



**LABORATORY DATA CONSULTANTS, INC.**

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

December 29, 2009

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

Dear Ms. Arnold,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on December 2, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 22193:**

**SDG #**

**Fraction**

G9J150241,  
G9K190437

Polychlorinated Biphenyls as Congeners,  
Dioxins/Dibenzofurans, Perchlorate

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

- Standard Operating Procedures (SOP) 40, Data Review/Validation, BRC 2009
- Quality Assurance Project Plan Tronox LLC Facility, Henderson Nevada, June 2009
- NDEP Guidance, May 2006
- USEPA, Contract Laboratory Program National Functional Guidelines for Polychlorinated Dioxins/Dibenzofurans Data Review, September 2005
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004

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

Sincerely,

Erlinda T. Rauto  
Operations Manager/Senior Chemist



**Tronox LLC Facility, 2009 Phase B Investigation  
Henderson, Nevada  
Data Validation Reports  
LDC# 22193**

**Polychlorinated Biphenyls as Congeners**

**LDC**

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

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

**Collection Date:** October 20, 2009

**LDC Report Date:** December 18, 2009

**Matrix:** Soil

**Parameters:** Polychlorinated Biphenyls as Congeners

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** G9J150241

**Sample Identification**

SA33-0.0B  
SA33-0.5B  
SA33009-0.5B  
SA33-33B

## Introduction

This data review covers 4 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1668A for Polychlorinated Biphenyls as Congeners.

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

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UU Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency and all criteria were met.

## 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 35.0% for labeled compounds.

The ion abundance ratios for all compounds were within validation 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 30.0% for unlabeled compounds and less than or equal to 50.0% for labeled compounds.

The ion abundance ratios for all compounds were within validation criteria.

## V. Blanks

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

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
9302266MB	10/30/09	PCB-1 PCB-3 PCB-5* PCB-8* PCB-11 PCB-16* PCB-17 PCB-18 PCB-19 PCB-20*	0.31 pg/g 0.26 pg/g 2.5 pg/g 2.5 pg/g 9.9 pg/g 2.4 pg/g 1.6 pg/g 3.1 pg/g 0.32 pg/g 4.4 pg/g	All samples in SDG G9J150241

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
9302266MB (continued)	10/30/09	PCB-21*	4.4 pg/g	All samples in SDG G9J150241
		PCB-22	2.2 pg/g	
		PCB-24*	0.34 pg/g	
		PCB-25	0.41 pg/g	
		PCB-26	0.75 pg/g	
		PCB-27*	0.34 pg/g	
		PCB-28	3.9 pg/g	
		PCB-31	3.6 pg/g	
		PCB-32*	2.4 pg/g	
		PCB-33*	4.4 pg/g	
		PCB-37	1.0 pg/g	
		PCB-40	0.96 pg/g	
		PCB-41*	2.6 pg/g	
		PCB-42*	1.2 pg/g	
		PCB-43*	2.2 pg/g	
		PCB-44*	2.6 pg/g	
		PCB-45	0.50 pg/g	
		PCB-46	0.20 pg/g	
		PCB-47*	3.2 pg/g	
		PCB-48*	3.2 pg/g	
		PCB-49*	2.2 pg/g	
		PCB-51	0.34 pg/g	
		PCB-52*	3.0 pg/g	
		PCB-53	0.47 pg/g	
		PCB-54	0.078 pg/g	
		PCB-55	0.13 pg/g	
		PCB-56*	3.3 pg/g	
		PCB-59*	1.2 pg/g	
		PCB-60*	3.3 pg/g	
		PCB-61*	2.1 pg/g	
		PCB-63	0.14 pg/g	
		PCB-64*	2.6 pg/g	
		PCB-66*	2.7 pg/g	
		PCB-67	0.17 pg/g	
		PCB-68*	2.6 pg/g	
		PCB-70	4.1 pg/g	
		PCB-71	1.1 pg/g	
		PCB-73*	3.0 pg/g	
		PCB-74*	2.1 pg/g	
		PCB-75*	3.2 pg/g	
PCB-76*	2.7 pg/g			
PCB-80*	2.7 pg/g			
PCB-82	0.39 pg/g			
PCB-83	0.097 pg/g			
PCB-84	0.73 pg/g			
PCB-85*	0.43 pg/g			
PCB-86*	2.1 pg/g			
PCB-87*	2.1 pg/g			
PCB-89*	2.1 pg/g			
PCB-90*	2.1 pg/g			
PCB-91	0.39 pg/g			
PCB-92	0.46 pg/g			
PCB-93*	2.3 pg/g			
PCB-95*	2.3 pg/g			
PCB-97*	2.1 pg/g			
PCB-99	0.97 pg/g			
PCB-101*	2.1 pg/g			
PCB-104	0.074 pg/g			
PCB-105*	0.65 pg/g			
PCB-106*	1.2 pg/g			
PCB-107/109*	0.15 pg/g			
PCB-108/107*	0.15 pg/g			
PCB-109/108*	0.097 pg/g			



Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
9302266MB (continued)	10/30/09	PCB-110	2.6 pg/g	All samples in SDG G9J150241
		PCB-111*	2.1 pg/g	
		PCB-114	0.15 pg/g	
		PCB-117*	2.1 pg/g	
		PCB-118*	1.2 pg/g	
		PCB-120*	0.43 pg/g	
		PCB-124	0.059 pg/g	
		PCB-125*	2.1 pg/g	
		PCB-127*	0.65 pg/g	
		PCB-128	0.33 pg/g	
		PCB-129	0.099 pg/g	
		PCB-130	0.15 pg/g	
		PCB-132*	0.66 pg/g	
		PCB-134	0.18 pg/g	
		PCB-135*	0.53 pg/g	
		PCB-136	0.38 pg/g	
		PCB-137	0.10 pg/g	
		PCB-138*	2.5 pg/g	
		PCB-139*	2.2 pg/g	
		PCB-141	0.64 pg/g	
		PCB-144*	0.53 pg/g	
		PCB-146	0.33 pg/g	
		PCB-147	0.060 pg/g	
		PCB-149*	2.2 pg/g	
		PCB-151	0.66 pg/g	
		PCB-153	2.2 pg/g	
		PCB-155	0.12 pg/g	
		PCB-156	0.18 pg/g	
		PCB-157	0.072 pg/g	
		PCB-158*	0.29 pg/g	
		PCB-160*	0.29 pg/g	
		PCB-163*	2.5 pg/g	
		PCB-164*	2.5 pg/g	
		PCB-167	0.12 pg/g	
		PCB-168*	0.66 pg/g	
		PCB-170*	0.75 pg/g	
		PCB-171	0.25 pg/g	
		PCB-174	0.83 pg/g	
		PCB-177	0.47 pg/g	
		PCB-178	0.15 pg/g	
PCB-179	0.25 pg/g			
PCB-180	1.4 pg/g			
PCB-182*	0.54 pg/g			
PCB-183	0.47 pg/g			
PCB-187*	0.54 pg/g			
PCB-190*	0.75 pg/g			
PCB-194	0.22 pg/g			
PCB-195	0.11 pg/g			
PCB-196*	0.33 pg/g			
PCB-198	0.034 pg/g			
PCB-199/200	0.036 pg/g			
PCB-200/201	0.033 pg/g			
PCB-201/199	0.29 pg/g			
PCB-202	0.11 pg/g			
PCB-203*	0.33 pg/g			
PCB-206	0.051 pg/g			
PCB-207	0.010 pg/g			
PCB-209	0.20 pg/g			

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SA33-0.0B (10X)	PCB-11 PCB-17 PCB-18 PCB-19 PCB-20* PCB-21* PCB-33* PCB-54	61 pg/g 36 pg/g 94 pg/g 13 pg/g 220 pg/g 220 pg/g 220 pg/g 2.7 pg/g	61U pg/g 36U pg/g 94U pg/g 13U pg/g 220U pg/g 220U pg/g 220U pg/g 2.7U pg/g
SA33-0.5B (10X)	PCB-11 PCB-17 PCB-18 PCB-19 PCB-20* PCB-21* PCB-26 PCB-31 PCB-33* PCB-54	79 pg/g 34 pg/g 81 pg/g 12 pg/g 130 pg/g 130 pg/g 35 pg/g 110 pg/g 130 pg/g 2.1 pg/g	79U pg/g 34U pg/g 81U pg/g 12U pg/g 130U pg/g 130U pg/g 35U pg/g 110U pg/g 130U pg/g 2.1U pg/g
SA33009-0.5B (10X)	PCB-11 PCB-54	56 pg/g 2.6 pg/g	56U pg/g 2.6U pg/g

Sample	Compound	Reported Concentration	Modified Final Concentration
SA33-33B	PCB-5*	5.2 pg/g	5.2U pg/g
	PCB-8*	5.2 pg/g	5.2U pg/g
	PCB-11	12 pg/g	12U pg/g
	PCB-16*	11 pg/g	11U pg/g
	PCB-17	6.5 pg/g	6.5U pg/g
	PCB-18	9.1 pg/g	9.1U pg/g
	PCB-20*	13 pg/g	13U pg/g
	PCB-21*	13 pg/g	13U pg/g
	PCB-22	7.9 pg/g	7.9U pg/g
	PCB-28	9.4 pg/g	9.4U pg/g
	PCB-31	9.0 pg/g	9.0U pg/g
	PCB-32*	11 pg/g	11U pg/g
	PCB-33*	13 pg/g	13U pg/g
	PCB-41*	6.6 pg/g	6.6U pg/g
	PCB-42*	3.8 pg/g	3.8U pg/g
	PCB-43*	5.2 pg/g	5.2U pg/g
	PCB-44*	6.4 pg/g	6.4U pg/g
	PCB-47*	7.5 pg/g	7.5U pg/g
	PCB-48*	7.5 pg/g	7.5U pg/g
	PCB-49*	5.2 pg/g	5.2U pg/g
	PCB-52*	5.5 pg/g	5.5U pg/g
	PCB-56*	7.8 pg/g	7.8U pg/g
	PCB-59*	3.8 pg/g	3.8U pg/g
	PCB-60*	7.8 pg/g	7.8U pg/g
	PCB-64*	6.6 pg/g	6.6U pg/g
	PCB-66*	4.6 pg/g	4.6U pg/g
	PCB-68*	6.6 pg/g	6.6U pg/g
	PCB-70	7.3 pg/g	7.3U pg/g
	PCB-73*	5.5 pg/g	5.5U pg/g
	PCB-75*	7.5 pg/g	7.5U pg/g
	PCB-76*	4.6 pg/g	4.6U pg/g
	PCB-80*	4.6 pg/g	4.6U pg/g
	PCB-86*	4.5 pg/g	4.5U pg/g
	PCB-87*	4.5 pg/g	4.5U pg/g
	PCB-89*	3.7 pg/g	3.7U pg/g
	PCB-90*	3.7 pg/g	3.7U pg/g
	PCB-93*	4.8 pg/g	4.8U pg/g
	PCB-95*	4.8 pg/g	4.8U pg/g
	PCB-97*	4.5 pg/g	4.5U pg/g
	PCB-101*	3.7 pg/g	3.7U pg/g
PCB-110	5.9 pg/g	5.9U pg/g	
PCB-111*	4.5 pg/g	4.5U pg/g	
PCB-117*	4.5 pg/g	4.5U pg/g	
PCB-125*	4.5 pg/g	4.5U pg/g	
PCB-138*	5.3 pg/g	5.3U pg/g	
PCB-139*	5.8 pg/g	5.8U pg/g	
PCB-149*	5.8 pg/g	5.8U pg/g	
PCB-153	4.2 pg/g	4.2U pg/g	
PCB-163*	5.3 pg/g	5.3U pg/g	
PCB-164*	5.3 pg/g	5.3U pg/g	
PCB-180	3.5 pg/g	3.5U pg/g	

Sample FB082809-SO (from SDG R0904894) was identified as a field blank. No polychlorinated biphenyls as congeners contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB082809-SO	8/28/09	PCB-1	20.6 pg/L	All samples in SDG G9J150241
		PCB-2	15.0 pg/L	
		PCB-3	28.6 pg/L	
		PCB-8	185 pg/L	
		PCB-11	1660 pg/L	
		PCB-19	22.6 pg/L	
		PCB-18+30	150 pg/L	
		PCB-17	82.0 pg/L	
		PCB-16	128 pg/L	
		PCB-32	53.1 pg/L	
		PCB-26+29	34.8 pg/L	
		PCB-31	166 pg/L	
		PCB-20+28	197 pg/L	
		PCB-21+33	125 pg/L	
		PCB-22	78.5 pg/L	
		PCB-37	41.2 pg/L	
		PCB-52	588 pg/L	
		PCB-49+69	148 pg/L	
		PCB-44+47+65	296 pg/L	
		PCB-42	40.7 pg/L	
		PCB-41+71+40	83.4 pg/L	
		PCB-64	84.5 pg/L	
		PCB-70+61+74+76	418 pg/L	
		PCB-66	153 pg/L	
		PCB-56	71.6 pg/L	
		PCB-60	40.6 pg/L	
		PCB-77	37.6 pg/L	
		PCB-95	776 pg/L	
		PCB-88+91	125 pg/L	
		PCB-84	291 pg/L	
		PCB-92	192 pg/L	
		PCB-90+101+113	1180 pg/L	
		PCB-83+99	595 pg/L	
		PCB-86+87+97+109+119+125	879 pg/L	
		PCB-117	23.2 pg/L	
		PCB-85+116	161 pg/L	
		PCB-110+115	1470 pg/L	
		PCB-82	136 pg/L	
		PCB-108+124	54.4 pg/L	
		PCB-107	75.4 pg/L	
PCB-118	1170 pg/L			
PCB-105	434 pg/L			
PCB-136	66.2 pg/L			
PCB-135+151	151 pg/L			
PCB-144	28.2 pg/L			
PCB-147+149	499 pg/L			
PCB-134	47.5 pg/L			
PCB-139+140	19.2 pg/L			
PCB-132	334 pg/L			
PCB-146	87.3 pg/L			
PCB-153+168	593 pg/L			
PCB-141	122 pg/L			
PCB-130	61.2 pg/L			
PCB-137	73.3 pg/L			
PCB-164	57.1 pg/L			
PCB-129+138+163	1080 pg/L			
PCB-158	124 pg/L			
PCB-128+166	211 pg/L			
PCB-167	58.4 pg/L			
PCB-156+157	206 pg/L			
PCB-179	14.8 pg/L			
PCB-187	51.5 pg/L			
PCB-183	38.3 pg/L			

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB082809-SO (continued)	8/28/09	PCB-174	71.9 pg/L	All samples in SDG G9J150241
		PCB-177	25.6 pg/L	
		PCB-171+173	24.3 pg/L	
		PCB-180+193	186 pg/L	
		PCB-170	165 pg/L	
		PCB-190	25.4 pg/L	
		PCB-198+199	55.4 pg/L	
		PCB-203	38.4 pg/L	
		PCB-194	46.7 pg/L	
		PCB-208	31.7 pg/L	
		PCB-206	83.4 pg/L	
		PCB-209	56.6 pg/L	
		Total MonoCB	64.3 pg/L	
		Total DiCB	1840 pg/L	
		Total TriCB	1080 pg/L	
		Total TetraCB	1960 pg/L	
Total PentaCB	6630 pg/L			
Total HexaCB	3820 pg/L			
Total HeptaCB	602 pg/L			
Total OctaCB	140 pg/L			
Total NonaCB	115 pg/L			

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SA33-33B	PCB-90+101+113	3.7 pg/g	3.7U pg/g
	PCB-110+115	5.9 pg/g	5.9U pg/g
	PCB-129+138+163	5.3 pg/g	5.3U pg/g

\*Co-eluting isomer

## VI. 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.

## VII. Laboratory Control Samples (LCS)

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

## VIII. Regional Quality Assurance and Quality Control

Not applicable.

**IX. Internal Standards**

All internal standard percent recoveries (%R) were within QC limits.

**X. Target Compound Identifications**

Raw data were not reviewed for this SDG.

**XI. Project Quantitation Limit**

All project quantitation limits were within validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
SA33-0.0B	PCB-138 PCB-139 PCB-149 PCB-153 PCB-163 PCB-164 PCB-170 PCB-174 PCB-180 PCB-182 PCB-187 PCB-190 PCB-196 PCB-203 PCB-207 PCB-209	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
SA33-0.5B	PCB-138 PCB-139 PCB-141 PCB-149 PCB-153 PCB-163 PCB-164 PCB-170 PCB-174 PCB-180 PCB-182 PCB-187 PCB-190 PCB-194 PCB-196 PCB-203 PCB-206 PCB-207 PCB-208 PCB-209	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects)	P

Sample	Compound	Finding	Criteria	Flag	A or P
SA33009-0.5B	PCB-138 PCB-139 PCB-149 PCB-153 PCB-163 PCB-164 PCB-174 PCB-180 PCB-182 PCB-187 PCB-196 PCB-203 PCB-206 PCB-207 PCB-209	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG G9J150241	All compounds reported below the PQL.	J (all detects)	A

All compounds reported as EMPC were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG G9J150241	All compounds reported as estimated maximum possible concentration (EMPC).	JK (all detects)	A

Raw data were not reviewed for this SDG.

## XII. System Performance

Raw data were not reviewed for this SDG.

## XIII. Overall Assessment of Data

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

## XIV. Field Duplicates

Samples SA33-0.5B and SA33009-0.5B were identified as field duplicates. No polychlorinated biphenyls as congeners were detected in any of the samples with the following exceptions:

Compound	Concentration (pg/g)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA33-0.5B	SA33009-0.5B				
PCB-1	57	45	-	12 ( $\leq 200$ )	-	-
PCB-2	110	68	-	42 ( $\leq 200$ )	-	-
PCB-3	170	96	-	74 ( $\leq 200$ )	-	-
PCB-5*	220	270	-	50 ( $\leq 200$ )	-	-
PCB-6	73	69	-	4 ( $\leq 200$ )	-	-
PCB-7*	50	200U	-	150 ( $\leq 200$ )	-	-
PCB-8*	220	270	-	50 ( $\leq 200$ )	-	-
PCB-9*	50	200U	-	150 ( $\leq 200$ )	-	-
PCB-11	79	56	-	23 ( $\leq 200$ )	-	-
PCB-12*	220	150	-	70 ( $\leq 200$ )	-	-
PCB-13*	220	150	-	70 ( $\leq 200$ )	-	-
PCB-15	660	540	-	120 ( $\leq 200$ )	-	-
PCB-16*	170	360	-	190 ( $\leq 200$ )	-	-
PCB-17	34	140	-	106 ( $\leq 200$ )	-	-
PCB-18	81	290	-	209 ( $\leq 200$ )	J (all detects)	A
PCB-19	12	28	-	16 ( $\leq 200$ )	-	-
PCB-20*	130	320	-	190 ( $\leq 200$ )	-	-
PCB-21*	130	320	-	190 ( $\leq 200$ )	-	-
PCB-22	150	310	-	160 ( $\leq 200$ )	-	-
PCB-23	9.6	8.4	-	1.2 ( $\leq 200$ )	-	-
PCB-24*	36	59	-	23 ( $\leq 200$ )	-	-



Compound	Concentration (pg/g)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA33-0.5B	SA33009-0.5B				
PCB-25	29	43	-	14 ( $\leq 200$ )	-	-
PCB-26	35	76	-	41 ( $\leq 200$ )	-	-
PCB-27*	36	59	-	23 ( $\leq 200$ )	-	-
PCB-28	350	670	-	320 ( $\leq 200$ )	J (all detects)	A
PCB-29	11	11	-	0 ( $\leq 200$ )	-	-
PCB-30	5.2	5.8	-	0.6 ( $\leq 200$ )	-	-
PCB-31	110	390	-	280 ( $\leq 200$ )	J (all detects)	A
PCB-32*	170	360	-	190 ( $\leq 200$ )	-	-
PCB-33*	130	320	-	190 ( $\leq 200$ )	-	-
PCB-34	17	17	-	0 ( $\leq 200$ )	-	-
PCB-35	91	69	-	22 ( $\leq 200$ )	-	-
PCB-36	55	44	-	11 ( $\leq 200$ )	-	-
PCB-37	470	520	-	50 ( $\leq 200$ )	-	-
PCB-38	20	20	-	0 ( $\leq 200$ )	-	-
PCB-39	66	58	-	8 ( $\leq 200$ )	-	-
PCB-40	260	270	-	10 ( $\leq 200$ )	-	-
PCB-41*	1000	1100	-	100 ( $\leq 200$ )	-	-
PCB-42*	290	350	-	60 ( $\leq 200$ )	-	-
PCB-43*	590	770	-	180 ( $\leq 200$ )	-	-
PCB-44	900	1000	-	100 ( $\leq 200$ )	-	-
PCB-45	98	120	-	22 ( $\leq 200$ )	-	-

Compound	Concentration (pg/g)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA33-0.5B	SA33009-0.5B				
PCB-46	53	58	-	5 ( $\leq 200$ )	-	-
PCB-47*	410	460	-	50 ( $\leq 200$ )	-	-
PCB-48*	410	460	-	50 ( $\leq 200$ )	-	-
PCB-49*	590	770	-	180 ( $\leq 200$ )	-	-
PCB-50	13	14	-	1 ( $\leq 200$ )	-	-
PCB-51	51	54	-	3 ( $\leq 200$ )	-	-
PCB-52*	1500	1700	13 ( $\leq 50$ )	-	-	-
PCB-53	150	180	-	30 ( $\leq 200$ )	-	-
PCB-54	2.1	2.6	-	0.5 ( $\leq 200$ )	-	-
PCB-55	140	97	-	43 ( $\leq 200$ )	-	-
PCB-56*	920	1100	-	180 ( $\leq 200$ )	-	-
PCB-58	68	53	-	15 ( $\leq 200$ )	-	-
PCB-59*	290	350	-	60 ( $\leq 200$ )	-	-
PCB-60*	920	1100	-	180 ( $\leq 200$ )	-	-
PCB-61*	480	610	-	130 ( $\leq 200$ )	-	-
PCB-62	87	68	-	19 ( $\leq 200$ )	-	-
PCB-63	80	78	-	2 ( $\leq 200$ )	-	-
PCB-64*	1000	1100	-	100 ( $\leq 200$ )	-	-
PCB-65	21	19	-	2 ( $\leq 200$ )	-	-
PCB-66*	830	960	-	130 ( $\leq 200$ )	-	-
PCB-67	82	58	-	34 ( $\leq 200$ )	-	-

Compound	Concentration (pg/g)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA33-0.5B	SA33009-0.5B				
PCB-68*	1000	1100	-	100 ( $\leq 200$ )	-	-
PCB-70	1100	1500	31 ( $\leq 50$ )	-	-	-
PCB-71	360	340	-	20 ( $\leq 200$ )	-	-
PCB-72	160	130	-	30 ( $\leq 200$ )	-	-
PCB-73*	1500	1700	13 ( $\leq 50$ )	-	-	-
PCB-74*	480	610	-	130 ( $\leq 200$ )	-	-
PCB-75*	410	460	-	50 ( $\leq 200$ )	-	-
PCB-76*	830	960	-	130 ( $\leq 200$ )	-	-
PCB-78	63	36	-	27 ( $\leq 200$ )	-	-
PCB-79	230	150	-	80 ( $\leq 200$ )	-	-
PCB-80*	830	960	-	130 ( $\leq 200$ )	-	-
PCB-82	1100	880	-	220 ( $\leq 200$ )	J (all detects)	A
PCB-83*	690	480	-	210 ( $\leq 200$ )	J (all detects)	A
PCB-84	1000	870	-	130 ( $\leq 200$ )	-	-
PCB-85*	1800	1300	32 ( $\leq 50$ )	-	-	-
PCB-86*	5100	4400	15 ( $\leq 50$ )	-	-	-
PCB-87*	5100	4400	15 ( $\leq 50$ )	-	-	-
PCB-88*	350	250	-	100 ( $\leq 200$ )	-	-
PCB-89*	5800	4700	21 ( $\leq 50$ )	-	-	-
PCB-90*	5800	4700	21 ( $\leq 50$ )	-	-	-
PCB-91	630	550	-	80 ( $\leq 200$ )	-	-

Compound	Concentration (pg/g)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA33-0.5B	SA33009-0.5B				
PCB-92	1500	1100	31 ( $\leq 50$ )	-	-	-
PCB-93*	6800	5300	25 ( $\leq 50$ )	-	-	-
PCB-95*	6800	5300	25 ( $\leq 50$ )	-	-	-
PCB-97*	5100	4400	15 ( $\leq 50$ )	-	-	-
PCB-98*	190	180	-	10 ( $\leq 200$ )	-	-
PCB-99	1900	1600	17 ( $\leq 50$ )	-	-	-
PCB-100	200U	110	-	90 ( $\leq 200$ )	-	-
PCB-101*	5800	4700	21 ( $\leq 50$ )	-	-	-
PCB-102*	190	180	-	10 ( $\leq 200$ )	-	-
PCB-103	150	110	-	40 ( $\leq 200$ )	-	-
PCB-104	20	16	-	4 ( $\leq 200$ )	-	-
PCB-105*	1700	1500	13 ( $\leq 50$ )	-	-	-
PCB-106*	2500	2300	8 ( $\leq 50$ )	-	-	-
PCB-107/109*	900	660	-	240 ( $\leq 200$ )	J (all detects)	A
PCB-108/107*	900	660	-	240 ( $\leq 200$ )	J (all detects)	A
PCB-109/108*	690	480	-	210 ( $\leq 200$ )	J (all detects)	A
PCB-110	8700	6800	25 ( $\leq 50$ )	-	-	-
PCB-111*	5100	4400	15 ( $\leq 50$ )	-	-	-
PCB-113	200U	100	-	100 ( $\leq 200$ )	-	-
PCB-114	170	130	-	40 ( $\leq 77$ )	-	-
PCB-117*	5100	4400	15 ( $\leq 50$ )	-	-	-

Compound	Concentration (pg/g)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA33-0.5B	SA33009-0.5B				
PCB-118*	2500	2300	8 ( $\leq 50$ )	-	-	-
PCB-119	120	120	-	0 ( $\leq 200$ )	-	-
PCB-120*	1800	1300	32 ( $\leq 50$ )	-	-	-
PCB-121*	350	250	-	100 ( $\leq 200$ )	-	-
PCB-122	170	130	-	40 ( $\leq 200$ )	-	-
PCB-124	450	340	-	110 ( $\leq 200$ )	-	-
PCB-125*	5100	4400	15 ( $\leq 50$ )	-	-	-
PCB-126	250	160	-	90 ( $\leq 110$ )	-	-
PCB-127*	1700	1500	13 ( $\leq 50$ )	-	-	-
PCB-128	3100	2100	38 ( $\leq 50$ )	-	-	-
PCB-129	1500	1000	-	500 ( $\leq 200$ )	-	-
PCB-130	1800	1200	40 ( $\leq 50$ )	-	-	-
PCB-131*	630	470	-	160 ( $\leq 200$ )	-	-
PCB-132*	8900	5700	44 ( $\leq 50$ )	-	-	-
PCB-133	550	370	-	180 ( $\leq 200$ )	-	-
PCB-134	1600	960	-	640 ( $\leq 200$ )	J (all detects)	A
PCB-135*	6900	4600	40 ( $\leq 50$ )	-	-	-
PCB-136	3700	2700	31 ( $\leq 50$ )	-	-	-
PCB-137	530	370	-	160 ( $\leq 200$ )	-	-
PCB-138*	28000	18000	43 ( $\leq 50$ )	-	-	-
PCB-139*	31000	22000	34 ( $\leq 50$ )	-	-	-

Compound	Concentration (pg/g)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA33-0.5B	SA33009-0.5B				
PCB-140	300	190	-	110 ( $\leq 200$ )	-	-
PCB-141	11000	6900	46 ( $\leq 50$ )	-	-	-
PCB-142*	630	470	-	160 ( $\leq 200$ )	-	-
PCB-144*	6900	4600	40 ( $\leq 50$ )	-	-	-
PCB-145	96	61	-	35 ( $\leq 200$ )	-	-
PCB-146	6000	3800	45 ( $\leq 50$ )	-	-	-
PCB-147	430	300	-	130 ( $\leq 200$ )	-	-
PCB-148	420	260	-	160 ( $\leq 200$ )	-	-
PCB-149*	31000	22000	34 ( $\leq 50$ )	-	-	-
PCB-150	290	190	-	100 ( $\leq 200$ )	-	-
PCB-151	9600	6600	37 ( $\leq 50$ )	-	-	-
PCB-152	77	54	-	23 ( $\leq 200$ )	-	-
PCB-153	28000	18000	43 ( $\leq 50$ )	-	-	-
PCB-154	660	410	-	250 ( $\leq 200$ )	J (all detects)	A
PCB-155	160	110	-	50 ( $\leq 200$ )	-	-
PCB-156	2100	1400	40 ( $\leq 50$ )	-	-	-
PCB-157	440	280	44 ( $\leq 50$ )	-	-	-
PCB-158*	3900	3700	5 ( $\leq 50$ )	-	-	-
PCB-159	1100	660	50 ( $\leq 50$ )	-	-	-
PCB-160*	3900	2700	36 ( $\leq 50$ )	-	-	-
PCB-161	280	160	-	120 ( $\leq 200$ )	-	-

Compound	Concentration (pg/g)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA33-0.5B	SA33009-0.5B				
PCB-162	780	470	-	310 ( $\leq 200$ )	J (all detects)	A
PCB-163*	28000	18000	43 ( $\leq 50$ )	-	-	-
PCB-164*	28000	18000	43 ( $\leq 50$ )	-	-	-
PCB-165*	630	470	-	160 ( $\leq 200$ )	-	-
PCB-166	220	160	-	60 ( $\leq 200$ )	-	-
PCB-167	1200	670	57 ( $\leq 50$ )	-	J (all detects)	A
PCB-168*	8900	5700	44 ( $\leq 50$ )	-	-	-
PCB-169	120	62	-	58 ( $\leq 73$ )	-	-
PCB-170*	16000	9800	48 ( $\leq 50$ )	-	-	-
PCB-171	4300	3400	23 ( $\leq 50$ )	-	-	-
PCB-172*	4300	3200	29 ( $\leq 50$ )	-	-	-
PCB-173	460	380	-	80 ( $\leq 200$ )	-	-
PCB-174	19000	15000	24 ( $\leq 50$ )	-	-	-
PCB-175	1600	1300	21 ( $\leq 50$ )	-	-	-
PCB-176	2200	1800	20 ( $\leq 50$ )	-	-	-
PCB-177	9500	7300	26 ( $\leq 50$ )	-	-	-
PCB-178	3600	2900	22 ( $\leq 50$ )	-	-	-
PCB-179	6100	5100	18 ( $\leq 50$ )	-	-	-
PCB-180	36000	23000	44 ( $\leq 50$ )	-	-	-
PCB-182*	15000	10000	40 ( $\leq 50$ )	-	-	-
PCB-183	9700	7400	27 ( $\leq 50$ )	-	-	-

Compound	Concentration (pg/g)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA33-0.5B	SA33009-0.5B				
PCB-184	1000	800	-	200 ( $\leq 200$ )	-	-
PCB-185	2600	2100	21 ( $\leq 50$ )	-	-	-
PCB-186	140	120	-	20 ( $\leq 200$ )	-	-
PCB-187*	15000	10000	40 ( $\leq 50$ )	-	-	-
PCB-188	500	340	-	160 ( $\leq 200$ )	-	-
PCB-189	1000	640	44 ( $\leq 50$ )	-	-	-
PCB-190*	16000	9800	48 ( $\leq 50$ )	-	-	-
PCB-191	1100	830	28 ( $\leq 50$ )	-	-	-
PCB-192*	4300	3200	29 ( $\leq 50$ )	-	-	-
PCB-193	2600	1900	31 ( $\leq 50$ )	-	-	-
PCB-194	13000	7700	51 ( $\leq 50$ )	-	J (all detects)	A
PCB-195	3900	2300	52 ( $\leq 50$ )	-	J (all detects)	A
PCB-196*	20000	12000	50 ( $\leq 50$ )	-	-	-
PCB-197	3700	2100	55 ( $\leq 50$ )	-	J (all detects)	A
PCB-198	2700	1500	57 ( $\leq 50$ )	-	J (all detects)	A
PCB-199/200	2600	1500	54 ( $\leq 50$ )	-	J (all detects)	A
PCB-200/201	4500	3700	20 ( $\leq 50$ )	-	-	-
PCB-201/199	14000	8800	46 ( $\leq 50$ )	-	-	-
PCB-202	2300	1400	49 ( $\leq 50$ )	-	-	-
PCB-203*	20000	12000	50 ( $\leq 50$ )	-	-	-
PCB-204	2200	1200	59 ( $\leq 50$ )	-	J (all detects)	A



Compound	Concentration (pg/g)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA33-0.5B	SA33009-0.5B				
PCB-205	2900	1600	58 ( $\leq 50$ )	-	J (all detects)	A
PCB-206	15000	11000	31 ( $\leq 50$ )	-	-	-
PCB-207	22000	14000	44 ( $\leq 50$ )	-	-	-
PCB-208	10000	6500	42 ( $\leq 50$ )	-	-	-
PCB-209	80000	56000	35 ( $\leq 50$ )	-	-	-

\*Co-eluting isomer

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
 Polychlorinated Biphenyls as Congeners - Data Qualification Summary - SDG  
 G9J150241**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
G9J150241	SA33-0.0B	PCB-138 PCB-139 PCB-149 PCB-153 PCB-163 PCB-164 PCB-170 PCB-174 PCB-180 PCB-182 PCB-187 PCB-190 PCB-196 PCB-203 PCB-207 PCB-209	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Project Quantitation Limit (e)
G9J150241	SA33-0.5B	PCB-138 PCB-139 PCB-141 PCB-149 PCB-153 PCB-163 PCB-164 PCB-170 PCB-174 PCB-180 PCB-182 PCB-187 PCB-190 PCB-194 PCB-196 PCB-203 PCB-206 PCB-207 PCB-208 PCB-209	J (all detects) J (all detects)	P	Project Quantitation Limit (e)
G9J150241	SA33009-0.5B	PCB-138 PCB-139 PCB-149 PCB-153 PCB-163 PCB-164 PCB-174 PCB-180 PCB-182 PCB-187 PCB-196 PCB-203 PCB-206 PCB-207 PCB-209	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Project Quantitation Limit (e)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
G9J150241	SA33-0.0B SA33-0.5B SA33009-0.5B SA33-33B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
G9J150241	SA33-0.0B SA33-0.5B SA33009-0.5B SA33-33B	All compounds reported as EMPC	JK (all detects)	A	Project Quantitation Limit (k)
G9J150241	SA33-0.5B SA33009-0.5B	PCB-18 PCB-28 PCB-31 PCB-82 PCB-83* PCB-107/109* PCB-108/107* PCB-109/108* PCB-134 PCB-154 PCB-162	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	A	Field duplicates (Difference) (fd)
G9J150241	SA33-0.5B SA33009-0.5B	PCB-167 PCB-194 PCB-195 PCB-197 PCB-198 PCB-199/200 PCB-204 PCB-205	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	A	Field duplicates (RPD) (fd)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Polychlorinated Biphenyls as Congeners - Laboratory Blank Data Qualification  
Summary - SDG G9J150241**

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
G9J150241	SA33-0.0B (10X)	PCB-11 PCB-17 PCB-18 PCB-19 PCB-20* PCB-21* PCB-33* PCB-54	61U pg/g 36U pg/g 94U pg/g 13U pg/g 220U pg/g 220U pg/g 220U pg/g 2.7U pg/g	A	bl

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
G9J150241	SA33-0.5B (10X)	PCB-11 PCB-17 PCB-18 PCB-19 PCB-20* PCB-21* PCB-26 PCB-31 PCB-33* PCB-54	79U pg/g 34U pg/g 81U pg/g 12U pg/g 130U pg/g 130U pg/g 35U pg/g 110U pg/g 130U pg/g 2.1U pg/g	A	bl
G9J150241	SA33009-0.5B (10X)	PCB-11 PCB-54	56U pg/g 2.6U pg/g	A	bl

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
G9J150241	SA33-33B	PCB-5*	5.2U pg/g	A	bl
		PCB-8*	5.2U pg/g		
		PCB-11	12U pg/g		
		PCB-16*	11U pg/g		
		PCB-17	6.5U pg/g		
		PCB-18	9.1U pg/g		
		PCB-20*	13U pg/g		
		PCB-21*	13U pg/g		
		PCB-22	7.9U pg/g		
		PCB-28	9.4U pg/g		
		PCB-31	9.0U pg/g		
		PCB-32*	11U pg/g		
		PCB-33*	13U pg/g		
		PCB-41*	6.6U pg/g		
		PCB-42*	3.8U pg/g		
		PCB-43*	5.2U pg/g		
		PCB-44*	6.4U pg/g		
		PCB-47*	7.5U pg/g		
		PCB-48*	7.5U pg/g		
		PCB-49*	5.2U pg/g		
		PCB-52*	5.5U pg/g		
		PCB-56*	7.8U pg/g		
		PCB-59*	3.8U pg/g		
		PCB-60*	7.8U pg/g		
		PCB-64*	6.6U pg/g		
		PCB-66*	4.6U pg/g		
		PCB-68*	6.6U pg/g		
		PCB-70	7.3U pg/g		
		PCB-73*	5.5U pg/g		
		PCB-75*	7.5U pg/g		
		PCB-76*	4.6U pg/g		
		PCB-80*	4.6U pg/g		
		PCB-86*	4.5U pg/g		
		PCB-87*	4.5U pg/g		
		PCB-89*	3.7U pg/g		
		PCB-90*	3.7U pg/g		
		PCB-93*	4.8U pg/g		
		PCB-95*	4.8U pg/g		
		PCB-97*	4.5U pg/g		
		PCB-101*	3.7U pg/g		
		PCB-110	5.9U pg/g		
		PCB-111*	4.5U pg/g		
		PCB-117*	4.5U pg/g		
		PCB-125*	4.5U pg/g		
		PCB-138*	5.3U pg/g		
		PCB-139*	5.8U pg/g		
		PCB-149*	5.8U pg/g		
		PCB-153	4.2U pg/g		
		PCB-163*	5.3U pg/g		
		PCB-164*	5.3U pg/g		
		PCB-180	3.5U pg/g		

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
 Polychlorinated Biphenyls as Congeners - Field Blank Data Qualification Summary -  
 SDG G9J150241**

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
G9J150241	SA33-33B	PCB-90+101+113 PCB-110+115 PCB-129+138+163	3.7U pg/g 5.9U pg/g 5.3U pg/g	A	bf

LDC #: 22193A3c  
 SDG #: G9J150241  
 Laboratory: Test America

**Tronox Northgate Henderson**  
**VALIDATION COMPLETENESS WORKSHEET**  
 Stage 2B

Date: 12/15/09  
 Page: 1 of 1  
 Reviewer: R  
 2nd Reviewer: \_\_\_\_\_

**METHOD:** HRGC/HRMS Polychlorinated Biphenyl Congeners (EPA Method 1668A)

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: 10/20/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	
IV.	Routine calibration/ICV	A	
V.	Blanks	TW	
VI.	Matrix spike/Matrix spike duplicates	N	diut spified
VII.	Laboratory control samples	A	LCs
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	A	
X.	Target compound identifications	N	
XI.	Compound quantitation and CRQLs	SN	
XII.	System performance	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	TW	D = 2+3
XV.	Field blanks	TW	FB 8 = 809-50 (R1924894)

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:

1	SA33-0.0B	S	11	9302266MB	21		31
2	SA33-0.5B		12		22		32
3	SA33009-0.5B		13		23		33
4	SA33-33B	↓	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

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
 Y  N  N/A Were all samples associated with a method blank?  
 Y  N  N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?  
 Y  N  N/A Was the method blank contaminated? If yes, please see qualification below.

Blank extraction date: 10/30/09 Blank analysis date: 11/17/09  
 Conc. units: pg/g Associated samples: All

Compound	Blank ID	Sample Identification								
		5X	1 (10X)	2 (10X)	3 (10X)	4				
PCB 1	9302266MB	1.55								
PCB 3	0.31	1.3								
PCB 5 *	0.26	12.5								
PCB 8 *	2.5	12.5							5.2/U	
PCB 11	2.5	49.5	61/U	79/U	56/U				5.2/U	
PCB 16 *	9.9	12							12/U	
PCB 17	2.4	8	36/U	34/U					11/U	
PCB 18	1.6	15.5	94/U	81/U					6.5/U	
PCB 19	0.32	1.6	13/U	12/U					9.1/U	
PCB 20 *	4.4	22	220/U	130/U					13/U	
PCB 21 *	4.4	22	220/U	130/U					13/U	
PCB 22	2.2	11							7.9/U	
PCB 24 *	0.34	1.7								
PCB 25	0.41	2.05								
PCB 26	0.75	3.75			35/U					
PCB 27 *	0.34	1.7								
PCB 28	3.9	19.5							9.4/U	
PCB 31	3.6	18			110/U				9.0/U	
PCB 32 *	2.4	12							11/U	
PCB 33 *	4.4	22	220/U	130/U					13/U	
PCB 37	1.0	5								









PCB 180	1.4	7	3.5/U						
PCB 182 *	0.54	2.7							
PCB 183	0.47	2.35							
PCB 187 *	0.54	2.7							
PCB 190 *	0.75	3.75							
PCB 194	0.22	1.1							
PCB 195	0.11	0.55							
PCB 196 *	0.33	1.65							
PCB 198	0.034	0.17							
PCB 199/200	0.036	0.18							
PCB 200/201	0.033	0.165							
PCB 201/199	0.29	1.45							
PCB 202	0.11	0.55							
PCB 203 *	0.33	1.65							
PCB 206	0.051	0.255							
PCB 207	0.010	0.05							
PCB 209	0.20	1							

\* Co-eluting isomer

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

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668)

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

Blank units: \_\_\_\_\_ pg/L Associated sample units: \_\_\_\_\_ pg/g

Field blank type: (circle one) Field Blank / Rinsate / Other: \_\_\_\_\_ Associated Samples: ALL

Compound	Blank ID	Sample Identification
	ER082809-SO	(5X)
PCB 1	20.6	0.103
PCB 2	15.0	0.075
PCB 3	28.6	0.143
PCB 8	185	0.925
PCB 11	1660	8.3
PCB 19	22.6	0.113
PCBs 18+30	150	0.75
PCB 17	82.0	0.41
PCB 16	128	0.64
PCB 32	53.1	0.2655
PCBs 26+29	34.8	0.174
PCB 31	166	0.83
PCBs 20+28	197	0.985
PCBs 21+33	125	0.625
PCB 22	78.5	0.3925
PCB 37	41.2	0.206
PCB 52	588	2.94
PCBs 49+69	148	0.74
PCBs 44+47+65	296	1.48
PCB 42	40.7	0.2035
PCBs 41+71+40	83.4	0.417
PCB 64	84.5	0.4225
PCBs 70+61+74+76	418	2.09











LDC#: 22193A3c  
SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 1 of 8  
Reviewer:                       
2nd Reviewer:                     

**METHOD: HRGC/HRMS PCB Cong (EPA Method 1668A)**

Y/N/NA  
Y/N/NA

Were field duplicate pairs identified in this SDG?  
Were target analytes detected in the field duplicate pairs?

Compound	Concentration (pg/g)		(≤50)	(pg/g)	(pg/g)	Qualifications (Parent Only)
	2	3	RPD	Difference	Limits	
PCB 1	57	45		12	(≤200)	
PCB 2	110	68		42	(≤200)	
PCB 3	170	96		74	(≤200)	
PCB 5 *	220	270		50	(≤200)	
PCB 6	73	69		4	(≤200)	
PCB 7 *	50	200U		150	(≤200)	
PCB 8 *	220	270		50	(≤200)	
PCB 9 *	50	200U		150	(≤200)	
PCB 11	79	56		23	(≤200)	
PCB 12 *	220	150		70	(≤200)	
PCB 13 *	220	150		70	(≤200)	
PCB 15	660	540		120	(≤200)	
PCB 16 *	170	360		190	(≤200)	
PCB 17	34	140		106	(≤200)	
PCB 18	81	290		209	(≤200)	sdets/A (fd)
PCB 19	12	28		16	(≤200)	
PCB 20 *	130	320		190	(≤200)	
PCB 21 *	130	320		190	(≤200)	
PCB 22	150	310		160	(≤200)	
PCB 23	9.6	8.4		1.2	(≤200)	
PCB 24 *	36	59		23	(≤200)	
PCB 25	29	43		14	(≤200)	
PCB 26	35	76		41	(≤200)	
PCB 27 *	36	59		23	(≤200)	
PCB 28	350	670		320	(≤200)	sdets/A (fd)
PCB 29	11	11		0	(≤200)	
PCB 30	5.2	5.8		0.6	(≤200)	

LDC#: 22193A3c  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 2 of 8  
 Reviewer: Q  
 2nd Reviewer: \_\_\_\_\_

**METHOD: HRGC/HRMS PCB Cong (EPA Method 1668A)**

Y N NA  
Y N NA

Were field duplicate pairs identified in this SDG?  
 Were target analytes detected in the field duplicate pairs?

Compound	Concentration (pg/g)		(≤50)	(pg/g)	(pg/g)	Qualifications (Parent Only)
	2	3	RPD	Difference	Limits	
PCB 31	110	390		280	(≤200)	<i>detected (f+d)</i>
PCB 32 *	170	360		190	(≤200)	
PCB 33 *	130	320		190	(≤200)	
PCB 34	17	17		0	(≤200)	
PCB 35	91	69		22	(≤200)	
PCB 36	55	44		11	(≤200)	
PCB 37	470	520		50	(≤200)	
PCB 38	20	20		0	(≤200)	
PCB 39	66	58		8	(≤200)	
PCB 40	260	270		10	(≤200)	
PCB 41 *	1000	1100		100	(≤200)	
PCB 42 *	290	350		60	(≤200)	
PCB 43 *	590	770		180	(≤200)	
PCB 44	900	1000		100	(≤200)	
PCB 45	98	120		22	(≤200)	
PCB 46	53	58		5	(≤200)	
PCB 47 *	410	460		50	(≤200)	
PCB 48 *	410	460		50	(≤200)	
PCB 49 *	590	770		180	(≤200)	
PCB 50	13	14		1	(≤200)	
PCB 51	51	54		3	(≤200)	
PCB 52 *	1500	1700	13			
PCB 53	150	180		30	(≤200)	
PCB 54	2.1	2.6		0.5	(≤200)	
PCB 55	140	97		43	(≤200)	
PCB 56 *	920	1100		180	(≤200)	
PCB 58	68	53		15	(≤200)	

LDC#: 22193A3c  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page 3 of 8  
 Reviewer: [Signature]  
 2nd Reviewer: \_\_\_\_\_

**METHOD:** HRGC/HRMS PCB Cong (EPA Method 1668A)

Y N NA  
Y N NA

Were field duplicate pairs identified in this SDG?  
 Were target analytes detected in the field duplicate pairs?

Compound	Concentration (pg/g)		(≤50)	(pg/g)	(pg/g)	Qualifications (Parent Only)
	2	3	RPD	Difference	Limits	
PCB 59 *	290	350		60	( ≤200)	
PCB 60 *	920	1100		180	( ≤200)	
PCB 61 *	480	610		130	( ≤200)	
PCB 62	87	68		19	( ≤200)	
PCB 63	80	78		2	( ≤200)	
PCB 64 *	1000	1100		100	( ≤200)	
PCB 65	21	19		2	( ≤200)	
PCB 66 *	830	960		130	( ≤200)	
PCB 67	82	58		34	( ≤200)	
PCB 68 *	1000	1100		100	( ≤200)	
PCB 70	1100	1500	31			
PCB 71	360	340		20	( ≤200)	
PCB 72	160	130		30	( ≤200)	
PCB 73 *	1500	1700	13			
PCB 74 *	480	610		130	( ≤200)	
PCB 75 *	410	460		50	( ≤200)	
PCB 76 *	830	960		130	( ≤200)	
PCB 78	63	36		27	( ≤200)	
PCB 79	230	150		80	( ≤200)	
PCB 80 *	830	960		130	( ≤200)	
PCB 82	1100	880		220	( ≤200)	<u>detected (td)</u>
PCB 83 *	690	480		210	( ≤200)	↓
PCB 84	1000	870		130	( ≤200)	
PCB 85 *	1800	1300	32		( ≤200)	
PCB 86 *	5100	4400	15		( ≤200)	
PCB 87 *	5100	4400	15		( ≤200)	
PCB 88 *	350	250		100	( ≤200)	

LDC#: 22193A3c  
SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 4 of 8  
Reviewer: [Signature]  
2nd Reviewer: \_\_\_\_\_

**METHOD:** HRGC/HRMS PCB Cong (EPA Method 1668A)

Y N NA  
Y N NA

Were field duplicate pairs identified in this SDG?  
Were target analytes detected in the field duplicate pairs?

Compound	Concentration (pg/g)		(≤50)	(pg/g)	(pg/g)	Qualifications (Parent Only)
	2	3	RPD	Difference	Limits	
PCB 89 *	5800	4700	21			
PCB 90 *	5800	4700	21			
PCB 91	630	550		80	( ≤200)	
PCB 92	1500	1100	31			
PCB 93 *	6800	5300	25			
PCB 95 *	6800	5300	25			
PCB 97 *	5100	4400	15			
PCB 98 *	190	180		10	( ≤200)	
PCB 99	1900	1600	17			
PCB 100	200U	110		90	( ≤200)	
PCB 101 *	5800	4700	21			
PCB 102 *	190	180		10	( ≤200)	
PCB 103	150	110		40	( ≤200)	
PCB 104	20	16		4	( ≤200)	
PCB 105 *	1700	1500	13			
PCB 106 *	2500	2300	8			
PCB 107/109 *	900	660		240	( ≤200)	delete A (td)
PCB 108/107 *	900	660		240	( ≤200)	↓
PCB 109/108 *	690	480		210	( ≤200)	
PCB 110	8700	6800	25			
PCB 111 *	5100	4400	15			
PCB 113	200U	100		100	( ≤200)	
PCB 114	170	130		40	( ≤77)	
PCB 117 *	5100	4400	15			
PCB 118 *	2500	2300	8			
PCB 119	120	120		0	( ≤200)	
PCB 120 *	1800	1300	32			

LDC#: 22193A3c  
SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 5 of 8  
Reviewer: [Signature]  
2nd Reviewer: \_\_\_\_\_

**METHOD:** HRGC/HRMS PCB Cong (EPA Method 1668A)

Y N NA Were field duplicate pairs identified in this SDG?  
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (pg/g)		(≤50)	(pg/g)	(pg/g)	Qualifications (Parent Only)
	2	3	RPD	Difference	Limits	
PCB 121 *	350	250		100	( ≤200)	
PCB 122	170	130		40	( ≤200)	
PCB 124	450	340		110	( ≤200)	
PCB 125 *	5100	4400	15			
PCB 126	250	160		90	( ≤110)	
PCB 127 *	1700	1500	13			
PCB 128	3100	2100	38			
PCB 129	1500	1000		500	( ≤200)	
PCB 130	1800	1200	40			
PCB 131 *	630	470		160	( ≤200)	
PCB 132 *	8900	5700	44			
PCB 133	550	370		180	( ≤200)	
PCB 134	1600	960		640	( ≤200)	↓ det = / Δ (fd)
PCB 135 *	6900	4600	40			
PCB 136	3700	2700	31			
PCB 137	530	370		160	( ≤200)	
PCB 138 *	28000	18000	43			
PCB 139 *	31000	22000	34			
PCB 140	300	190		110	( ≤200)	
PCB 141	11000	6900	46			
PCB 142 *	630	470		160	( ≤200)	
PCB 144 *	6900	4600	40			
PCB 145	96	61		35	( ≤200)	
PCB 146	6000	3800	45			
PCB 147	430	300		130	( ≤200)	
PCB 148	420	260		160	( ≤200)	
PCB 149 *	31000	22000	34			

LDC#: 22193A3c  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 6 of 8  
 Reviewer: [Signature]  
 2nd Reviewer: \_\_\_\_\_

**METHOD:** HRGC/HRMS PCB Cong (EPA Method 1668A)

Y N NA Were field duplicate pairs identified in this SDG?  
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (pg/g)		(≤50)	(pg/g)	(pg/g)	Qualifications (Parent Only)
	2	3	RPD	Difference	Limits	
PCB 150	290	190		100	(≤200)	
PCB 151	9600	6600	37			
PCB 152	77	54		23	(≤200)	
PCB 153	28000	18000	43			
PCB 154	660	410		250	(≤200)	↓ det = A (fd)
PCB 155	160	110		50	(≤200)	
PCB 156	2100	1400	40			
PCB 157	440	280	44			
PCB 158 *	3900	3700	5			
PCB 159	1100	660	50			
PCB 160 *	3900	2700	36			
PCB 161	280	160		120	(≤200)	
PCB 162	780	470		310	(≤200)	↓ det = A (fd)
PCB 163 *	28000	18000	43			
PCB 164 *	28000	18000	43			
PCB 165 *	630	470		160	(≤200)	
PCB 166	220	160		60	(≤200)	
PCB 167	1200	670	57			↓ det = A (fd)
PCB 168 *	8900	5700	44			
PCB 169	120	62		58	(≤73)	
PCB 170 *	16000	9800	48			
PCB 171	4300	3400	23			
PCB 172 *	4300	3200	29			
PCB 173	460	380		80	(≤200)	
PCB 174	19000	15000	24			
PCB 175	1600	1300	21			
PCB 176	2200	1800	20			

LDC#: 22193A3c  
SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 7 of 8  
Reviewer: [Signature]  
2nd Reviewer: \_\_\_\_\_

**METHOD:** HRGC/HRMS PCB Cong (EPA Method 1668A)

Y N NA Were field duplicate pairs identified in this SDG?  
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (pg/g)		(≤50)	(pg/g)	(pg/g)	Qualifications (Parent Only)
	2	3	RPD	Difference	Limits	
PCB 177	9500	7300	26			
PCB 178	3600	2900	22			
PCB 179	6100	5100	18			
PCB 180	36000	23000	44			
PCB 182 *	15000	10000	40			
PCB 183	9700	7400	27			
PCB 184	1000	800		200	(≤200)	
PCB 185	2600	2100	21			
PCB 186	140	120		20	(≤200)	
PCB 187 *	15000	10000	40			
PCB 188	500	340		160	(≤200)	
PCB 189	1000	640	44			
PCB 190 *	16000	9800	48			
PCB 191	1100	830	28			
PCB 192 *	4300	3200	29			
PCB 193	2600	1900	31			
PCB 194	13000	7700	51			↓ detz/A (Ad)
PCB 195	3900	2300	52			↓
PCB 196 *	20000	12000	50			
PCB 197	3700	2100	55			↓ detz/A (+d)
PCB 198	2700	1500	57			↓
PCB 199/200	2600	1500	54			
PCB 200/201	4500	3700	20			
PCB 201/199	14000	8800	46			
PCB 202	2300	1400	49			
PCB 203 *	20000	12000	50			
PCB 204	2200	1200	59			↓ detz/A (+d)



LDC#: 21563H3c  
SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 8 of 8  
Reviewer: \_\_\_\_\_  
2nd Reviewer: \_\_\_\_\_

**METHOD:** HRGC/HRMS PCB Cong (EPA Method 1668A)

Y N NA Were field duplicate pairs identified in this SDG?  
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (pg/g)		(≤50)	(pg/g)	(pg/g)	Qualifications (Parent Only)
	2	3	RPD	Difference	Limits	
PCB 205	2900	1600	58			↓ detects/A (+d)
PCB 206	15000	11000	31			
PCB 207	22000	14000	44			
PCB 208	10000	6500	42			
PCB 209	80000	56000	35			

\* Co-eluting isomer

**Tronox LLC Facility, 2009 Phase B Investigation  
Henderson, Nevada  
Data Validation Reports  
LDC# 22193**

Perchlorate

**LDC**

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

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

**Collection Date:** October 23 through October 30, 2009

**LDC Report Date:** December 21, 2009

**Matrix:** Water

**Parameters:** Perchlorate

**Validation Level:** Stage 4

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** G9K190437

**Sample Identification**

M-141B  
M-141009B  
PB-102309-A3  
M-139B  
M-145B  
M-144B  
M-146B  
M-138B  
M-138009B  
M-148B  
M-137B  
EB103009-GWA4  
M-139BMS  
M-139BMSD

## Introduction

This data review covers 14 water samples listed on the cover sheet. The analyses were per EPA Method 314.0 for Perchlorate.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UU Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. Calibration

### a. Initial Calibration

All criteria for the initial calibration were met.

### b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

## III. Blanks

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

Sample EB103009-GWA4 was identified as an equipment blank. No contaminant concentrations were found in this blank.

Sample FB080409-GW (from SDG R0904290) was identified as a field blank. No contaminant concentrations were found in this blank.

Sample PB-102309-A3 was identified as a pump blank. No contaminant concentrations were found in this blank with the following exceptions:

Pump Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
PB-102309-A3	10/23/09	Perchlorate	6.6 ug/L	M-141B M-141009B M-139B M-145B M-148B

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

## 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 and Project Quantitation Limit

All sample result verifications were acceptable.

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG G9K190437	All analytes reported below the PQL.	J (all detects)	A

## VIII. Overall Assessment

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

## IX. Field Duplicates

Samples M-141B and M-141009B and samples M-138B and M-138009B were identified as field duplicates. No perchlorate was detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-141B	M-141009B				
Perchlorate	716000	714000	0 ( $\leq 30$ )	-	-	-

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-138B	M-138009B				
Perchlorate	1920	1890	2 ( $\leq 30$ )	-	-	-

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Perchlorate - Data Qualification Summary - SDG G9K190437**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Perchlorate - Laboratory Blank Data Qualification Summary - SDG G9K190437**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Perchlorate - Equipment Blank Data Qualification Summary - SDG G9K190437**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Perchlorate - Field Blank Data Qualification Summary - SDG G9K190437**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Perchlorate - Pump Blank Data Qualification Summary - SDG G9K190437**

No Sample Data Qualified in this SDG



LDC #: 22193B6  
 SDG #: G9K190437  
 Laboratory: Test America

**Tronox Northgate Henderson**  
**VALIDATION COMPLETENESS WORKSHEET**  
 Stage 2B4

Date: 12-12-09  
 Page: (of)  
 Reviewer: CR  
 2nd Reviewer: W

**METHOD: (Analyte)** Perchlorate (EPA Method 314.0)

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

Validation Area			Comments
I.	Technical holding times	A	Sampling dates: <u>10/23/09 - 10/30/09</u>
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	<u>MS/D</u>
V	Duplicates	N	
VI.	Laboratory control samples	A	<u>LCS</u>
VII.	Sample result verification	A	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	<u>(1,2), (8,9)</u>
X	Field blanks	SW	<u>EB = 12, Pump Blank = 3, see below CR</u> <u>FB = FB080409-GWCS06X R0904290</u>

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

Validated Samples: water

1	M-141B	11	M-137B	21		31	<u>PB</u>
2	M-141009B	12	EB103009-GWA4	22		32	
3	PB-102309-A3	13	M-139BMS	23		33	
4	M-139B	14	M-139BMSD	24		34	
5	M-145B	15		25		35	
6	M-144B	16		26		36	
7	M-146B	17		27		37	
8	M-138B	18		28		38	
9	M-138009B	19		29		39	
10	M-148B	20		30		40	

Notes: FB = FB071909-SO (S06X R0904226) - CR  
FB = FB082909-SO (S06X R0904894)  
FB = FB083009-SO (S06X R0904279)

LDC #: 2219306  
 SDG #: see cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2  
 Reviewer: CR  
 2nd Reviewer: W

Method: Inorganics (EPA Method See cover)

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. Calibration</b>				
Were all instruments calibrated daily, each set-up time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the proper number of standards used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all initial calibration correlation coefficients > 0.995?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were titrant checks performed as required? (Level IV only)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Were balance checks performed as required? (Level IV only)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<b>III. Blanks</b>				
Was a method blank associated with every sample in this SDG?	<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>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.	<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 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>V. Laboratory control samples</b>				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was an LCS analyzed per extraction batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>VI. 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 checked="" type="checkbox"/>	<input type="checkbox"/>	

LDC #: 22A3B6  
 SDG #: see cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2  
 Reviewer: CR  
 2nd Reviewer: ✓

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 #: 22193B6

SDG #: See Cover

# VALIDATION FINDINGS WORKSHEET

## Field Blanks

Page: 1 of 1  
Reviewer: CR  
2nd Reviewer: CR

**METHOD:** Inorganics, EPA Method. See Cover

**Y**  **N**  **N/A** Were field blanks identified in this SDG?

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

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

**Sampling date:** 10/23/09 Soil factor applied NA

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

*Reason: bp*

Associated Samples: 1, 2, 4, 5, 10

Analyte	Blank ID	Action Limit	Sample Identification																		
			No. Qualifiers																		
	3																				
CIO4	6.6	66																			

LDC#: 22193B6  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

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

Inorganics, Method See Cover

Y N NA Were field duplicate pairs identified in this SDG?  
Y N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (ug/L)		RPD ( $\leq 30$ )	Difference	Limits	Qualification (Parent only)
	1	2				
Perchlorate	716000	714000	0			

V:\FIELD DUPLICATES\FD\_inorganic\22193B6.wpd

Analyte	Concentration (ug/L)		RPD ( $\leq 30$ )	Difference	Limits	Qualification (Parent only)
	8	9				
Perchlorate	1920	1890	2			

LDC #: 2219386  
 SDG #: see cal

**Validatin Findings Worksheet**  
**Initial and Continuing Calibration Calculation Verification**

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

**Method:** Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of ClO4 was recalculated. Calibration date: 11/9/09

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

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

Type of analysis	Analyte	Standard	Conc. (ug/l)	Area	Recalculated		Reported		Acceptable (Y/N)
					r or r <sup>2</sup>	r or r <sup>2</sup>			
Initial calibration	ClO4	s1	1	0.00166	0.999618	0.999618			Y
		s2	4	0.00767					
		s3	20	0.04261					
		s4	40	0.08716					
		s5	60	0.13357					
		s6	80	0.18076					
		s7	100	0.23229					
Calibration verification		CCV	60	59.458	99	-	-		
Calibration verification			60	54.426	91	-	-		
Calibration verification			100	95.627	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.

LDC #: 22-193186  
 SDG #: See cover

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

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

METHOD: Inorganics, Method See cover

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

$\%R = \frac{\text{Found}}{\text{True}} \times 100$  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		Acceptable (Y/N)
					%R / RPD	%R / RPD	
LCS	Laboratory control sample	ClO <sub>2</sub>	49.7	50.0	99	99	Y
13	Matrix spike sample	↓	4750 (SSR-SR)	5000	95	95	Y
13/14	Duplicate sample	↓	6380	6470	1.4	1.3	Y

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

LDC #: 22193BC  
 SDG #: see over

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

Page: 1 of 1  
 Reviewer: CF  
 2nd reviewer: W

METHOD: Inorganics, Method see over

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

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

Compound (analyte) results for ClO<sub>4</sub> reported with a positive detect were recalculated and verified using the following equation:

Concentration =  $\left( \frac{\text{Area} - \text{offset}}{\text{slope}} \right) DF$

Recalculation:  
 $5 = \left( \frac{0.05324 - 0.0003}{0.0021} \right) 20 = 504 \mu\text{g/L}$   
 $6 = \left( \frac{0.06330 - 0.0003}{0.0021} \right) 100 = 3000 \mu\text{g/L}$

#	Sample ID	Analyte	Reported Concentration ( $\mu\text{g/L}$ )	Calculated Concentration ( $\mu\text{g/L}$ )	Acceptable (Y/N)
	5	ClO <sub>4</sub>	499	504	Y
	6	<del>2950</del> ClO <sub>4</sub>	2950	3000	Y

Note: \_\_\_\_\_



**Tronox LLC Facility, 2009 Phase B Investigation  
Henderson, Nevada  
Data Validation Reports  
LDC# 22193**

Dioxins/Dibenzofurans

**LDC**

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** October 14 through October 21, 2009

**LDC Report Date:** December 18, 2009

**Matrix:** Soil/Water

**Parameters:** Dioxins/Dibenzofurans

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** G9J150241

### Sample Identification

SA160-0.5B  
SA178-0.5B  
SA142-20.5B  
SA142009-20.5B  
SA108-20B  
SA141-14B  
SA141009-14B  
SA143-24B  
SA171-5B  
EB101909-SO1A3  
SA157-0.5B  
SA157009-0.5B  
SA33-0.5B  
SA33009-0.5B  
SA156-0.5B  
SA52-15B  
SA149-22B  
SA108-20BMS  
SA108-20BMSD

## Introduction

This data review covers 18 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 8290 for Polychlorinated Dioxins/Dibenzofurans.

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

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UU Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. 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% .

## 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.

## 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 with the following exceptions:

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
9301394MB	10/28/09	OCDD	0.84 pg/g	All samples in SDG G9J150241

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SA141-14B	OCDD	1.1 pg/g	1.1U pg/g
SA141009-14B	OCDD	1.1 pg/g	1.1U pg/g
SA143-24B	OCDD	2.6 pg/g	2.6U pg/g
SA171-5B	OCDD	0.95 pg/g	0.95U pg/g

Sample EB101909-SO1A3 was identified as an equipment blank. No polychlorinated dioxin/dibenzofuran contaminants were found in this blank.

Samples FB080309-SO (from SDG R0904279) and FB082809-SO (from SDG R0904894) were identified as field blanks. No polychlorinated dioxin/dibenzofuran contaminants were found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB080309-SO	8/3/09	1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total HpCDD	2.58 pg/L 10.4 pg/L 1.71 pg/L 3.68 pg/L 2.58 pg/L	SA156-0.5B

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

## VI. 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.

## VII. Laboratory Control Samples (LCS)

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

## 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
SA142-20.5B	<sup>13</sup> C-OCDD	36 (40-135)	OCDD  OCDF	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P
SA142009-20.5B	<sup>13</sup> C-2,3,7,8-TCDF <sup>13</sup> C-2,3,7,8-TCDD <sup>13</sup> C-1,2,3,7,8-PeCDF <sup>13</sup> C-1,2,3,7,8-PeCDD <sup>13</sup> C-1,2,3,4,7,8-HxCDF <sup>13</sup> C-1,2,3,6,7,8-HxCDD <sup>13</sup> C-1,2,3,4,6,7,8-HpCDF <sup>13</sup> C-1,2,3,4,6,7,8-HpCDD <sup>13</sup> C-OCDD	27 (40-135) 30 (40-135) 28 (40-135) 25 (40-135) 21 (40-135) 24 (40-135) 27 (40-135) 28 (40-135) 30 (40-135)	2,3,7,8-TCDD 1,2,3,7,8-PeCDD 1,2,3,4,7,8-HxCDD 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD 2,3,7,8-TCDF 1,2,3,7,8-PeCDF 2,3,4,7,8-PeCDF 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF OCDF	J (all detects) UJ (all non-detects)	P
SA143-24B	<sup>13</sup> C-OCDD	33 (40-135)	OCDD  OCDF	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P
SA156-0.5B	<sup>13</sup> C-2,3,7,8-TCDF <sup>13</sup> C-2,3,7,8-TCDD <sup>13</sup> C-1,2,3,7,8-PeCDD <sup>13</sup> C-1,2,3,4,7,8-HxCDF <sup>13</sup> C-1,2,3,6,7,8-HxCDD <sup>13</sup> C-1,2,3,4,6,7,8-HpCDF <sup>13</sup> C-1,2,3,4,6,7,8-HpCDD <sup>13</sup> C-OCDD	34 (40-135) 38 (40-135) 37 (40-135) 27 (40-135) 34 (40-135) 30 (40-135) 39 (40-135) 29 (40-135)	2,3,7,8-TCDD 1,2,3,7,8-PeCDD 1,2,3,4,7,8-HxCDD 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD 2,3,7,8-TCDF 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF OCDF	J (all detects) UJ (all non-detects)	P
EB101909-SO1A3	<sup>13</sup> C-1,2,3,4,7,8-HxCDF <sup>13</sup> C-1,2,3,6,7,8-HxCDD <sup>13</sup> C-1,2,3,4,6,7,8-HpCDF	24 (40-135) 29 (40-135) 33 (40-135)	1,2,3,4,7,8-HxCDD 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF	J (all detects) UJ (all non-detects)	P

## X. Target Compound Identifications

Raw data were not reviewed for this SDG.

## XI. Project Quantitation Limit

All project quantitation limits were within validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
SA143-24B SA171-5B	2,3,7,8-TCDF	2nd column confirmation was not performed for this compound.	This compound must be confirmed on the 2nd column per the method.	None	P

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG G9J150241	All compounds reported below the PQL.	J (all detects)	A

All compounds reported as EMPC were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG G9J150241	All compounds reported as estimated maximum possible concentration (EMPC).	JK (all detects)	A

Raw data were not reviewed for this SDG.

## XII. System Performance

Raw data were not reviewed for this SDG.

## XIII. Overall Assessment of Data

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

## XIV. Field Duplicates

Samples SA142-20.5B and SA142009-20.5B, samples SA141-14B and SA141009-14B, samples SA157-0.5B and SA157009-0.5B, and samples SA33-0.5B and SA33009-0.5B were identified as field duplicates. No polychlorinated dioxins/dibenzofurans were detected in any of the samples with the following exceptions:



Compound	Concentration (pg/g)		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA142-20.5B	SA142009-20.5B				
2,3,7,8-TCDD	1.6	2.3	-	0.7 ( $\leq 0.52$ )	J (all detects)	A
1,2,3,7,8-PeCDD	4.2	6.6	-	2.4 ( $\leq 2.6$ )	-	-
1,2,3,4,7,8-HxCDD	2.4	5.1	-	2.7 ( $\leq 2.6$ )	-	-
1,2,3,6,7,8-HxCDD	4.8	11	-	6.2 ( $\leq 2.6$ )	J (all detects)	A
1,2,3,7,8,9-HxCDD	5.1	14	-	8.9 ( $\leq 2.6$ )	J (all detects)	A
1,2,3,4,6,7,8-HpCDD	16	40	86 ( $\leq 50$ )	-	J (all detects)	A
OCDD	15	43	-	28 ( $\leq 5.2$ )	J (all detects)	A
2,3,7,8-TCDF	34	42	21 ( $\leq 50$ )	-	-	-
1,2,3,7,8-PeCDF	60	91	41 ( $\leq 50$ )	-	-	-
2,3,4,7,8-PeCDF	28	38	30 ( $\leq 50$ )	-	-	-
1,2,3,4,7,8-HxCDF	93	200	73 ( $\leq 50$ )	-	J (all detects)	A
1,2,3,6,7,8-HxCDF	69	140	68 ( $\leq 50$ )	-	J (all detects)	A
2,3,4,6,7,8-HxCDF	18	41	78 ( $\leq 50$ )	-	J (all detects)	A
1,2,3,7,8,9-HxCDF	13	23	-	10 ( $\leq 2.6$ )	J (all detects)	A
1,2,3,4,6,7,8-HpCDF	220	510	79 ( $\leq 50$ )	-	J (all detects)	A
1,2,3,4,7,8,9-HpCDF	99	190	63 ( $\leq 50$ )	-	J (all detects)	A
OCDF	610	1400	79 ( $\leq 50$ )	-	J (all detects)	A

Compound	Concentration (pg/g)		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA141-14B	SA141009-14B				
1,2,3,6,7,8-HxCDD	2.7U	0.22	-	2.48 ( $\leq 2.7$ )	-	-
1,2,3,7,8,9-HxCDD	2.7U	0.23	-	2.47 ( $\leq 2.7$ )	-	-

Compound	Concentration (pg/g)		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA141-14B	SA141009-14B				
1,2,3,4,6,7,8-HpCDD	0.36	0.42	-	0.06 ( $\leq 2.7$ )	-	-
OCDD	1.1	1.1	-	0 ( $\leq 5.4$ )	-	-
2,3,7,8-TCDF	0.51	0.52U	-	0.01 ( $\leq 0.52$ )	-	-
1,2,3,7,8-PeCDF	1.0	0.95	-	0.05 ( $\leq 2.7$ )	-	-
2,3,4,7,8-PeCDF	0.52	0.50	-	0.02 ( $\leq 2.7$ )	-	-
1,2,3,4,7,8-HxCDF	2.2	1.5	-	0.7 ( $\leq 2.7$ )	-	-
1,2,3,6,7,8-HxCDF	1.5	1.1	-	0.4 ( $\leq 2.7$ )	-	-
2,3,4,6,7,8-HxCDF	0.39	0.47	-	0.08 ( $\leq 2.7$ )	-	-
1,2,3,7,8,9-HxCDF	2.7U	0.33	-	2.37 ( $\leq 2.7$ )	-	-
1,2,3,4,6,7,8-HpCDF	5.0	2.2	-	2.8 ( $\leq 2.7$ )	-	-
1,2,3,4,7,8,9-HpCDF	1.7	1.0	-	0.7 ( $\leq 2.7$ )	-	-
OCDF	13	5.4	-	7.6 ( $\leq 5.4$ )	J (all detects)	A

Compound	Concentration (pg/g)		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA157-0.5B	SA157009-0.5B				
2,3,7,8-TCDD	0.37	0.44	-	0.07 ( $\leq 0.53$ )	-	-
1,2,3,7,8-PeCDD	1.3	1.1	-	0.2 ( $\leq 2.6$ )	-	-
1,2,3,4,7,8-HxCDD	0.76	0.60	-	0.16 ( $\leq 2.6$ )	-	-
1,2,3,6,7,8-HxCDD	2.0	1.3	-	0.7 ( $\leq 2.6$ )	-	-
1,2,3,7,8,9-HxCDD	2.3	1.6	-	0.7 ( $\leq 2.6$ )	-	-
1,2,3,4,6,7,8-HpCDD	6.8	4.7	-	2.1 ( $\leq 2.6$ )	-	-
OCDD	8.3	6.3	-	2 ( $\leq 2.6$ )	-	-

Compound	Concentration (pg/g)		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA157-0.5B	SA157009-0.5B				
2,3,7,8-TCDF	24	21	13 ( $\leq 50$ )	-	-	-
1,2,3,7,8-PeCDF	19	14	30 ( $\leq 50$ )	-	-	-
2,3,4,7,8-PeCDF	8.4	7.5	-	0.9 ( $\leq 2.6$ )	-	-
1,2,3,4,7,8-HxCDF	34	22	43 ( $\leq 50$ )	-	-	-
1,2,3,6,7,8-HxCDF	24	16	40 ( $\leq 50$ )	-	-	-
2,3,4,6,7,8-HxCDF	6.9	4.3	-	2.6 ( $\leq 2.6$ )	-	-
1,2,3,7,8,9-HxCDF	4.8	2.5	-	2.3 ( $\leq 2.6$ )	-	-
1,2,3,4,6,7,8-HpCDF	88	56	44 ( $\leq 50$ )	-	-	-
1,2,3,4,7,8,9-HpCDF	36	22	48 ( $\leq 50$ )	-	-	-
OCDF	200	130	42 ( $\leq 50$ )	-	-	-

Compound	Concentration (pg/g)		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA33-0.5B	SA33009-0.5B				
2,3,7,8-TCDD	20	17	16 ( $\leq 50$ )	-	-	-
1,2,3,7,8-PeCDD	70	54	26 ( $\leq 50$ )	-	-	-
1,2,3,4,7,8-HxCDD	45	32	34 ( $\leq 50$ )	-	-	-
1,2,3,6,7,8-HxCDD	97	65	40 ( $\leq 50$ )	-	-	-
1,2,3,7,8,9-HxCDD	110	69	46 ( $\leq 50$ )	-	-	-
1,2,3,4,6,7,8-HpCDD	350	210	50 ( $\leq 50$ )	-	-	-
OCDD	520	220	81 ( $\leq 50$ )	-	J (all detects)	A
2,3,7,8-TCDF	540	470	14 ( $\leq 50$ )	-	-	-
1,2,3,7,8-PeCDF	900	670	29 ( $\leq 50$ )	-	-	-

Compound	Concentration (pg/g)		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA33-0.5B	SA33009-0.5B				
2,3,4,7,8-PeCDF	420	370	13 ( $\leq 50$ )	-	-	-
1,2,3,4,7,8-HxCDF	1900	1400	30 ( $\leq 50$ )	-	-	-
1,2,3,6,7,8-HxCDF	1300	930	33 ( $\leq 50$ )	-	-	-
2,3,4,6,7,8-HxCDF	360	260	32 ( $\leq 50$ )	-	-	-
1,2,3,7,8,9-HxCDF	90	150	-	60 ( $\leq 50$ )	J (all detects)	A
1,2,3,4,6,7,8-HpCDF	4600	2700	52 ( $\leq 50$ )	-	J (all detects)	A
1,2,3,4,7,8,9-HpCDF	1700	1300	27 ( $\leq 50$ )	-	-	-
OCDF	12000	7500	46 ( $\leq 50$ )	-	-	-

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Dioxins/Dibenzofurans - Data Qualification Summary - SDG G9J150241**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
G9J150241	SA142-20.5B SA143-24B	OCDD  OCDF	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Internal standards (%R) (i)
G9J150241	SA142009-20.5B	2,3,7,8-TCDD 1,2,3,7,8-PeCDD 1,2,3,4,7,8-HxCDD 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD 2,3,7,8-TCDF 1,2,3,7,8-PeCDF 2,3,4,7,8-PeCDF 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF OCDF	J (all detects) UJ (all non-detects)	P	Internal standards (%R) (i)
G9J150241	SA156-0.5B	2,3,7,8-TCDD 1,2,3,7,8-PeCDD 1,2,3,4,7,8-HxCDD 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD 2,3,7,8-TCDF 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF OCDF	J (all detects) UJ (all non-detects)	P	Internal standards (%R) (i)
G9J150241	EB101909-SO1A3	1,2,3,4,7,8-HxCDD 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,7,8,9-HxCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF	J (all detects) UJ (all non-detects)	P	Internal standards (%R) (i)
G9J150241	SA143-24B SA171-5B	2,3,7,8-TCDF	None	P	Project Quantitation Limit

SDG	Sample	Compound	Flag	A or P	Reason (Code)
G9J150241	SA160-0.5B SA178-0.5B SA142-20.5B SA142009-20.5B SA108-20B SA141-14B SA141009-14B SA143-24B SA171-5B EB101909-SO1A3 SA157-0.5B SA157009-0.5B SA33-0.5B SA33009-0.5B SA156-0.5B SA52-15B SA149-22B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
G9J150241	SA160-0.5B SA178-0.5B SA142-20.5B SA142009-20.5B SA108-20B SA141-14B SA141009-14B SA143-24B SA171-5B EB101909-SO1A3 SA157-0.5B SA157009-0.5B SA33-0.5B SA33009-0.5B SA156-0.5B SA52-15B SA149-22B	All compounds reported as EMPC	JK (all detects)	A	Project Quantitation Limit (k)
G9J150241	SA142-20.5B SA142009-20.5B	2,3,7,8-TCDD 1,2,3,6,7,8-HxCDD 1,2,3,7,8,9-HxCDD OCDD 1,2,3,7,8,9-HxCDF	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	A	Field duplicates (Difference) (fd)
G9J150241	SA142-20.5B SA142009-20.5B	1,2,3,4,6,7,8-HpCDD 1,2,3,4,7,8-HxCDF 1,2,3,6,7,8-HxCDF 2,3,4,6,7,8-HxCDF 1,2,3,4,6,7,8-HpCDF 1,2,3,4,7,8,9-HpCDF OCDF OCDD	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	A	Field duplicates (RPD) (fd)
G9J150241	SA141-14B SA141009-14B	OCDF	J (all detects)	A	Field duplicates (Difference) (fd)
G9J150241	SA33-0.5B SA33009-0.5B	1,2,3,7,8,9-HxCDF	J (all detects)	A	Field duplicates (Difference) (fd)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
G9J150241	SA33-0.5B SA33009-0.5B	OCDD 1,2,3,4,6,7,8-HpCDF	J (all detects) J (all detects)	A	Field duplicates (RPD) (fd)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG  
G9J150241**

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
G9J150241	SA141-14B	OCDD	1.1U pg/g	A	bl
G9J150241	SA141009-14B	OCDD	1.1U pg/g	A	bl
G9J150241	SA143-24B	OCDD	2.6U pg/g	A	bl
G9J150241	SA171-5B	OCDD	0.95U pg/g	A	bl

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Dioxins/Dibenzofurans - Equipment Blank Data Qualification Summary - SDG  
G9J150241**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG  
G9J150241**

No Sample Data Qualified in this SDG

LDC #: 22193A21  
 SDG #: G9J150241  
 Laboratory: Test America

**Tronox Northgate Henderson**  
**VALIDATION COMPLETENESS WORKSHEET**  
 Stage 2B

Date: 12/15/09  
 Page: 1 of 1  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: <u>10/14 - 21/09</u>
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration	A	
IV.	Routine calibration/IGV	A	
V.	Blanks	A	
VI.	Matrix spike/Matrix spike duplicates	A	
VII.	Laboratory control samples	A	<u>109</u>
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	SW	
X.	Target compound identifications	N	
XI.	Compound quantitation and CRQLs	SW N	
XII.	System performance	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	SW	<u>D = 3+4, 6+7, 11+12, 13+14</u>
XV.	Field blanks	SW	<u>EB = 10*, EB080309-SO(209A-T9), FB080809-SO(209A) (R090489*)</u>

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

Validated Samples:

1	SA160-0.5B	S	11	SA157-0.5B	21	930394MB	31
2	SA178-0.5B		12	SA157009-0.5B	22	930229MB	32
3	SA142-20.5B		13	SA33-0.5B	23		33
4	SA142009-20.5B		14	SA33009-0.5B	24		34
5	SA108-20B		15	SA156-0.5B	A 25		35
6	SA141-14B		16	SA52-15B	26		36
7	SA141009-14B		17	SA149-22B	27		37
8	SA143-24B		18	SA108-20BMS	28		38
9	SA171-5B		19	SA108-20BMSD	29		39
10	EB101909-SO1A3	W	20		30		40

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



# VALIDATION FINDINGS WORKSHEET

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

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

Notes:

# VALIDATION FINDINGS WORKSHEET

Page: 1 of 9  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

## Blanks

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

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

- Y  N  N/A Were all samples associated with a method blank?
- Y  N  N/A Was a method blank analyzed for each matrix?
- Y  N  N/A Was the blank contaminated? If yes, please see qualification below.

Blank extraction date: 10/28/09 Blank analysis date: 11/10/09

Conc. units: pg/g Associated Samples: all (bl)

Compound	Blank ID	Sample Identification	Sample Identification	Sample Identification
[Shaded]	9301344B	7	9	all (bl) > 5X
☐	0.84	1.1/4	2.6/4	0.95/4

Blank extraction date: \_\_\_\_\_ Blank analysis date: \_\_\_\_\_  
 Conc. units: \_\_\_\_\_ Associated Samples: \_\_\_\_\_

Compound	Blank ID	Sample Identification	Sample Identification	Sample Identification
[Shaded]				

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



LDC #: 22193A  
 SDG #: 20000

**VALIDATION FINDINGS WORKSHEET**  
**Internal Standards**

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

**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".

N/A Are all internal standard recoveries within the 40-135% criteria?

N/A Was the S/N ratio all internal standard peaks > 10?

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit: 40-135%)	Qualifications (I)	
		<u>3</u>	<u>I</u>	<u>36</u>	<u>(40-135) ✓N/P (F. R)</u>	
		<u>4</u>	<u>A</u>	<u>27</u>	<u>✓N/P (F. R)</u>	
			<u>B</u>	<u>30</u>		
			<u>C</u>	<u>28</u>		
			<u>D</u>	<u>25</u>		
			<u>E</u>	<u>27</u>		
			<u>F</u>	<u>24</u>		
			<u>G</u>	<u>27</u>		
			<u>H</u>	<u>28</u>		
			<u>I</u>	<u>30</u>		
		<u>8</u>	<u>I</u>	<u>33</u>	<u>✓N/P (F. R)</u>	
		<u>15</u>	<u>A</u>	<u>34</u>	<u>✓N/P (A-F. HOK-R)</u>	
			<u>B</u>	<u>38</u>		
			<u>C</u>	<u>37</u>		
			<u>D</u>	<u>27</u>		
			<u>E</u>	<u>34</u>		
			<u>F</u>	<u>30</u>		
Internal Standards						
A.	Internal Standards			Check Standard Used	Internal Standards	Check Standard Used
	<sup>13</sup> C-2,3,7,8-TCDF			I.	<sup>13</sup> C-OCDD	
	<sup>13</sup> C-2,3,7,8-TCDD			K.	<sup>13</sup> C-1,2,3,4-TCDD	
	<sup>13</sup> C-1,2,3,7,8-PeCDF			L.	<sup>13</sup> C-1,2,3,7,8,9-HxCDD	
	<sup>13</sup> C-1,2,3,7,8-PeCDD			M.		
	<sup>13</sup> C-1,2,3,4,7,8-HxCDF			N.		
	<sup>13</sup> C-1,2,3,6,7,8-HxCDD			O.		
	<sup>13</sup> C-1,2,3,4,6,7,8-HpCDF			P.		
	<sup>13</sup> C-1,2,3,4,6,7,8-HpCDD					

LDC #: 221932  
 SDG #: 222101

VALIDATION FINDINGS WORKSHEET  
 Internal Standards

Page: 2 of 2  
 Reviewer: G  
 2nd Reviewer: R

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".

Y/N N/A  
 Y N N/A  
 Was the S/N ratio all internal standard peaks > 10?

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit: 40-135%)	Qualifications
		15	H	39 (40-135)	✓ <u>NY</u> P (F E R)
			I	29 ( )	✓ <u>NY</u> P (F E R)
		10	E	27 (40-135)	✓ <u>NY</u> P (C-E-K-Q)
			F	29 ( )	✓ <u>NY</u> P (C-E-K-Q)
			G	33 ( )	✓ <u>NY</u> P (C-E-K-Q)
Internal Standards					
		Internal Standards	Check Standard Used	Internal Standards	Check Standard Used
A.	<sup>13</sup> C-2,3,7,8-TCDF	I.		<sup>13</sup> C-OCDD	
B.	<sup>13</sup> C-2,3,7,8-TCDD	K.		<sup>13</sup> C-1,2,3,4-TCDD	
C.	<sup>13</sup> C-1,2,3,7,8-PeCDF	L.		<sup>13</sup> C-1,2,3,7,8,9-HxCDD	
D.	<sup>13</sup> C-1,2,3,7,8-PeCDD	M.			
E.	<sup>13</sup> C-1,2,3,4,7,8-HxCDF	N.			
F.	<sup>13</sup> C-1,2,3,6,7,8-HxCDD	O.			
G.	<sup>13</sup> C-1,2,3,4,6,7,8-HpCDF	P.			
H.	<sup>13</sup> C-1,2,3,4,6,7,8-HpCDD				

**VALIDATION FINDINGS WORKSHEET**  
**Compound Quantitation and Reported CRQLs**

**METHOD:** HRGC/HRMS Polychlorinated Biphenyls (EPA Method 1668)

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

Y N / N/A N/A  
 Y N / N/A N/A  
 Were the correct internal standard (IS), quantitation ions and relative response factors (RRF) used to quantitate the compound?  
 Compound quantitation and CRQLs were adjusted to reflect all sample dilutions and dry weight factors (if necessary).

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		8.9	No confirmation for 2,3,7,8-TCDF	8	None / P
		All	EMPA & C (R-flog)	All	K(K)

Comments: See sample calculation verification worksheet for recalculations

LDC#: 22193A21  
SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 1 of 3  
Reviewer: 9  
2nd Reviewer: 9

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

Y N NA  
Y N NA

Were field duplicate pairs identified in this SDG?  
Were target analytes detected in the field duplicate pairs?

Compound	Concentration (pg/g)		(<50) RPD	(pg/g) Difference	(pg/g) Limits	Qualifications (Parent Only)
	3	4				
A	1.6	2.3		0.7	(≤0.52)	ndets/A (fd)
B	4.2	6.6		2.4	(≤2.6)	
C	2.4	5.1		2.7	(≤2.6)	
D	4.8	11		6.2	(≤2.6)	ndets/A (fd)
E	5.1	14		8.9	(≤2.6)	↓
F	16	40	86			↓
G	15	43		28	(≤5.2)	↓
H	34	42	21			
I	60	91	41			
J	28	38	30			
K	93	200	73			ndets/A (fd)
L	69	140	68			↓
M	18	41	78			↓
N	13	23		10	(≤2.6)	
O	220	510	79			↓
P	99	190	63			↓
Q	610	1400	79			↓

Compound	Concentration (pg/g)		(<50) RPD	(pg/g) Difference	(pg/g) Limits	Qualifications (Parent Only)
	6	7				
D	2.7U	0.22		2.48	(≤2.7)	
E	2.7U	0.23		2.47	(≤2.7)	
F	0.36	0.42		0.06	(≤2.7)	
G	1.1	1.1		0	(≤5.4)	
H	0.51	0.52U		0.01	(≤0.52)	
I	1.0	0.95		0.05	(≤2.7)	
J	0.52	0.50		0.02	(≤2.7)	

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**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

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 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

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

Y N NA Were field duplicate pairs identified in this SDG?  
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (pg/g)		(<=50) RPD	(pg/g) Difference	(pg/g) Limits	Qualifications (Parent Only)
	6	7				
K	2.2	1.5		0.7	(<=2.7)	
L	1.5	1.1		0.4	(<=2.7)	
M	0.39	0.47		0.08	(<=2.7)	
N	2.7U	0.33		2.37	(<=2.7)	
O	5.0	2.2		2.8	(<=2.7)	
P	1.7	1.0		0.7	(<=2.7)	
Q	13	5.4		7.6	(<=5.4)	<u>detected (fd)</u>

Compound	Concentration (pg/g)		(<=50) RPD	(pg/g) Difference	(pg/g) Limits	Qualifications (Parent Only)
	11	12				
A	0.37	0.44		0.07	(<=0.53)	
B	1.3	1.1		0.2	(<=2.6)	
C	0.76	0.60		0.16	(<=2.6)	
D	2.0	1.3		0.7	(<=2.6)	
E	2.3	1.6		0.7	(<=2.6)	
F	6.8	4.7		2.1	(<=2.6)	
G	8.3	6.3		2	(<=5.2)	
H	24	21	13			
I	19	14	30			
J	8.4	7.5		0.9	(<=2.6)	
K	34	22	43			
L	24	16	40			
M	6.9	4.3		2.6	(<=2.6)	
N	4.8	2.5		2.3	(<=2.6)	
O	88	56	44			
P	36	22	48			
Q	200	130	42			



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VALIDATION FINDINGS WORKSHEET

Field Duplicates

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2nd Reviewer: [Signature]

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

Y N NA

Were field duplicate pairs identified in this SDG?

Y N NA

Were target analytes detected in the field duplicate pairs?

Compound	Concentration (pg/g)		(≤50)	(pg/g)	(pg/g)	Qualifications (Parent Only)
	13	14	RPD	Difference	Limits	
A	20	17	16			
B	70	54	26			
C	45	32	34			
D	97	65	40			
E	110	69	46			
F	350	210	50			
G	520	220	81			↓ dots/Δ (+d)
H	540	470	14			
I	900	670	29			
J	420	370	13			
K	1900	1400	30			
L	1300	930	33			
M	360	260	32			
N	90	150		60	(≤50)	↓ dots/Δ (+d)
O	4600	2700	52			↓
P	1700	1300	27			
Q	12000	7500	46			