



**LABORATORY DATA CONSULTANTS, INC.**

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

August 14, 2008

SUBJECT: BRC Tronox Parcel G, Data Validation

Dear Ms. Barajas-Albalawi

Enclosed are the final validation reports for the fractions listed below. This SDG was received on July 31, 2008. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 19214:**

<b><u>SDG #</u></b>	<b><u>Fraction</u></b>
IRF1299	2,2'-/4,4'-Dichlorobenzil, Chlorite & Hexavalent Chromium

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

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

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

Sincerely,

Erlinda T. Rauto  
Operations Manager/Senior Chemist



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

**Project/Site Name:** BRC Tronox Parcel G  
**Collection Date:** June 11, 2008  
**LDC Report Date:** August 12, 2008  
**Matrix:** Soil  
**Parameters:** 2,2'-/4,4'-Dichlorobenzil  
**Validation Level:** EPA Level III & IV  
**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** IRF1299

**Sample Identification**

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

\*\*Indicates sample underwent EPA Level IV review

## Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for 2,2'-/4,4'-Dichlorobenzil.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. GC/MS Instrument Performance Check**

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

## **III. Initial Calibration**

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% .

Average relative response factors (RRF) for all target compounds were within validation criteria.

## **IV. Continuing Calibration**

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% .

The percent differences (%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 validation criteria.

## **V. Blanks**

Method blanks were reviewed for each matrix as applicable. No 2,2'-/4,4'-Dichlorobenzil was found in the method blanks.

No field blanks were identified in this SDG.

## **VI. Surrogate Spikes**

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

## **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. 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)**

Tentatively identified compounds were not reported by the laboratory.

## **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**

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

## **XVI. Field Duplicates**

No field duplicates were identified in this SDG.

**BRC Tronox Parcel G  
2,2'-/4,4'-Dichlorobenzil - Data Qualification Summary - SDG IRF1299**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel G  
2,2'-/4,4'-Dichlorobenzil - Laboratory Blank Data Qualification Summary - SDG  
IRF1299**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel G  
2,2'-/4,4'-Dichlorobenzil - Field Blank Data Qualification Summary - SDG IRF1299**

No Sample Data Qualified in this SDG



LDC #: 19214A2  
 SDG #: IRF1299  
 Laboratory: Test America

**VALIDATION COMPLETENESS WORKSHEET**  
 Level III/IV

Date: 8/11/08  
 Page: 1 of 1  
 Reviewer: JVC  
 2nd Reviewer: *[Signature]*

**METHOD:** GC/MS 2,2'-/4,4'-Dichlorobenzil (EPA SW 846 Method 8270C)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/11/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	non CCC / non SPEC
IV.	Continuing calibration/ICV	A	ICV ≤ 25% ↓
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	ICS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation/CRQLs	A	Not reviewed for Level III validation.
XIII.	Tentatively identified compounds (TICs)	N	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	N	

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

Validated Samples: *Soil*      \*\* Indicates sample underwent Level IV validation

1	TSB-GJ-08-10'	11		21		31	
2	TSB-GJ-08-20**	12		22		32	
3	TSB-GJ-08-30'	13		23		33	
4	TSB-GJ-08-40'	14		24		34	
5	TSB-GJ-08-10'MS	15		25		35	
6	TSB-GJ-08-10'MSD	16		26		36	
7	8F 16058 - BUK1	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 19214 Ar  
 SDG #: See Cover

**VALIDATION FINDINGS CHECKLIST**

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

**Method: Semivolatiles (EPA SW 846 Method 8270C)**

Validation Area	Yes	No	NA	Findings/Comments
<b>I. Technical holding times</b>				
All technical holding times were met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooler temperature criteria was met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>II. GC/MS instrument performance criteria</b>				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all samples analyzed within the 12 hour clock criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>III. Initial calibration</b>				
Did the laboratory perform a 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Did the initial calibration meet the curve fit acceptance criteria of $> 0.990$ ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were all percent relative standard deviations (%RSD) $\leq 30\%$ and relative response factors (RRF) $> 0.05$ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>IV. Continuing calibration</b>				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) $\leq 25\%$ and relative response factors (RRF) $\geq 0.05$ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>V. Blanks</b>				
Was a method blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a method blank analyzed for each matrix and concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<b>VI. Surrogate spikes</b>				
Were all surrogate %R within QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<b>VII. Matrix spike/Matrix spike duplicates</b>				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a MS/MSD analyzed every 20 samples of each matrix?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>VIII. Laboratory control samples</b>				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

LDC #: 19214 Ar  
 SDG #: See Cover

**VALIDATION FINDINGS CHECKLIST**

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

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

**VALIDATION FINDINGS WORKSHEET**  
**Initial Calibration Calculation Verification**

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

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

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

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported		Recalculated		Reported	Recalculated	Reported	Recalculated
				RRF (SD)	std)	RRF (SD)	std)				
1	ICAL	4 6 9 6 8	Phenol (1st internal standard) - DC Benzol	1.095		1.076		1.076		7.21	7.21
			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)								
2			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)								
3			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 Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

**VALIDATION FINDINGS WORKSHEET**  
**Continuing Calibration Results Verification**

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

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

% Difference =  $100 \times (\text{ave. RRF} - \text{RRF}) / \text{ave. RRF}$  Where: ave. RRF = initial calibration average RRF  
 RRF = continuing calibration RRF  
 $\text{RRF} = (A_x)(C_s) / (A_s)(C_x)$   
 A<sub>x</sub> = Area of compound,  
 C<sub>x</sub> = Concentration of compound,  
 A<sub>s</sub> = Area of associated internal standard  
 C<sub>s</sub> = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (Initial)	Reported		Recalculated	
					RRF (CC)	%D	RRF (CC)	%D
1	SSTD050	6/16/68	Phenol (1st internal standard) - DC Benzil	1.076	1.096	1.9	1.8	
			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)					
2			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)					
3			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 #: 19214Ar  
 SDG #: See Copy

**VALIDATION FINDINGS WORKSHEET**  
**Surrogate Results Verification**

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

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

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

% Recovery:  $SF/SS * 100$

Where: SF = Surrogate Found  
 SS = Surrogate Spiked

Sample ID: # 2

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	50	34.80	70	70	0
2-Fluorobiphenyl		34.75	70	70	
Terphenyl-d14		41.84	84	84	
Phenol-d5	100	78.36	78	78	
2-Fluorophenol		78.43	78	78	
2,4,6-Tribromophenol		83.46	83	83	
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID: \_\_\_\_\_

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

Sample ID: \_\_\_\_\_

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

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

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

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

RPD =  $|LCS - LCSD| * 2 / (LCS + LCSD)$  LCS = Laboratory control sample percent recovery  
LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 8F16058 - B51

Compound	Spike Added (ug/kg)		Spike Concentration (ug/kg)		LCS		LCSD	
	LCS	LCSD	LCS	LCSD	Percent Recovery Reported	Recalc	Percent Recovery Reported	Recalc
2,2',4,4'-Dibenzil Phenol	3330	NA	2780	NA	83	82		
N-Nitroso-di-n-propylamine								
4-Chloro-3-methylphenol								
Acenaphthene								
Pentachlorophenol								
Pyrene								

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.





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

**Project/Site Name:** BRC Tronox Parcel G  
**Collection Date:** June 11, 2008  
**LDC Report Date:** August 6, 2008  
**Matrix:** Soil  
**Parameters:** Chlorite & Hexavalent Chromium  
**Validation Level:** EPA Level III & IV  
**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** IRF1299

**Sample Identification**

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

\*\*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 300.1 for Chlorite and EPA SW 846 Method 7196A for Hexavalent Chromium.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## **I. Technical Holding Times**

All technical holding time requirements were met.

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

## **II. Calibration**

### **a. Initial Calibration**

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

### **b. Calibration Verification**

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

## **III. Blanks**

Method blanks were reviewed for each matrix as applicable. No chlorite or hexavalent chromium were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

## **IV. Matrix Spike/Matrix Spike Duplicates**

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## **V. Duplicates**

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

## **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  
Chlorite & Hexavalent Chromium - Data Qualification Summary - SDG IRF1299**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel G  
Chlorite & Hexavalent Chromium - Laboratory Blank Data Qualification Summary -  
SDG IRF1299**

No Sample Data Qualified in this SDG

**BRC Tronox Parcel G  
Chlorite & Hexavalent Chromium - Field Blank Data Qualification Summary - SDG  
IRF1299**

No Sample Data Qualified in this SDG

LDC #: 19214A6  
 SDG #: IRF1299  
 Laboratory: Test America

**VALIDATION COMPLETENESS WORKSHEET**  
 Level III/IV

Date: 8/11/08  
 Page: 1 of 1  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

METHOD: (Analyte) Chlorite (EPA Method 300.1), Hexavalent Chromium (EPA SW846 Method 7196A)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: <u>6/11/08</u>
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Surrogate Spikes	A	
V	Matrix Spike/Matrix Spike Duplicates	A	} <u>MS/MSD</u>
VI.	Duplicates	N	
VII.	Laboratory control samples	A	<u>LLS</u>
VIII.	Sample result verification	A	Not reviewed for Level III validation.
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

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

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

AM soil

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

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

LDC #: 1221426  
 SDG #: 12F1253

VALIDATION FINDINGS CHECKLIST

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

Method: Inorganics (EPA Method for Cu)

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



LDC #: 19214AL  
 SDG #: 12 F1299

VALIDATION FINDINGS CHECKLIST

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

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

LDC #: 192146  
SDG #: 12F1293

**VALIDATION FINDINGS WORKSHEET**  
**Sample Specific Analysis Reference**

Page: 1 of 1  
Reviewer:       
2nd reviewer:     

All circled methods are applicable to each sample.

Sample ID	Parameter
1-4	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC (CR <sup>6+</sup> ) <u>Chlorite</u> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
5-6	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC (CR <sup>6+</sup> ) <u>Chlorite</u> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____
	pH TDS Cl F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>-</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup> _____

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

LDC #: 19214A  
SDG #: 12F1299

**VALIDATION FINDINGS WORKSHEET**  
**Initial and Continuing Calibration Calculation Verification**

Page: 1 of 1  
Reviewer: CU  
2nd Reviewer: CU

METHOD: Inorganics, Method See Com

The correlation coefficient (r) for the calibration of Cr6+ was recalculated. Calibration date: 6/25/08

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

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

Type of Analysis	Analyte	Conc (units)	Avg (units)	Recalculated		Reported		Acceptable (Y/N)
				r	%R	r	%R	
Initial calibration								
Calibration verification	Blank	0	0					
	Standard 1	0.008	0.007					
	Standard 2	0.01	0.008					
	Standard 3	0.025	0.021					
	Standard 4	0.1	0.081	0.999993	100.00			Y
	Standard 5	0.5	0.403					
	Standard 6							
Standard 7								
Calibration verification	Cr6+	0.309	0.30	100.3	100.3	NR	NR	Y
Calibration verification	Chloride	92.02	100	92.02	92.02	NR	NR	Y
Calibration verification								

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.

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

METHOD: Inorganics, Method Sm-Cu

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

$\%R = \frac{\text{Found}}{\text{True}} \times 100$  Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, True = concentration of each analyte in the source.

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

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

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated		Reported %R / RPD	Acceptable (Y/N)
					%R / RPD	%R / RPD		
8F23067-651	Laboratory control sample	Chlorite	96.31	100.0	96.3	96		Y
8F24080-451	Matrix spike sample	Cu <sup>2+</sup>	(SSR-SR) 0.31434	0.4	79	79		Y
8F23067-452	Duplicate sample	Chlorite	99.57	92.59	7	7		Y

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

