogate Recovery

Reviewer:

Page:

Are surrogates required by the method? Yes____ or No____.

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

Were surrogates spiked into all samples and blanks?

Did all surrogate recoveries (%R) meet the QC limits?

*	Sample ID	Detector/ Column	stor/ mn	Surrogate Compound		%R (Limits)	(S		Qual	Qualifications
	7	Not	+ Spectit	H P		) //	75-	J. CES/	d/[n/-[	
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								(		
	Surrogate Compound		Surroga	Surrogate Compound		Surrogate Compound		Surrogate Compound	punoduc	
4	Chlorobenzene (CBZ)	ပ	8	Octacosane	Σ	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene	robenzene Y	Tetrachloro-m- xylene
В	4-Bromofluorobenzene (BFB)	I	Ort	Ortho-Terphenyl	z	Terphenyl-D14	⊢	3,4-Dinitrotoluene	oluene	
U	a,a,a-Trifluorotoluene	-	Fluoro	Fluorobenzene (FBZ)	0	Decachlorobiphenyl (DCB)	D	Tripentyltin	dtin	
d	Bromochlorobenene	1	[:]	n-Triacontane	٩	1-methylnaohthalene	>	Trl-n-propyltin	viltin	
w	1,4-Dichlorobutane	¥	Ť	Hexacosane	σ	Dichlorophenyl Acetic Acid (DCAA)	A)	Tributyl Phosphate	sphate	
u	1.4-Difluorobenzene (DFB)	-	Bro	Bromobenzene	В	4-Nitrophenol	×	Triphenyl Phosphate	osphate	

SDG #: LDC #:

## Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

100	C	4
Page:	Reviewer.	nd Reviewer

FC METHOD: GC_

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

CF = A/C average CF = sum of the CF/number of standards %RSD = 100  $^{\bullet}$  (S/X)

A ≈ Area of compound,
C ≈ Concentration of compound,
S ≈ Standard deviation of the CF
X ≈ Mean of the CFs

			<u> </u>	_		T	7	 Γ	T	7		T	T	T	丁	 j
	L chelicolecco O		AKSD	3.756												
	Reported	2007	מאה כ	2:25												
	Recalculated	Average CF	200//	5200/							-					•
٠	Reported	Average CF	1603													
	Recalculated	CF (/coc@td)	J	L			·									
	Reported	CF (/œ&td)	16236						٠							
		Compound	PR													
		Calibration Date	89/9//5													•
		Standard ID	1447		-											
		*	-				7			6				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

303188 LDC#: SDG#:

## Continuing Calibration Results Verification VALIDATION FINDINGS WORKSHEET

2nd Reviewer: Page: Reviewer.

METHOD: GC_

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

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

ave. CF ≈ initial calibration average CF
CF ≈ continuing calibration CF
A ≈ Area of compound
C ≈ Concentration of compound

# Standard iD   Calibration   Compound   Average CF(leal)   CF(Conc.   CF(Conc.   Average CF(leal)   CF(Conc.   CF(Conc.   Average CF(leal)   CF(Conc.   CF(Conc.   Average CF(leal)   CF(Conc.   CF(Conc.   Average CF(leal)   CCV Conc.   Average CF(leal)   CF(Conc.   CF(Conc.   Average CF(leal)   CCV Conc.   Average CF(leal)   Average CF(leal)   CCV Conc.   Average CF(leal)   Average CF(leal									
Standard ID         Calibration Date         Compound Compound         Average CF(Ical) CF(Conc.         CF(Conc. Occv Occv Occv Occv Occv Occv Occv Oc						Renorted	Racalculated	Reported	Recalculated
EALSIST       6/1768       PRO       10000       976.53       976.53       0.3         EALSIST       6/1763       4       1       1034.324       3.5	**	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	CF/Conc.	CF/Conc.	Q%	۵%
EA1537       6/17/by       V       I       IO34/324/IO34/3624/33.5624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.2624/33.26	-	ECALS W	89/11/9	PRO	0 000/	976.53	996.53	6,3	6.3
		1	6/11/02	1		1001100	1021/1201	ŗ	(
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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

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## VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page: or	Reviewer:	2nd reviewer:
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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: #2		55 - Sullogate Opined				
Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
O-Terphens	Cuit year ton	74.	10.2	14	1/5	0
D	/ /					

sample ID:						
Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample IU:						
Aintrain	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

1909 1908 LDC #: 1909 7.188 SDG#:

## Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

Page: Lof Z Reviewer:

the following calculation: %Recovery = 100 * (SSC - SC)/SA

Where

SSC = Spiked sample concentration SA = Spike added MS = Matrix spike

SC = Sample concentration

MSD = Matrix spike duplicate

MS/MSD samples:_

RPD =(({SSCMS - SSCMSD}) * 2) / (SSCMS + SSCMSD))*100 ンナら Spike

	Spike Added	e 10	Sample	Spike	Spike Sample	Matrix	Matrix spike	Matrix Spike Duplicate	• Duplicate	MS/MSD	SD
Compound	1 km	K	( mx//h	15 kg		Percent Recovery	Secovery	Derce	, 10000	Ċ	
こうこう かんしゅう かんしゅ かんしゅん かんしゃ かんしゅん しゅん しゃ かんしゃ かんしゃ かんしゃ かんしゃ かんしゃ かんしゃ かんしゃ			0	•	- C		7	reicelli Aecovery	(#COVery	RPD	
1、1、1、1、1、1、1、1、1、1、1、1、1、1、1、1、1、1、1、	MS	MSD	-	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc
Gasoline (8015)											
Diesel (8015)	87.2	8.8	OA	5.82	76./	2	3	8 %	63	7	700
Benzene (8021B)							20		•	ò	5
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 an all findings and accordance of the comments of the c	ike/Matrix S	pike Dupli	cates finding	s worksheet	for list of a ralif	ic ations and a		1			
of the recalculated results.						במיוסווס מווח מי	Socialed Sall	Dies when re	Sorred results	do not agree	within 10.0%

86126061 LDC #:

## VALIDATION FINDINGS WORKSHEET

Reviewer: 2nd Reviewer. ا اقر Page:

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

GC HPLC METHOD:

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

%Recovery = 100 * (SSC - SC)/SA

SSC = Spiked concentration SA = Spike added Where

SC = Sample concentration

RPD =(((ssclcs - ssclcsD) * 2) / (ssclcs + ssclcsD))*100

1605

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LCS/LCSD samples:

LCS = Laboratory Control Sample percent recovery

LCSD = Laboratory Control Sample duplicate percent recovery

Recalc. CS/CSD RPD Reported Recalc. Percent Recovery LCSD Reported 4 ર Recaic. 3 Percent Recovery 00 LCS Reported 3 ፇ 45 CSD Spike Sample Concentration 68.3 CS Sample Conç. X 0 Spike Added/ ma/kx LCSD 4 ij rcs . %3 2,4,6-Trinitrotoluene (8330) (RSK-175) (8021B) (8310) (8310) (8330) (8015) (8015) (8151) (8151) Compound Naphthalene Anthracene Gasoline Benzene Methane Dinoseb Diesel 2,4-D XXI

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.

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## VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page: Lof Reviewer:

HPLC	
ွ	
METHOD:	

/ 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?	
N N N N N N N N N N N N N N N N N N N	

Concentration≈ (A)(F∨)(Df) (RF)(Vs or Ws)(%S/100)	Example:	
A= Area or height of the compound to be measured Fv= Final Volume of extract	Sample ID.	Compound Name
Df≃ Dilution Factor RF≃ Average response factor of the compound	Concentration =	
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.
- 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) 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)	А

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)	А

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)	А	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)	А	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 # SDG # Labora		<b>VA</b> - -	LIDATION	-		TENE III/IV	ESS WORKS	HEET		2nd	Page	te: 7/2// e: /of_ er: //
The sa	HOD: GC Polynuclear Arc amples listed below were tion findings worksheets.	e revie	·					Validation	findir			
	Validation	Area						Comme	nts			
l.	Technical holding times			A	Sam	npling da	ates: 6//	11/08				
lla.	Initial calibration			A								
IIb.	Calibration verification/ICV			SW	1	cv =	-15					
111.	Blanks			Δ								
IVa.	Surrogate recovery			Α								
IVb.	Matrix spike/Matrix spike du	plicate	es	A								
IVc.	Laboratory control samples			A	L	LCS						
V.	Target compound identificat			A	Not	review	ed for Level III valida	lation.				
VI.	Compound Quantitation and		Ls	A			ed for Level III valid					
VII.	System Performance			4			ed for Level III valid					
VIII.	Overall assessment of data			A		<u> </u>						
IX.	Field duplicates	***************************************		N								
X.	Field blanks			ND	1	R =	Rinsati	/ :	3 DG	#	18F1	120/3
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet  ted Samples: ** Indicates samples: **		R = Rins FB = Fie	lo compounds esate eld blank		ected	D = Duplica TB = Trip bl EB = Equipi	ate Ilank				
<del>-</del> 1	TSB-GJ-08-10	11	F8 ]=16a	21-000	=== K	21	8168158	1	31			
	TSB-GJ-08-20**	12	, -, -			22		1	32	•		
	TSB-GJ-08-30**	13				23 33						
	TSB-GJ-08-40	14				24			34			
	TSB-GJ-08-10MS	15				25			35			
	TSB-GJ-08-10MSD	16				26		,	36			
7		17				27			37			
8		18				28			38			
		10				20			30			

Notes:_

20

LDC #: 19097,89 SDG #: pu coner

### **VALIDATION FINDINGS CHECKLIST**

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

Method:	GC	HPLC

a reanalysis performed to confirm %R?  If any %R was less than 10 percent, was a reanalysis performed to confirm %R?  Were a matrix spike (MS) and matrix spike duplicates (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?  Was an LCS analyzed for this SDG?  Nas an LCS analyzed per extraction batch?  Were the LCS percent recoveries (%R) and relative percent difference (RPD)	metilodGCAFLC				
All technical holding times were met.  Cooler temperature criteria was met.  It is a support to a point calibration prior to sample analysis?  Was a finant fit used for evaluation? If yes, were all percent relative standard deviations (KRSD) < 20%; Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?  Old the initial calibration meet the curve fit acceptance criteria?  Where the RT windows properly established?  What type of continuing calibration calculation was performed?  What type of continuing calibration calculation was performed?  Was a continuing calibration analyzed daily?  Were all percent differences (%0) < 15% 0 or percent recoveries 85-115%?  Was a method blank associated with every sample in this SDG?  Was a method blank associated with every sample in this SDG?  Was a method blank associated with every sample in this SDG?  Was a method blank associated with every sample in this SDG?  Was a method blank associated with every sample in this SDG?  Was a method blank was containiation in the method blanks? If yes, please see the Blanks validation completeness worksheet.  Were all surveys the seed of	Validation Area	Yes	No	NA	Findings/Comments
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	Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				

LDC #: 19097139 SDG #: pu cond

### VALIDATION FINDINGS CHECKLIST

Page: 20f 2
Reviewer: P
2nd Reviewer: 4

Validation Area	Yes	No	NA	Findings/Comments
X. Regional Quality Assurance and Quality Control	<b>H</b> ya.			
Were performance evaluation (PE) samples performed?	T		1-	
Were the performance evaluation (PE) samples within the acceptance limits?			1	
Education (2010) (2010) (education 2010)				
Were the retention times of reported detects within the RT windows?	T			
M. Compound quantitation (c) (c)				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
Moral response fields to the second s				
System performance was found to be acceptable.		_		
alis de l'orsesement nomes (se la company de la company				
Overall assessment of data was found to be acceptable.				
ield duplicate pairs were identified in this SDG.	a de la companya de l			
arget compounds were detected in the field duplicates.				
v spelijo saci.				
ield blanks were identified in this SDG.		wys scale (		WELLOW THE STREET STREET
arget compounds were detected in the field blanks.			$\top$	

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LDC # 1902789 SDG #: Ay com

### VALIDATION FINDINGS WORKSHEET Continuing Calibration

2nd Reviewer.

Reviewer:

-GC HPLC METHOD: Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

What type of continuing calibration calculation was performed? ___%D or ___ RPD
Y N/A Were continuing calibration standards analyzed at the required frequencies?
Y N/A N/A Did the continuing calibration standards meet the %D / RPD validation criteria of <15.0%?

ever IV Only

Were the retention times for all calibrated compounds within their respective acceptance windows?

Qualifications	1+/Act			J-142													
Associated Samples	A11 + B1/K			4													
RT (limit)	( )	(	(		(	Moran then e	: ) some (		)	~		(		(			)
%D / RPD (Limit ≤ 15.0)	16.6			18.5		_	2.60	1									
Compound	Ħ			D		H= Be	6.1	1									
Detector/ Column	not 3 pulin	, ,		<b>&gt;</b>													
	8961218			GCAL873													
<del>  </del>  -	6/4/08		-	20/9//9													1
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1909789 SDG#: LDC #:

### Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: 2nd Reviewer._ Reviewer.

> HPLC METHOD: GC_

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

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

Reported Recalculated Reported Description	Cody	-	18.1 011.908	-					
Reported Recalculated R	mpound (0-5 std) (0-5 std)	10/2 20126	VEL134 815134						
		20/1/0	- Inthrace			m		4	

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

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en cons LDC#: 1909789 SDG#:

### Continuing Calibration Results Verification VALIDATION FINDINGS WORKSHEET

Page: 2nd Reviewer: Reviewer.

> HPLC METHOD: GC_

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

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

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

-								
·					Renorted	Recalculated	Reported	Receiptisted
*	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	CF/Conc. CCV	CF/Conc.	%D	۵%
9	BCA L873 6/16/08	6/16/08	naphthalens	5.0	S:3978	R268:5	0.%	8.0
+-			anthrace	aB	0.5307	6.5307	/ 9	6.1
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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

1 CM E	3
140	3
*	#
Ö	SDG

### VALIDATION FINDINGS WORKSHEE! Surrogate Results Verification

rage: or viewer: Reviewer:

METHOD: ___GC__ HPLC

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

3 % Recovery: SF/SS * 100

Where: SF ≈ Surrogate Found SS ≈ Surrogate Spiked

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
p - Terphony	but specifor	7	21.3996	8	25	Ю
	1 1					

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•	2
ł	Ξ
•	v

Difference
Recovery
Recovery
Found
Spiked
ColumnDetector
Surrogate

Sample ID:							
Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference	
				Reported	Recalculated		
							•

SDG #: 42

## Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

Reviewer: 2nd Reviewer:

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

SC = Sample concentration

MS/MSD samples:

RPD =(((\$SCMS - SSCMSD) * 2) / (\$SCMS + SSCMSD))*100

MSD = Matrix spike duplicate

Concentration   Concentration   Percent Recovery   Percent Recovery   Percent Recovery   Percent Recovery   Percent Recovery   Recipic   Recipic	ine (8015) אור (8015) וויפ (8015) וויפ (8021B) וויפ (8151)	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Concer MS	ifration	Percent		MIGC XIDE	e Duplicate	MS/k	ASD
Gasoline         (8015)         MS         MSD         MSD         Reported	ine (8015)  (8015)  (8015)  Ine (8021B)  Ine (RSK-175)  Ob (8151)		SW SW	Z	Derren	(	=			The second secon
Gasoline         (8015)         MS         MSD         MSD         Reported         Recalic         Reported         Recalic         Recalic         Recalic         Reported         Recalic         Reported         Recalic         Recalic         Recalic         Recalic         Recalic         Recalic         Recalic         Recalic         Recalic         Reported         Recalic         Recalic         Reported         Recalic         Recalic         Reported         Recalic         Recalic         Reported         Recalic         <	ine (8015) I (8015) Ine (8021B) Ine (RSK-175)		MS	0	1110010	Recovery	Percent	Zecovery	É	
Gasoline         (8015)         Acadic         Reported         Reported <th< th=""><th>ine Ine</th><th></th><th></th><th>MSD</th><th>Reported</th><th>2</th><th></th><th></th><th>Ž.</th><th>2</th></th<>	ine Ine			MSD	Reported	2			Ž.	2
Diesel         (8015)         Control	ne ne eb					Vacalc.	керопед	Recalc.	Reported	Recalc.
Benzene         (80218)         Methane         (RSK-175)         Control (RSK-175)	ine The									
Methane         (RSK-175)         Control	an ab									
24-D       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)       (8151)	qe									
Dinoseb         (8151)         CTX         TX		-								
thalene (8310) 67K 709 ND 5DS 5/5- 72 72 73 73 7.0  acene (8310) 67.8 70.9 S2.9 49.6 76 70 70 6.5  (8330) Trinltrotoluene (8330)  Trinltrotoluene (8330)										
Anthracene (8310) 67.8 70.9	(8310)	3	7,63		7		1			
HMX (8330) 67.5 6.5 6.5 6.5 2.4,6-Trinitrotoluene (8330) 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5	(8310)		3 3	2	11	77	73	23	1, C	2.0
2,4,6-Trinitrotoluene (8330)  2,4,6-Trinitrotoluene (8330)	(8330)		57.7	49:6	76	76	20	70	6.5	6.5
	2,4,6-Trinitrotoluene (8330)									

LDC #: 1909789 SDG #: LU COMEN

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: 7

GC HPLC METHOD:

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

%Recovery = 100 * (SSC - SC)/SA

SSC * Spiked concentration SA * Spike added Where

SC = Sample concentration

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

8/08/15B-105

LCS/LCSD samples:

LCS = Laboratory Control Sample percent recovery

LCSD = Laboratory Control Sample duplicate percent recovery

	Spike	ike	Sample	Spike Sample	Sample	רל	rcs	rcsd	O	TCS/FCSD	CSD.
Compound	7	1/2	1 ng / mg	( //	1/57	Percent	Percent Recovery	Percent Recovery	scovery	RPD	۵
	rcs	LCSD	7	SOT	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	44		187	45	73	37				
Anthracene (8310)	66.7	7		2/5	1	77	77	747			
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 #: 19097 187 SDG #:

### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page: 2nd Reviewer: Reviewer:

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

HPLC

METHOD:

Y N N/A Ϋ́

(RF)(Vs or Ws)(%S/100) (A)(Fv)(Df) Concentration≈

Example:

Sample ID.

A≈ Area or height of the compound to be measured Fv≈ Final Volume of extract Df≈ Dilution Factor

Compound Name_

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

Concentration =

#	Sample ID	Compound	Reported Concentrations	Recalculated Results Concentrations	Qualifications
	•				
comments:	ents:				

### 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 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)	Р

### 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)	Р
TSB-GJ-08-30**	¹³ C-OCDD	29 (40-135)	OCDD	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Р
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)	Р

### 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)	Р	Internal standards (%R)
F8F120167	TSB-GJ-08-30**	OCDD OCDF	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Р	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

SDG#	: 19097B21 t: F8F120167 atory: Test America	_ <b>VA</b>  	LIDATIOI		PLETEN evel III/I\	ESS WORKS	SHEET	Date: ⁵ Page: Reviewer:_ 2nd Reviewer:_	10f <u>l</u>
/IETH	OD: HRGC/HRMS Dio	xins/D	ibenzofuran	s (EPA SV	N 846 Me	ethod 8290)		Ziid Neviewei	7
	amples listed below wer ion findings worksheets		ewed for ead	ch of the fo	ollowing v	alidation areas.	Validation fir	ndings are noted in at	tached
	Validation	n Area					Comment	S	
1.	Technical holding times			A	Sampling of	dates: 6/11/	08		
11.	GC/MS Instrument perform	nance ch	neck	4					
III.	Initial calibration			4					
IV.	Routine calibration/ <del>ICV</del>	100		A					
V.	Blanks			Å					
VI.	Matrix spike/Matrix spike d	uplicate	s	N	hiert	& specified		*s	
VII.	Laboratory control samples	3		SW	MS				
VIII.	Regional quality assurance	and qu	ality control	N					
IX.	Internal standards			SW					
Χ.	Target compound identification	ations		<u> </u>	Not review	ved for Level III valid	dation.		
XI.	Compound quantitation an	d CRQL	.s	1	Not reviev	ved for Level III valid	tation.		
XII.	System performance A Not reviewed for Level III validation.								
XIII.	Overall assessment of data	a _.		<b>A</b>	A				
XIV.	Field duplicates			H					
XV.	Field blanks			ND	R=	PINSATE 1	(+8F124	0137)	
lote:	A = Acceptable N = Not provided/applicab SW = See worksheet ad Samples; ** Indicates sar		R = Rin FB = Fi	eld blank		D = Duplica TB = Trip b EB = Equip			
			r						
	TSB-GJ-08-10	11	817049:	3MB	21		31		
	TSB-GJ-08-20**	12			22		32		
	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		

### **VALIDATION FINDINGS CHECKLIST**

LDC #: 1909782| SDG #: F8F120167

	Page:_	<u></u> 1 of <del>3</del>
	Reviewer:	И
2nd	Reviewer:	1
		/

### 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 $\geq$ 2.5 and for each recovery and internal standard $\geq$ 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	 ! " 7	r	1	
Was an LCS analyzed for this SDG?	/		<u> </u>	

LDC #: 1909782| SDG #: F8F120167

### **VALIDATION FINDINGS CHECKLIST**

Page: 2of 3
Reviewer: & 2nd Reviewer: 4

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 $\geq$ 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 $\geq$ 2.5?			/	
Does the maximum intensity of each specified characteristic ion coincide within $\pm$ 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?			1	
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XII, System performence				
System performance was found to be acceptable.	/			
XIII. Overall assessment of data			- 1	
Overall assessment of data was found to be acceptable.	/		***************************************	
XIV. Field duplicates		1		
Field duplicate pairs were identified in this SDG.				

LDC #: 19097B2| SDG #: F8F120167

### **VALIDATION FINDINGS CHECKLIST**

Page: 3 of 3
Reviewer: K
2nd Reviewer:

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	a. 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	1. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X Total HyCDE
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:		

SDG #: FRF 120167 LDC #: 19097132

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

Page: 1 of /

Reviewer: 2nd Reviewer:_

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

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

Was a LCS required? Y N N/A Y N N/A

Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

_		1	<del>-</del>		· ; ·	_	71	_	-				-		_													
	Qualifications	That F	, ,	•																								
•	Associated Samples	Je St	1																									
DBD 41 inter	AFD (LIMITS)	( )	· ·	)		)	)			)					,	( )	(	(					~	^ 	^ )	-		
LCSD %B (1 imits)	(culling)	( )	)	( )	( )	( )	( )		(								( )	( )	)				-	( )	( )	^ )		
LCS %R (Limits)		77.	108(11-111)		( )	( )	( )	(	( )	( )	( )	( )					(	( )	-	<u> </u>	^ )	^		^	( )	( )	( )	^ ·
Compound		۲	D																									
Lab ID/Reference	81734025CC	01 10 T/7 CS						·														-						
Date																												
*												T	T	$\Box$			1			$\exists$		┪	 $\top$	$\top$	$\top$	$\dashv$		ᅦ

SDG #: [8/12016] LDC #: 19097824

## **VALIDATION FINDINGS WORKSHEET**

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2nd Reviewer:__ Reviewer:

Internal Standards

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

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  $\frac{Y(N)N/A}{N}$  Are all internal standard recoveries were within the 40-135% criteria? Was the S/N ratio all internal standard peaks  $\geq$  10?

N N/A

*	Date	Lab ID/Reference	Internal Standard		% Recovery (Limit: 40-135%)	Qualif	Qualifications
		7	1	11	37 (40-135	1 5/45/6	(৫,১)
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		4	+-1	• `	) 65		
					)		
		7	1		) 92	(	
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					)	(	
		Internal Standards	Check Standard Used		Recovery Standards	Chec	Check Standard Used
Ä	¹³ C-2,3,7,8-TCDF	DF.		노	¹³ C-1,2,3,4-TCDD		
8	¹³ C-2,3,7,8-TCDD	DD		نـ.	¹³ C-1,2,3,7,8,9-HxCDD		
Ö	¹³ C-1,2,3,7,8-PeCDF	eCDF		Ā			
ا	¹³ C-1,2,3,7,8-PeCDD	eCDD		Ż			
انس	¹³ C-1,2,3,6,7,8-HxCDF	HXCDF		Ö			
ιί (	"C-1,2,3,6,7,8-HxCDD	HXCDD		<u>a</u>			
ပ :	"C-1,2,3,4,6,7,8-HpCDF	8-HpCDF		Ö			
-	13C OCDD	8-нрсии		œ			
$\ $	11.11.11.			H			

SDG #: F8F120167 LDC #: (9097.B2)

### Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page:__(_of_ 2nd Reviewer: Reviewer:

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

 $RRF = \langle A_{\nu}(C_{\mu})/(A_{\mu})(C_{\nu})$  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,

 $A_{\bf k}=$  Area of associated internal standard  $C_{\bf k}=$  Concentration of internal standard X= Mean of the RRFs

L									
				Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
*	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF	Average RRF	RRF			
_	Γ.Δ.L.	11/16/100	23.78-TODE (%c.23.78-TODE)	, 3	(1000)	(CLV std)	_	%RSD	%RSD
L		- A A / A		6.748	0.748	0.87 2	28.0	מ'ת/	7
			2,3,7,8-TCDD ( ¹³ C-2,3,7,8-TCDD)	0.913	215.0	0.92	192		
			1,2,3,6,7,8-HxCDD (13C-1,2,3,6,7,8-HxCDD)	128.0	0.820	001	5	700	0.0
			1,2,3,4,6,7,8-HpCDD (19C-1,2,4,6,7,8,-HpCDD)	71700	1000	1000	18:0	15.7	7,4
			(30 OCDE / 30 OCDE)	1 2 2	2.874	0.8%	88.7	Ø	, 'A
			(ביסטים ביים	1.72	1.722	1.8%	.8	7.9	> 7
2			2,3,7,8-TCDF (13C-2,3,7,8-TCDF)						12.4
			2,3,7,8-TCDD ( ¹³ C-2,3,7,8-TCDD)						
		-							
			1,2,3,6,7,8-HXCDD ("C-1,2,3,6,7,8-HXCDD)						
T		-	1,2,3,4,6,7,8-HpCDD (13C-1,2,4,6,7,8,-HpCDD)						
			OCDF (1°C-OCDD)						
6			2,3,7,8-TCDF ( ¹³ C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (4C-2,3,7,8-TCDD)						
			TO SO TO						
Γ			1,5,5,5,7,8-HXCDD)						
T			1,2,3,4,6,7,8-HpCDD (40-1,2,4,6,7,8,-HpCDD)						
			OCDF (*C-OCDD)	T					

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

LDC #: 19697B2

## VALIDATION FINDINGS WORKSHEET Routine Calibration Results Verification

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

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 * (ave, RRF - RRF)/ave, RRF RRF =  $(A_{\nu})(C_{\nu})/(A_{\nu})(C_{\nu})$ 

Where: ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

 $A_x = Area$  of compound,  $A_x = Area$  of associated internal standard  $C_x = Concentration$  of internal standard

					Reported	Recalculated	Reported	Boselinleted
*	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF	RRF (CC)	RRF		
L	5706278	39/3=/2	2,3,7,8-TCDF ( ¹ °C-2,3,7,8-TCDF)	0 790	0.83	(22)	σ». 7 7	a%
<u> </u>		-	2,3,7,8-TCDD ( ¹³ C-2,3,7,8-TCDD)	2 6 0	10.0	200	0 =	
			1,2,3,6,7,8-HxCDD (13C-1,2,3,6,7,8-HxCDD)	0.82	0.87	18.00	7 2	7 7
			1,2,3,4,6,7,8-HpCDD (13C-1,2,4,6,7,8,-HpCDD)	0.844	0.83	0.83	. 5	- U
			OCDF (*c-OCDD)	1.7.1	85.1	1.58	8.3	0.2
7	Sper	80/67/9	2,3,7,8-TCDF (13C-2,3,7,8-TCDF)	8620	0.85	0.85	£.9	60
			2,3,7,8-TCDD (13C-2,3,7,8-TCDD)	0,912	0.87	0.82	10.3	10 2
			1,2,3,6,7,8-HxCDD (13C-1,2,3,6,7,8-HxCDD)	0.82	2.92	0.92	9,	7.0
			1,2,3,4,6,7,8-HpCDD (13C-1,2,4,6,7,8,-HpCDD)	748.0	68.0	650	6.2	3
			OCDF (1°C-OCDD)	1.72	39.)	1.0	7 7	12
က			2,3,7,8-TCDF (13C-2,3,7,8-TCDF)					
			2,3,7,8-TCDD (13C-2,3,7,8-TCDD)					
			1,2,3,6,7,8-HxCDD (13C-1,2,3,6,7,8-HxCDD)					
			1,2,3,4,6,7,8-HpCDD (13C-1,2,4,6,7,8,-HpCDD)					
			OCDF (4c-ocpb)					

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.

LDC #. 19097B21 SDG #: F8F[22167

## Laboratory Control Sample Results Verification VALIDATION FINDINGS WORKSHEET

Page: 1 of *1* 2nd Reviewer: Reviewer:__

METHOD: GC/MS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

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

% Recovery = 100 * SSC/SA

Where: SSC = Spiked sample concentration SA = Spike added

LCS = Laboraotry control sample percent recovery

8170493105 LCS ID:

RPD = I LCS - LCSD I * 2/(LCS + LCSD)

LCSD = Laboratory control sample duplicate percent recovery

	S	pike	Spiked (	Sample	01	SJI	I CSD	O.S.	1 CS/I	I CS/I CSD
Compound	A ( P2	Added $(P_2/K)$	Concentration (アイン)	tration く)	Percent F	Percent Recovery	Percent Recovery	ecovery	12.	RPD
	SDT	ICSN	SOI	ت ایجوا	Reported	Recaic	Reported	Recalc	Denorted	Postel included
2,3,7,8-TCDD	cz	\	p. 81		426	42				
1,2,3,7,8-PeCDD	80/		7=1		=	7				
1,2,3,4,7,8-HxCDD			70		102	401				
1,2,3,4,7,8,9-HpCDF	>		601		40)	63				
OCDF	200		p 92		401	20				
						-				
				-		·		-		-

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.

# lons Monitored for HRGC/HRMS Analysis of PCDDs/PCDFs

	HPCDF HPCDF HPCDF HPCDD HPCDD HPCDD (S) HPCDD (S) PFK	ocof ocob ocob ocob (s) ocope PFK	
Flamontal Composition	C ₁₂ H ² C ₁₃ TClO C ₁₂ H ² C ₁₃ TClO ₂ C ₁₂ H ² C ₁₃ TClO ₂ C ₁₂ H ² C ₁₃ TCl ₂ O ₂ C ₁₂ H ² C ₁₃ TCl ₂ O ₂ C ₁₂ H ² C ₁₃ TCl ₂ O ₂ C ₁₂ H ² C ₁₃ TCl ₂ O ₂	C ₁₂ ³⁶ Cl ₂ ³⁷ ClO C ₁₂ ³⁶ Cl ₃ ³⁷ Cl ₂ O C ₁₂ ³⁶ Cl ₃ ³⁷ Cl ₂ O ₂ C ₁₂ ³⁶ Cl ₃ ³⁷ Cl ₂ O ₂ 13C ₁₂ ³⁶ Cl ₃ ³⁷ Cl ₂ O ₂ C ₁₂ ³⁶ Cl ₃ ³⁷ Cl ₂ O ₂ C ₁₂ ³⁶ Cl ₃ ³⁷ Cl ₂ O ₂ C ₁₂ ³⁶ Cl ₃ ³⁷ Cl ₂ O ₂ C ₁₂ ³⁶ Cl ₃ ³⁷ Cl ₂ O ₂	
Ci noi	M M M H + + + + + + + + + + + + + + + +	M + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 +	
Accurate Mass ^(a)	407.7818 409.7788 417.8250 419.8220 423.7767 425.7737 435.8169 437.8140 479.7165	441.7428 443.7399 457.7377 459.7348 469.7780 471.7750 513.6775	
Descriptor	4	ro	
Analyte	TCDF TCDF (S) TCDF (S) TCDD TCDD TCDD (S) TCDD (S) HXCDPE	Pecde Pecde (S) Pecde (S) Pecde (S) Pecdd (S) Pecdd (S) Pecdd (S) Hpcdpe	HXCDF HXCDF HXCDF (S) HXCDD HXCDD HXCDD (S) HXCDD (S) OCCDPE PFK
Elemental Composition	C ₁₂ H, 35Cl ₄ O C ₁₂ H, 35Cl ₄ O (3C ₁₂ H, 35Cl ₃ O (3C ₁₂ H, 35Cl ₃ O (3C ₁₃ H, 3Cl ₃ O)	C ₁₂ H ₃ ³ ClO C ₁₂ H ₃ ³ Cl ₂ OlO 13C ₁₂ H ₃ ³ Cl ₂ OlO 13C ₁₂ H ₃ ³ Cl ₂ OlO ₂ C ₁₂ H ₃ ³ Cl ₂ OlO ₂ C ₁₂ H ₃ ³ Cl ₃ OlO ₂ 13C ₁₂ H ₃ ³ Cl ₂ OlO ₂ 13C ₁₂ H ₃ ³ Cl ₂ OlO ₂ 13C ₁₂ H ₃ ³ Cl ₂ OlO ₂ C ₁₂ H ₃ ³ Cl ₂ OlO ₂ C ₁₂ H ₃ ³ Cl ₂ OlO ₂ C ₁ ² H ₃ ³ Cl ₂ OlO ₂ C ₂ F ₁₃	C ₁ 242 C ₁ 37ClO C ₁ 242 C ₁ 37ClO 13C ₁ 242 C ₁ 37ClO 13C ₁ 242 C ₁ 37ClO C ₁ 242 C ₁ 37ClO C ₁ 242 C ₁ 37ClO C ₁ 242 C ₁ 37ClO 13C ₁ 242 C ₁ 37ClO 13C ₁ 242 C ₁ 37ClO C ₁ 242 C ₁ 37ClO
Ol nol	M M M M M M M M M M M M M M M M M M M	M + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 +	M + 4 M + 4 M + 2 M + 4 M + 4 M + 4 COCK
Accurate mass ⁽²⁾	303,9016 305,8987 315,9419 317,9389 319,8965 321,8936 331,9368 333,938 375,8364 [354,9792]	339.8597 341.8567 351.9000 353.8970 355.8546 357.8516 367.8949 369.8919 409.7974 [354.9792]	373.8208 375.8178 383.8639 385.8610 389.8156 391.8127 401.8559 445.7555 [430.9728]
Descriptor		N	ဗ

The following nuclidic masses were used;

Ø

H = 1.007825 C = 12.000000  $^{13}C = 13.003355$ F = 18.9984

O = 15.994915 $^{36}CI = 34.968853$  $^{37}CI = 36.965903$ 

S = internal/recovery standard

LDC #:_	1909782	<u> </u>
SDG #:	F8F120	67

### **VALIDATION FINDINGS WORKSHEET**

Sample Calculation Verification

Page:	<u>l of / </u>
Reviewer:	K
2nd reviewer:	م

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

(Y)	N	N/A
Y	Ν	(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?

Concentration = $(A_{\cdot})(I_{\cdot})(DF)$ $(A_{\cdot})(RRF)(V_{\circ})(\%S)$			Example:				
A _x	=	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D	<u>,                                     </u>	NO.	:	
$A_{is}$	=	Area of the characteristic ion (EICP) for the specific internal standard					
l _s	=	Amount of internal standard added in nanograms (ng)	Conc. = (	) (	)(	)( )	
V _o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).					
RRF	===	Relative Response Factor (average) from the initial calibration	=				
Df	==	Dilution Factor.					
%S	=	Percent solids, applicable to soil and solid matrices only.					

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification
	· · · · · · · · · · · · · · · · · · ·				
			<del> </del>		
1 1				<u> </u>	