

**LABORATORY DATA CONSULTANTS, INC.**

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

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

October 16, 2009

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

Dear Ms. Arnold,

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

**LDC Project # 21494:**

**SDG #**

**Fraction**

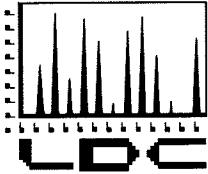
8304603, 8304604, 8304606  
8304610, 8304621

Organophosphorus Pesticides

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

Sincerely,

Erlinda T. Rauto  
Operations Manager/Senior Chemist



**LABORATORY DATA CONSULTANTS, INC.**

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

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

September 28, 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 September 4, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 21494:**

<b><u>SDG #</u></b>	<b><u>Fraction</u></b>
8304601, 8304602, 8304603, 8304604, 8304605, 8304606, 8304607, 8304608, 8304609, 8304610, 8304611, 8304612, 8304613, 8304614, 8304615, 8304616, 8304617, 8304619, 8304620, 8304621, 8304622, 8304623, 8304624	Organophosphorus Pesticides Metals

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

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

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

Sincerely,

Erlinda T. Rauto  
Operations Manager/Senior Chemist

Attachment 1

Stage 2B/4 EDD LDC #21494 (Tronox LLC-Northgate, Henderson NV / Tronox Phase B 2009)

LDC	SDG#	DATE RECD	(3) DATE DUE	As,Se (6020)	OPHS Pest. (8141A)	W		S		W		S		W		S		W		S	
						W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
Matrix: Water/Soil																					
A	8304601	09/04/09	09/28/09	-	-	-	3	0													
B	8304602	09/04/09	09/28/09	-	-	0	3														
C	8304603	09/04/09	09/28/09	-	-	9	0														
D	8304604	09/04/09	09/28/09	-	-	5	0														
E	8304605	09/04/09	09/28/09	-	-	0	4														
F	8304606	09/04/09	09/28/09	-	-	0	6														
G	8304607	09/04/09	09/28/09	9	0	4	0														
H	8304608	09/04/09	09/28/09	11	0	1	0														
I	8304609	09/04/09	09/28/09	7	0	2	0														
J	8304610	09/04/09	09/28/09	-	-	2	4														
K	8304611	09/04/09	09/28/09	7	0	-	-														
L	8304612	09/04/09	09/28/09	-	-	1	6														
M	8304613	09/04/09	09/28/09	-	-	0	4														
N	8304614	09/04/09	09/28/09	7	0	1	0														
O	8304615	09/04/09	09/28/09	7	0	1	0														
P	8304616	09/04/09	09/28/09	-	-	5	11														
Q	8304617	09/04/09	09/28/09	-	-	0	4														
S	8304619	09/04/09	09/28/09	4	0	-	-														
T	8304620	09/04/09	09/28/09	-	-	1	4														
U	8304621	09/04/09	09/28/09	-	-	0	5														
V	8304622	09/04/09	09/28/09	5	0	1	0														
W	8304623	09/04/09	09/28/09	-	-	1	2														
X	8304624	09/04/09	09/28/09	-	-	0	6														
Total								57	0	37	59	0	0	0	0	0	0	0	0	0	153
	T/LR																				

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

EDD CHECKLIST

LDC #: 21494

SDG #: 8304601, 8304602, 8304603, 8304604, 8304605, 8304606, 8304607, 8304608,  
8304609, 8304610, 8304611, 8304612, 8304613, 8304614, 8304615, 8304616,  
8304617, 8304619, 8304620, 8304621, 8304622, 8304623, 8304624,

Page: 1 of 1  
Reviewer: JE  
2nd Reviewer: BC

Tronox Northgate Henderson Worksheet

EDD Area	Yes	No	NA	Findings/Comments
<b>I. Completeness</b>				
Is there an EDD for the associated Tronox validation report?	X			
<b>II. EDD Qualifier Population</b>				
Were all qualifiers from the validation report populated into the EDD?	X			
<b>III. EDD Lab Anomalies</b>				
Were EDD anomalies identified?	X			
If yes, were they corrected or documented for the client?	X			See EDD_discrepancy_ form_LDC21494_092409.doc
<b>IV. EDD Delivery</b>				
Was the final EDD sent to the client?	X			



**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Data Validation Reports  
LDC# 21494**

Metals

*LDC*

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

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

**Collection Date:** June 15 through June 19, 2009

**LDC Report Date:** September 14, 2009

**Matrix:** Water

**Parameters:** Metals

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304607

**Sample Identification**

M-29B  
M-130B  
M-130BDISS  
M-78B  
M-128B  
M-128BDISS  
H-38B  
M-19B  
M-34B  
M-29BMS  
M-29BMSD  
M-130BDISSMS  
M-130BDISSMSD

## Introduction

This data review covers 13 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic and Selenium.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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. ICPMS Tune

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

## III. Calibration

An initial calibration was performed.

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

## IV. Blanks

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

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Selenium	0.887 ug/L	M-130BDISS M-128BDISS

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
M-128BDISS	Selenium	3.2 ug/L	5.0U ug/L

No field blanks were identified in this SDG.

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## VI. Matrix Spike Analysis

Matrix spike (MS) 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. Duplicate Sample Analysis

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

## VIII. Laboratory Control Samples (LCS)

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

## IX. Internal Standards

Raw data were not reviewed for this SDG.

## X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

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

## XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304607	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

## XIII. Overall Assessment of Data

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

## XIV. Field Duplicates

No field duplicates were identified in this SDG.

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Data Qualification Summary - SDG 8304607**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
8304607	M-29B M-130B M-130BDISS M-78B M-128B M-128BDISS H-38B M-19B M-34B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Laboratory Blank Data Qualification Summary - SDG 8304607**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
8304607	M-128BDISS	Selenium	5.0U ug/L	A	bl

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Field Blank Data Qualification Summary - SDG 8304607**

No Sample Data Qualified in this SDG

LDC #: 21494G4  
 SDG #: 8304607  
 Laboratory: Test America

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

Date: 9/11/09  
 Page: 1 of 1  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**METHOD:** As & Se (EPA SW 846 Method 6020)

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>6/15/09 - 6/19/09</u>
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	<u>yes/no</u>
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	<u>LCS</u>
IX.	Internal Standard (ICP-MS)	N	<u>not reviewed</u>
X.	Furnace Atomic Absorption QC	N	<u>not checked</u>
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV.	Field Blanks	N	

Note: A = Acceptable      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: As

1	M-29B	11	M-29BMSD	21	<u>MS</u>	31	
2	M-130B	12	M-130BDISSMS	22		32	
3	M-130BDISS	13	M-130BDISSMSD	23		33	
4	M-78B	14		24		34	
5	M-128B	15		25		35	
6	M-128BDISS	16		26		36	
7	H-38B	17		27		37	
8	M-19B	18		28		38	
9	M-34B	19		29		39	
10	M-29BMS	20		30		40	

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



LDC #: 21494  
 SDG #: See over

**VALIDATION FINDINGS WORKSHEET**  
**Sample Specific Element Reference**

Page: 6 of 9  
 Reviewer: [Signature]  
 2nd reviewer: [Signature]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-9	Aa	Al, Sb, (As), Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se), Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
10, 11, 12, 13		Al, Sb, (As), Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se), Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
<b>Analysis Method</b>		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
ICP-MS		Al, Sb, (As), Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se), Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____

Comments: Mercury by CVAA if performed

LDC #: 21494G4

SDG #: See Cover

METHOD: Trace Metals (EPA SW 846 Method 6020)

Sample Concentration units, unless otherwise noted:

ug/L

Associated Samples: 3, 6

VALIDATION FINDINGS WORKSHEET  
PB/ICB/CCB QUALIFIED SAMPLES

Soil preparation factor applied:

Page: 1 of 1

Reviewer: [Signature]

2nd Reviewer: [Signature]

(62)

Sample Identification										
Analyte	Maximum PB <sup>a</sup> (mg/kg)	Maximum PB <sup>a</sup> (ug/L)	Maximum ICB/CCB <sup>a</sup> (ug/L)	Blank Action Limit	6					
Se			0.887		3.2 / 5.0					

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** June 23 through June 25, 2009

**LDC Report Date:** September 14, 2009

**Matrix:** Water

**Parameters:** Metals

**Validation Level:** Stage 4

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304608

### Sample Identification

M-125B  
M-125BDISS  
M-22AB  
M-17AB  
M-17ABDISS  
M-64B  
M-75B  
M-13AB  
M-13ABDISS  
M-13009AB  
M-13009ABDISS  
M-125BMS  
M-125BMSD  
M-125BDISSMS  
M-125BDISSMSD  
M-22ABMS  
M-22ABMSD  
M-13ABDISSMS  
M-13ABDISSMSD

## **Introduction**

This data review covers 19 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic and Selenium.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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. ICPMS Tune

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

## III. Calibration

An initial calibration was performed.

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

## IV. Blanks

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

No field blanks were identified in this SDG.

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## VI. Matrix Spike Analysis

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

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
M-13ABDISSMS/MSD (M-13ABDISS)	Arsenic	-	132 (75-125)	-	J+ (all detects)	A

## VII. Duplicate Sample Analysis

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

## VIII. Laboratory Control Samples (LCS)

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

## IX. Internal Standards

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

## X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

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

## XII. Sample Result Verification and Project Quantitation Limit

All 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 8304608	All analytes reported below the PQL.	J (all detects)	A

## XIII. Overall Assessment of Data

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

## XIV. Field Duplicates

Samples M-13AB and M-13009AB and samples M-13ABDISS and M-13009ABDISS were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-13AB	M-13009AB				
Arsenic	120	120	-	0 ( $\leq 50$ )	-	-

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-13ABDISS	M-13009ABDISS				
Arsenic	110	120	-	10 ( $\leq 50$ )	-	-



**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Data Qualification Summary - SDG 8304608**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
8304608	M-13ABDISS	Arsenic	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
8304608	M-125B M-125BDISS M-22AB M-17AB M-17ABDISS M-64B M-75B M-13AB M-13ABDISS M-13009AB M-13009ABDISS	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Laboratory Blank Data Qualification Summary - SDG 8304608**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Field Blank Data Qualification Summary - SDG 8304608**

No Sample Data Qualified in this SDG

LDC #: 21494H4  
 SDG #: 8304608  
 Laboratory: Test America

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

Date: 9/14/09  
 Page: 1 of 1  
 Reviewer: [Signature]  
 2nd Reviewer: gms

**METHOD:** As & Se (EPA SW 846 Method 6020)

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>6/23/09 - 6/25/09</u>
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	<u>3ms/mso</u>
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	<u>Lcs</u>
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	<u>not analyzed</u>
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N/A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	<u>(8,10), (9,11)</u>
XV.	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: As

1	M-125B	11	M-13009ABDISS	21	<u>MB</u>	31	
2	M-125BDISS	12	M-125BMS	22		32	
3	M-22AB	13	M-125BMSD	23		33	
4	M-17AB	14	M-125BDISSMS	24		34	
5	M-17ABDISS	15	M-125BDJSSMSD	25		35	
6	M-64B	16	<del>M-17</del> ABMS	26		36	
7	M-75B	17	<del>M-17</del> ABMSD	27		37	
8	M-13AB	18	M-13ABDISSMS	28		38	
9	M-13ABDISS	19	M-13ABDISSMSD	29		39	
10	M-13009AB	20		30		40	

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

LDC #: 21694144  
 SDG #: Su com

VALIDATION FINDINGS CHECKLIST

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

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

Validation Area	Yes	No	NA	Findings/Comments
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	/			
Were %RSD of isotopes in the tuning solution $\leq 5\%$ ?	/			
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	/			
Were all initial calibration correlation coefficients $> 0.995$ ?	/			
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.		/		
Were ICP interference check samples performed daily?	/			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	/			
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		/		
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for waters and $\leq 35\%$ for soil samples? A control limit of $\pm RL$ ( $\pm 2X RL$ for soil) was used for samples that were $\leq 5X$ the RL, including when only one of the duplicate sample values were $< 5X$ the RL.	/			
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	/			

LDC #: 1494  
 SDG #: cell cover

VALIDATION FINDINGS CHECKLIST

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

Validation Area	Yes	No	NA	Findings/Comments
If MSA was performed, was the correlation coefficients > 0.995?			/	
Do all applicable analyses have duplicate injections? (Level IV only)			/	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			/	
Were analytical spike recoveries within the 85-115% QC limits?			/	
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL (ICP/MS)?	/			
Were all percent differences (%Ds) < 10%?	/			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			/	
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	/			
If the %Rs were outside the criteria, was a reanalysis performed?			/	
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			/	
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
Overall assessment of data was found to be acceptable.	/			
Field duplicate pairs were identified in this SDG.	/			
Target analytes were detected in the field duplicates.	/			
Field blanks were identified in this SDG.		/		
Target analytes were detected in the field blanks.			/	

LDC #: 21494114  
SDG #: See over

**VALIDATION FINDINGS WORKSHEET**  
**Sample Specific Element Reference**

Page: 1 of 2  
Reviewer: \_\_\_\_\_  
2nd reviewer: MR

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-11	As	Al, Sb, <u>As</u> , Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, <u>Se</u> , Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
12-19	As	Al, Sb, <u>As</u> , Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, <u>Se</u> , Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		<b>Analysis Method</b>
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
ICP-MS		Al, Sb, <u>As</u> , Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, <u>Se</u> , Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____

Comments: Mercury by CVAA if performed

**VALIDATION FINDINGS WORKSHEET**  
**Matrix Spike/Matrix Spike Duplicates**

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

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

N  N/A Was a matrix spike analyzed for each matrix in this SDG?  
 N  N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

N  N/A Were all duplicate sample relative percent differences (RPD)  $\leq$  20% for water samples and  $\leq$  35% for soil samples?

**LEVEL IV ONLY:**

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

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
1	8/15	Ac	As		132		X19	JL/A (m)

Comments: see page #9 pit for Area

LDC#: 21494H4  
 SDG#: See Cover

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

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

**METHOD:** Metals (EPA Method 6020)

- ~~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 (ug/L)		(<=30) RPD	(ug/L) Difference	(ug/L) Limits	Qualifications (Parent Only)
	8	10				
Arsenic	120	120		0	(<=50)	

Compound	Concentration (ug/L)		(<=30) RPD	(ug/L) Difference	(ug/L) Limits	Qualifications (Parent Only)
	9	11				
Arsenic	110	120		10	(<=50)	

V:\FIELD DUPLICATES\FD\_inorganic\21494H4.wpd

LDC #: 1-49-f-14  
 SDG #: Lee com

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

Page: 1 of 1  
 Reviewer: WH  
 2nd Reviewer: gms

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

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

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

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated		Acceptable (Y/N)
					%R	%R	
Zn	ICP (Initial calibration)	As	39.29	40	98.2	98.2	Y
	GFAA (Initial calibration)						
	CVAA (Initial calibration)						
Cu	ICP (Continuing calibration)	Se	49.2	50	98.4	98.4	Y
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
	ICP/MS (Initial calibration)						
	ICP/MS (Continuing calibration)						

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 #: 146414  
 SDG #: See cover

VALIDATION FINDINGS WORKSHEET  
Level IV Recalculation Worksheet

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

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

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

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

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

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

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

$$\%D = \frac{|I-SDR|}{I} \times 100$$
 Where, I = Initial Sample Result (mg/L)  
 SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated		Acceptable (Y/N)
					%R / RPD / %D	%R / RPD / %D	
745 H6	ICP interference check	As	103.1	100	103.1	103.1	Y
LC5	Laboratory control sample	Se	38.3	40.0	96	96	Y
12	Matrix spike	As (SSR-SR)	38.7	40.0	97	97	Y
12/13	Duplicate	Se	48.2	39.8	19	19	Y
1	ICP serial dilution	As	5.9	6.18	4.5	4.6	Y

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



## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** June 29 through July 1, 2009

**LDC Report Date:** September 14, 2009

**Matrix:** Water

**Parameters:** Metals

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304609

### Sample Identification

M-111AB  
M-110AB  
M-110ABDISS  
I-ARB  
M-25B  
M-12AB  
M-12ABDISS  
M-110ABMS  
M-110ABMSD  
M-12ABDISSMS  
M-12ABDISSMSD

## Introduction

This data review covers 11 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic and Selenium.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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. ICPMS Tune

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

## III. Calibration

An initial calibration was performed.

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

## IV. Blanks

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

No field blanks were identified in this SDG.

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## VI. Matrix Spike Analysis

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

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
M-110ABMS/MSD (M-110AB)	Selenium	-	126 (75-125)	-	J+ (all detects)	A
M-12ABDISSMS/MSD (M-12ABDISS)	Selenium	130 (75-125)	130 (75-125)	-	J+ (all detects)	A

## VII. Duplicate Sample Analysis

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

## VIII. Laboratory Control Samples (LCS)

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

## IX. Internal Standards

Raw data were not reviewed for this SDG.

## X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

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

## XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304609	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

## XIII. Overall Assessment of Data

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

## XIV. Field Duplicates

No field duplicates were identified in this SDG.

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Data Qualification Summary - SDG 8304609**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
8304609	M-110AB M-12ABDISS	Selenium	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
8304609	M-111AB M-110AB M-110ABDISS I-ARB M-25B M-12AB M-12ABDISS	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Laboratory Blank Data Qualification Summary - SDG 8304609**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Field Blank Data Qualification Summary - SDG 8304609**

No Sample Data Qualified in this SDG



LDC #: 2149414  
 SDG #: 8304609  
 Laboratory: Test America

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

Date: 9/14/09  
 Page: 1 of 1  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**METHOD:** As & Se (EPA SW 846 Method 6020)

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>6/29/09 - 7/01/09</u>
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	<u>3ms/msd</u>
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	<u>LC</u>
IX.	Internal Standard (ICP-MS)	N	<u>not reviewed</u>
X.	Furnace Atomic Absorption QC	N	<u>not checked</u>
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV.	Field Blanks	N	

Note: A = Acceptable      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: As

1	M-111AB	11	M-12ABDISSMSD	21	<u>MB</u>	31	
2	M-110AB	12		22		32	
3	M-110ABDISS	13		23		33	
4	I-ARB	14		24		34	
5	M-25B	15		25		35	
6	M-12AB	16		26		36	
7	M-12ABDISS	17		27		37	
8	M-110ABMS	18		28		38	
9	M-110ABMSD	19		29		39	
10	M-12ABDISSMS	20		30		40	

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



LDC #: 2149434  
SDG #: See con

Page: ( of )  
Reviewer: MM  
2nd Reviewer: GML

**VALIDATION FINDINGS WORKSHEET**  
**Matrix Spike/Matrix Spike Duplicates**

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

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

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

Y N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N/A Were all duplicate sample relative percent differences (RPD)  $\leq$  20% for water samples and  $\leq$  35% for soil samples?

Y N/A LEVEL IV ONLY:

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

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
1	8/9*	AR	Se		126	<input checked="" type="checkbox"/>	<del>624</del> b 2	JUL/A (m)
2	10/11*	AR	Se	130	130		37-7	

Comments: \* Percent spike is not from area

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** July 6 through July 10, 2009

**LDC Report Date:** September 14, 2009

**Matrix:** Water

**Parameters:** Metals

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304611

### Sample Identification

M-117B  
M-120B  
M-103B  
M-10B  
M-10BDISS  
M-121B  
M-118B  
M-117BMS  
M-117BMSD  
M-120BMS  
M-120BMSD  
M-10BDISSMS  
M-10BDISSMSD

## Introduction

This data review covers 13 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic and Selenium.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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. ICPMS Tune**

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

## **III. Calibration**

An initial calibration was performed.

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

## **IV. Blanks**

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

No field blanks were identified in this SDG.

## **V. ICP Interference Check Sample (ICS) Analysis**

The frequency of analysis was met.

The criteria for analysis were met.

## **VI. Matrix Spike Analysis**

Matrix spike (MS) 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. Duplicate Sample Analysis**

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

## **VIII. Laboratory Control Samples (LCS)**

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

### **IX. Internal Standards**

Raw data were not reviewed for this SDG.

### **X. Furnace Atomic Absorption QC**

Graphite furnace atomic absorption was not utilized in this SDG.

### **XI. ICP Serial Dilution**

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

### **XII. Sample Result Verification and Project Quantitation Limit**

All analytes reported below the PQL were qualified as follows:

<b>Sample</b>	<b>Finding</b>	<b>Flag</b>	<b>A or P</b>
All samples in SDG 8304611	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

### **XIII. Overall Assessment of Data**

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

### **XIV. Field Duplicates**

No field duplicates were identified in this SDG.



**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
 Metals - Data Qualification Summary - SDG 8304611**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
8304611	M-117B M-120B M-103B M-10B M-10BDISS M-121B M-118B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
 Metals - Laboratory Blank Data Qualification Summary - SDG 8304611**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
 Metals - Field Blank Data Qualification Summary - SDG 8304611**

No Sample Data Qualified in this SDG

LDC #: 21494K4  
 SDG #: 8304611  
 Laboratory: Test America

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

Date: 9/14/09  
 Page: 1 of 1  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**METHOD:** As & Se (EPA SW 846 Method 6020)

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>7/6/09 - 7/10/09</u>
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	} MS/MSD
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	v.t. reviewed
X.	Furnace Atomic Absorption QC	N	v.t. analyzed
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV.	Field Blanks	N	

Note: A = Acceptable      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: M

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

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

LDC #: 21494 K4  
SDG #: See cover

VALIDATION FINDINGS WORKSHEET  
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-7	AA	Al, Sb, (As), Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se), Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
m 8-13	AA	Al, Sb, (As), Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se), Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
		<b>Analysis Method</b>
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
ICP-MS		Al, Sb, (As), Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se), Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN, _____

Comments: Mercury by CVAA if performed

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** July 13 through July 15, 2009

**LDC Report Date:** September 14, 2009

**Matrix:** Water

**Parameters:** Metals

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304614

### Sample Identification

H-11B  
H-11BDISS  
TR-8B  
TR-10B  
M-92B  
M-92BDISS  
M-97B  
H-11BMS  
H-11BMSD  
H-11BDISSMS  
H-11BDISSMSD  
TR-8BMS  
TR-8BMSD  
M-92BMS  
M-92BMSD  
M-92BDISSMS  
M-92BDISSMSD

## **Introduction**

This data review covers 17 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic and Selenium.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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. ICPMS Tune**

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

## **III. Calibration**

An initial calibration was performed.

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

## **IV. Blanks**

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

No field blanks were identified in this SDG.

## **V. ICP Interference Check Sample (ICS) Analysis**

The frequency of analysis was met.

The criteria for analysis were met.

## **VI. Matrix Spike Analysis**

Matrix spike (MS) 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. Duplicate Sample Analysis**

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

## **VIII. Laboratory Control Samples (LCS)**

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

**IX. Internal Standards**

Raw data were not reviewed for this SDG.

**X. Furnace Atomic Absorption QC**

Graphite furnace atomic absorption was not utilized in this SDG.

**XI. ICP Serial Dilution**

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

**XII. Sample Result Verification and Project Quantitation Limit**

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304614	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

**XIII. Overall Assessment of Data**

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

**XIV. Field Duplicates**

No field duplicates were identified in this SDG.



**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Data Qualification Summary - SDG 8304614**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
8304614	H-11B H-11BDISS TR-8B TR-10B M-92B M-92BDISS M-97B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Laboratory Blank Data Qualification Summary - SDG 8304614**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Field Blank Data Qualification Summary - SDG 8304614**

No Sample Data Qualified in this SDG

LDC #: 21494N4  
 SDG #: 8304614  
 Laboratory: Test America

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

Date: 9/14/09  
 Page: 1 of 1  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**METHOD:** As & Se (EPA SW 846 Method 6020)

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>7/13/09 - 7/15/09</u>
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	<u>3 ms/mss</u>
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	<u>LCs</u>
IX.	Internal Standard (ICP-MS)	N	<u>kit reviewed</u>
X.	Furnace Atomic Absorption QC	N	<u>kit utilized</u>
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV.	Field Blanks	N	

Note: A = Acceptable      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:

As

1	H-11B	11	H-11BDISSMSD	21	<u>MR</u>	31	
2	H-11BDISS	12	TR-8BMS	22		32	
3	TR-8B	13	TR-8BMSD	23		33	
4	TR-10B	14	M-92BMS	24		34	
5	M-92B	15	M-92BMSD	25		35	
6	M-92BDISS	16	M-92BDISSMS	26		36	
7	M-97B	17	M-92BDISSMSD	27		37	
8	H-11BMS	18		28		38	
9	H-11BMSD	19		29		39	
10	H-11BDISSMS	20		30		40	

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

LDC #: 21494NY  
 SDG #: See over

**VALIDATION FINDINGS WORKSHEET**  
**Sample Specific Element Reference**

Page: 1 of 1  
 Reviewer: \_\_\_\_\_  
 2nd reviewer: md

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-7	AA	Al, Sb, <u>As</u> , Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, <u>Se</u> , Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
~8-14	AA	Al, Sb, <u>As</u> , Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, <u>Se</u> , Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
<b>Analysis Method</b>		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
ICP-MS		Al, Sb, <u>As</u> , Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, <u>Se</u> , Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____

Comments: Mercury by CVAA if performed

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** July 20 through July 24, 2009

**LDC Report Date:** September 14, 2009

**Matrix:** Water

**Parameters:** Metals

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304615

### Sample Identification

M-77B  
M-77BDISS  
M-33B  
CLD-4RB  
MW-6RB  
M-35B  
M-52B  
M-77BMS  
M-77BMSD  
M-77BDISSMS  
M-77BDISSMSD  
M-33BMS  
M-33BMSD  
CLD-4RBMS  
CLD-4RBMSD

## Introduction

This data review covers 15 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic and Selenium.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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. ICPMS Tune

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

## III. Calibration

An initial calibration was performed.

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

## IV. Blanks

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

No field blanks were identified in this SDG.

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## VI. Matrix Spike Analysis

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

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
M-77BMS/MSD (M-77B)	Arsenic	73 (75-125)	70 (75-125)	-	J- (all detects) UJ (all non-detects)	A
	Selenium	-	69 (75-125)	-	J- (all detects) UJ (all non-detects)	

## VII. Duplicate Sample Analysis

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

## VIII. Laboratory Control Samples (LCS)

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

## IX. Internal Standards

Raw data were not reviewed for this SDG.

## X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

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

## XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304615	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

## XIII. Overall Assessment of Data

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

## XIV. Field Duplicates

No field duplicates were identified in this SDG.



**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Data Qualification Summary - SDG 8304615**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
8304615	M-77B	Arsenic Selenium	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
8304615	M-77B M-77BDISS M-33B CLD-4RB MW-6RB M-35B M-52B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Laboratory Blank Data Qualification Summary - SDG 8304615**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Field Blank Data Qualification Summary - SDG 8304615**

No Sample Data Qualified in this SDG

LDC #: 2149404  
 SDG #: 8304615  
 Laboratory: Test America

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

Date: 9/14/09  
 Page: 1 of 1  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**METHOD:** As & Se (EPA SW 846 Method 6020)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/20/09 - 7/24/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	3 MS/MS
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	4cs
IX.	Internal Standard (ICP-MS)	N	not reviewed
X.	Furnace Atomic Absorption QC	N	not analyzed
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV.	Field Blanks	N	

Note: A = Acceptable      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: 12

1	M-77B	11	M-77BDISSMSD	21	MB	31
2	M-77BDISS	12	M-33BMS	22		32
3	M-33B	13	M-33BMSD	23		33
4	CLD-4RB	14	CLD-4RBMS	24		34
5	MW-6RB	15	CLD-4RBMSD	25		35
6	M-35B	16		26		36
7	M-52B	17		27		37
8	M-77BMS	18		28		38
9	M-77BMSD	19		29		39
10	M-77BDISSMS	20		30		40

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

LDC #: 2149404  
 SDG #: See over

**VALIDATION FINDINGS WORKSHEET**  
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
<u>1-7</u>	<u>AA</u>	Al, Sb, <b>(As)</b> , Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, <b>(Se)</b> , Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
<u>8-15</u>	<u>AA</u>	Al, Sb, <b>(As)</b> , Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, <b>(Se)</b> , Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
<b>Analysis Method</b>		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
ICP-MS		Al, Sb, <b>(As)</b> , Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, <b>(Se)</b> , Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, _____

Comments: Mercury by CVAA if performed

**VALIDATION FINDINGS WORKSHEET**  
**Matrix Spike/Matrix Spike Duplicates**

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

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

Y  N  N/A  
 Y  N  N/A

Was a matrix spike analyzed for each matrix in this SDG?

Were matrix spike percent recoveries (%R) within the control limits of 75-125? if the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y  N  N/A  
 Y  N  N/A

Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤ 35% for soil samples?

LEVEL IV ONLY:

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

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
1	819	A2	As	73	70		1	J-14J/A (m)
			Se		69			

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

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

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

**Collection Date:** July 27, 2009

**LDC Report Date:** September 14, 2009

**Matrix:** Water

**Parameters:** Metals

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304619

**Sample Identification**

M-11B  
M-11BDISS  
M-11009B  
M-11009BDISS  
M-11BDISSMS  
M-11BDISSMSD  
M-11009BMS  
M-11009BMSD

## Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic and Selenium.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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. ICPMS Tune**

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

## **III. Calibration**

An initial calibration was performed.

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

## **IV. Blanks**

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

No field blanks were identified in this SDG.

## **V. ICP Interference Check Sample (ICS) Analysis**

The frequency of analysis was met.

The criteria for analysis were met.

## **VI. Matrix Spike Analysis**

Matrix spike (MS) 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. Duplicate Sample Analysis**

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

## **VIII. Laboratory Control Samples (LCS)**

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



### IX. Internal Standards

Raw data were not reviewed for this SDG.

### X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

### XI. ICP Serial Dilution

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

### XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304619	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

### XIII. Overall Assessment of Data

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

### XIV. Field Duplicates

Samples M-11B and M-11009B and samples M-11BDISS and M-11009BDISS were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-11B	M-11009B				
Arsenic	220	220	0 ( $\leq 30$ )	-	-	-

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-11BDISS	M-11009BDISS				
Arsenic	190	200	5 ( $\leq 30$ )	-	-	-

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Data Qualification Summary - SDG 8304619**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
8304619	M-11B M-11BDISS M-11009B M-11009BDISS	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Laboratory Blank Data Qualification Summary - SDG 8304619**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Field Blank Data Qualification Summary - SDG 8304619**

No Sample Data Qualified in this SDG

LDC #: 21494S4  
 SDG #: 8304619  
 Laboratory: Test America

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

Date: 9/14/09  
 Page: 1 of 1  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**METHOD:** As & Se (EPA SW 846 Method 6020)

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>7/27/09</u>
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	<u>3ms/msd</u>
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	<u>LC</u>
IX.	Internal Standard (ICP-MS)	N	<u>not reviewed</u>
X.	Furnace Atomic Absorption QC	N	<u>not analyzed</u>
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	<u>SW</u>	<u>(1,3) (2,4)</u>
XV.	Field Blanks	<u>N</u>	

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

Validated Samples: AS

1	M-11B	11	<u>MB</u>	21		31	
2	M-11BDISS	12		22		32	
3	M-11009B	13		23		33	
4	M-11009BDISS	14		24		34	
5	M-11BDISSMS	15		25		35	
6	M-11BDISSMSD	16		26		36	
7	M-11009BMS	17		27		37	
8	M-11009BMSD	18		28		38	
9		19		29		39	
10		20		30		40	

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

LDC #: 2149454  
 SDG #: See cover

**VALIDATION FINDINGS WORKSHEET**  
**Sample Specific Element Reference**

Page: 1 of 2  
 Reviewer: \_\_\_\_\_  
 2nd reviewer: MA

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4	A2	Al, Sb, (As), Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se), Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
05-8	A2	Al, Sb, (As), Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se), Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
<b>Analysis Method</b>		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
ICP-MS		Al, Sb, (As), Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, (Se), Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN', _____

Comments: Mercury by CVAA if performed

LDC#: 21494S4  
 SDG#: See Cover

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

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

**METHOD:** Metals (EPA Method 6020)

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

Compound	Concentration (ug/L)		(≤30)	(ug/L)	(ug/L)	Qualifications (Parent Only)
	1	3	RPD	Difference	Limits	
Arsenic	220	220	0			

Compound	Concentration (ug/L)		(≤30)	(ug/L)	(ug/L)	Qualifications (Parent Only)
	2	4	RPD	Difference	Limits	
Arsenic	190	200	5			

V:\FIELD DUPLICATES\FD\_inorganic\21494S4.wpd

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** August 3 through August 4, 2009

**LDC Report Date:** September 24, 2009

**Matrix:** Water

**Parameters:** Metals

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304622

### Sample Identification

M-31AB  
M-31ABDISS  
M-50B  
M-21B  
FB080409-GW  
M-31ABMS  
M-31ABMSD  
M-31ABDISSMS  
M-31ABDISSMSD  
M-21BMS  
M-21BMSD

## Introduction

This data review covers 11 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 6020 for Metals. The metals analyzed were Arsenic and Selenium.

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

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

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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. ICPMS Tune**

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

## **III. Calibration**

An initial calibration was performed.

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

## **IV. Blanks**

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

Sample FB080409-GW was identified as a field blank. No metals contaminants were found in this blank.

## **V. ICP Interference Check Sample (ICS) Analysis**

The frequency of analysis was met.

The criteria for analysis were met.

## **VI. Matrix Spike Analysis**

Matrix spike (MS) 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. Duplicate Sample Analysis**

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

## **VIII. Laboratory Control Samples (LCS)**

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

### **IX. Internal Standards**

Raw data were not reviewed for this SDG.

### **X. Furnace Atomic Absorption QC**

Graphite furnace atomic absorption was not utilized in this SDG.

### **XI. ICP Serial Dilution**

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

### **XII. Sample Result Verification and Project Quantitation Limit**

All analytes reported below the PQL were qualified as follows:

<b>Sample</b>	<b>Finding</b>	<b>Flag</b>	<b>A or P</b>
All samples in SDG 8304622	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

### **XIII. Overall Assessment of Data**

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

### **XIV. Field Duplicates**

No field duplicates were identified in this SDG.

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Data Qualification Summary - SDG 8304622**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
8304622	M-31AB M-31ABDISS M-50B M-21B FB080409-GW	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Laboratory Blank Data Qualification Summary - SDG 8304622**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Metals - Field Blank Data Qualification Summary - SDG 8304622**

No Sample Data Qualified in this SDG

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

LDC #: 21494V4  
 SDG #: 8304622  
 Laboratory: Test America

Date: 9/14/09  
 Page: 1 of 1  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**METHOD:** As & Se (EPA SW 846 Method 6020)

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>8/3/09 - 8/4/09</u>
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	} MS/MSD
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	w/ review
X.	Furnace Atomic Absorption QC	N	w/ review
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV.	Field Blanks	ND	FB=5

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: [Signature]

1	M-31AB	11	M-21BMSD	21	31
2	M-31ABDISS	12	<u>MB</u>	22	32
3	M-50B	13		23	33
4	M-21B	14		24	34
5	FB080409GW	15		25	35
6	M-31ABMS	16		26	36
7	M-31ABMSD	17		27	37
8	M-31ABDISSMS	18		28	38
9	M-31ABDISSMSD	19		29	39
10	M-21BMS	20		30	40

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



**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Data Validation Reports  
LDC# 21494**

Organophosphorus Pesticides

*LDC*

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

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

**Collection Date:** May 27 through May 28, 2009

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

**Matrix:** Water

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304601

**Sample Identification**

EB052709  
MC-45B  
M-127B

## Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8141A for Organophosphorus Pesticides.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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



The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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

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

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

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

### b. Calibration Verification

Calibration verification was performed at the required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/5/09	023F1001	1	Fensulfothion	25.6	All samples in SDG 8304601	J- (all detects) UJ (all non-detects)	A
6/5/09	023F2501	2	Naled Azinphos-methyl	24.1 21.3	All samples in SDG 8304601	J+ (all detects) J+ (all detects)	A

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/1/09	010F1001	1	Naled	29.0	All samples in SDG 8304601	J- (all detects) UJ (all non-detects)	P
6/1/09	010F1001	2	Naled	35.8	All samples in SDG 8304601	J- (all detects) UJ (all non-detects)	P

### III. Blanks

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

Sample EB052709 was identified as an equipment blank. No organophosphorus pesticide contaminants were found in this blank.

Sample FB060309-SO (from SDG 8304603) was identified as a field blank. No organophosphorus pesticide contaminants were found in this blank.

### IV. Accuracy and Precision Data

#### a. Surrogate Recovery

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

#### b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

#### c. Laboratory Control Samples

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

### V. Target Compound Identification

Raw data were not reviewed for this SDG.

### VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304601	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

### VII. System Performance

Raw data were not reviewed for this SDG.

### **VIII. Overall Assessment of Data**

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

### **IX. Field Duplicates**

No field duplicates were identified in this SDG.

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304601**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304601	EB052709 MC-45B M-127B	Fensulfothion	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304601	EB052709 MC-45B M-127B	Naled Azinphos-methyl	J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
8304601	EB052709 MC-45B M-127B	Naled	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304601	EB052709 MC-45B M-127B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG 8304601**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG 8304601**

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET

LDC #: 21494A17

SDG #: 8304601

Laboratory: Test America

Stage 2B

Date: 9/10/09

Page: 1 of 1

Reviewer: JVG

2nd Reviewer: [Signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/27-28/09
IIa.	Initial calibration	A	r <sup>2</sup> , % RSD
IIb.	Calibration verification/ICV	SW	CCV/ICV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	Client spec
IVc.	Laboratory control samples	A	LCS/D
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	EB = 1 <del>FB</del> FB = FB060309

from 8304603

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	EB052709	11		21		31	
2	MC-45B	12		22		32	
3	M-127B	13		23		33	
4	9153088 MB*	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

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

VALIDATION FINDINGS WORKSHEET

METHOD: GC HPLC

8310	8330	8151	8141	8141(Cont)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensufothion	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Bolstar	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X. EPN	EE. Ethyl Benzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	Y. Azinphos-methyl	SSS. O-Xylene
E. Benzo(a)pyrene	E. Tetral	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. MP-Xylene
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total Xylene
G. Benzo(g,h,i)perylene	G. 2,4,6-Trinitrotoluene	G. Dicamba	G. Suifotep	BB. Trichloronate	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Trichlorinate	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotoluene	J. MCPA	J. Diazinon	EE. Def	
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowl	
L. Fluorene	L. 2-Nitrotoluene	L. 2,4,5-TP (silvex)	L. Parathion-methyl	GG. Ethion	
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel	HH. Tetrachlorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	II. Sulprofos	
O. Phenanthrene	O.		O. Chlorpyrifos	JJ. Thionazin	
P. Pyrene	P.		P. Fenthion	kk. Phosmet	
Q.	Q		Q. Parathion-ethyl	LL. O,O,O-Triethylphosphorothioate	
R.			R. Trichloronate	MM. Fampbur	
S.			S. Merphos	NN. Carbo phenothion	
			T. Stirofos	OO. Carbo phenothion - methyl	
			U. Tokuthion		

Notes:

**VALIDATION FINDINGS WORKSHEET**  
Continuing Calibration

METHOD: GC HPLC

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

What type of continuing calibration calculation was performed?  %D or \_\_\_ RPD

N N/A Were continuing calibration standards analyzed at the required frequencies? >0

N N/A Did the continuing calibration standards meet the %D / RPD validation criteria of <15.0%?

Level IV Only

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

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit <u>&lt;15.0</u> )	( <u>≤ 20</u> ) RT (limit)	Associated Samples	Qualifications
	6/01/09	010 F1001 (10W)	Col. 1	<del>C (+)</del> F (-)	<del>178.00</del> 29.0	( )	All + Blk	J+ det B / P (C) J- / MS / P
				<del>D (+)</del>	<del>78.1</del>	( )		J- / R / P
			Col. 2	C (+)	223.9	( )		J+ det B / P
				F (-)	35.8	( )		J- / MS / P
				<del>D (-)</del>	<del>89.0</del>	( )		J- / R / P
						( )		
						( )		
	6/05/09	023 F2501 (CCU)	Col. 1	V (-)	25.6	( )		J- / MS / A
			Col. 2	F (+)	24.1	( )		J+ det B / A
				Y (+)	21.3	( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		

(10W - Ave > 20)



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

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

**Collection Date:** June 1 through June 4, 2009

**LDC Report Date:** September 19, 2009

**Matrix:** Soil

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304602

**Sample Identification**

RSAM3-0.5B  
RSAM2-0.5B  
RSAJ3-0.5B  
RSAM2-0.5BMS  
RSAM2-0.5BMSD

## Introduction

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

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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

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

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

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

### b. Calibration Verification

Calibration verification was performed at the required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/19/09	051F5101	1	Dichlorvos Azinphos-methyl	24.2 30.9	All samples in SDG 8304602	J+ (all detects) J+ (all detects)	A
6/19/09	051F5101	1	Naled Disulfoton	38.2 26.8	All samples in SDG 8304602	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
6/19/09	051F5101	2	Naled	49.0	All samples in SDG 8304602	J- (all detects) UJ (all non-detects)	A
6/19/09	051F5101	2	Azinphos-methyl	35.3	All samples in SDG 8304602	J+ (all detects)	A

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/1/09	010F1001	1	Naled	29.0	All samples in SDG 8304602	J- (all detects) UJ (all non-detects)	P
6/1/09	010F1001	2	Naled	35.8	All samples in SDG 8304602	J- (all detects) UJ (all non-detects)	P

### III. Blanks

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

Sample FB072109-SO (from SDG 8304616) was identified as a field blank. No organophosphorus pesticide contaminants were found in this blank.

### IV. Accuracy and Precision Data

#### a. Surrogate Recovery

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

#### b. Matrix Spike/Matrix Spike Duplicates

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

#### c. Laboratory Control Samples

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

### V. Target Compound Identification

Raw data were not reviewed for this SDG.

### VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304602	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

## **VII. System Performance**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

No field duplicates were identified in this SDG.

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304602**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304602	RSAM3-0.5B RSAM2-0.5B RSAJ3-0.5B	Dichlorvos Azinphos-methyl	J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
8304602	RSAM3-0.5B RSAM2-0.5B RSAJ3-0.5B	Naled  Disulfoton	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304602	RSAM3-0.5B RSAM2-0.5B RSAJ3-0.5B	Naled	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304602	RSAM3-0.5B RSAM2-0.5B RSAJ3-0.5B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG 8304602**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG 8304602**

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #: 21494B17  
 SDG #: 8304602  
 Laboratory: Test America

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 9/10/09  
 Page: 1 of 1  
 Reviewer: SVG  
 2nd Reviewer: [Signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/01 - 04/09
IIa.	Initial calibration	A	% RSD ≤ 20% ✓
IIb.	Calibration verification/ICV	SW	CON/ICV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	FB = FB072009-SO from 8304602

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

Validated Samples: Soil

1	<del>RSAM2-0.5B</del>	11	9166561 MBZ	21	31
2	RSAM3-0.5B	12		22	32
3	RSAM2-0.5B	13		23	33
4	RSAM3-0.5B	14		24	34
5	RSAM2-0.5BMS	15		25	35
6	RSAM2-0.5BMSD	16		26	36
7		17		27	37
8		18		28	38
9		19		29	39
10		20		30	40

Notes: (#1 Not validated per list)



VALIDATION FINDINGS WORKSHEET

METHOD: / GC HPLC

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

Notes:

LDC #: 21444 B 17  
 SDG #: Sec Cal. V.1

# VALIDATION FINDINGS WORKSHEET

## Continuing Calibration

Page: 1 of 1  
 Reviewer: JVC  
 2nd Reviewer:       

METHOD: GC HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
 What type of continuing calibration calculation was performed? %D or RPD  
Y N N/A  
Y N N/A  
 Were continuing calibration standards analyzed at the required frequencies?  
 Did the continuing calibration standards meet the %D / RPD validation criteria of ±20.0%?

Level IV Only  
 Y N (N/A)

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

#	Date	Standard ID	Detector/ (Column)	Compound	%D / RPD (Limit <u>±20.0%</u> )	RT (limit)	Associated Samples	Qualifications
	6/01/09	010 F1001 (ICV)	Col. 1 ↓	C (+) F (-) D (-)	178.0 29.0 78.1	( ) ( ) ( )	All + Bk	<del>J+ dots / P</del> J- / WJ / P <del>J+ dots / P</del> <del>J+ dots / P</del>
			Col. 2 ↓	C (+) F (-) D (-)	222.9 35.8 89.0	( ) ( ) ( )		J- / WJ / P <del>J+ dots / P</del> <del>J+ dots / P</del>
	6/19/09	051 F5101 (CCV)	Col. 1 ↓	A (+) F (-) K (-)	24.2 38.2 26.8	( ) ( ) ( )		J+ dots / A J- / WJ / A ↓
			Col. 2 ↓	Y (+) F (-) Y (+)	30.9 49.0 35.3	( ) ( ) ( )		J+ dots / A J- / WJ / A J+ dots / A

(ICV - Ave 720)

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** June 1 through June 5, 2009

**LDC Report Date:** October 6, 2009

**Matrix:** Water

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304603

### Sample Identification

M-7BB  
M-5AB  
FB060309  
M-23B  
M-23009B  
PC-40B  
PC-40BRE  
PC-4009B  
PC-4009BRE

## Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8141A for Organophosphorus Pesticides.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

## I. Technical Holding Times

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Days From Sample Collection Until Analysis	Required Holding Time (in Days) From Sample Collection Until Analysis	Flag	A or P
PC-40BRE PC-4009BRE	All TCL compounds	15	7	J- (all detects) R (all non-detects)	P

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

## II. Calibration

### a. Initial Calibration

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

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

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

### b. Calibration Verification

Calibration verification was performed at the required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/12/09	014F1401	1	Naled Azinphos-methyl	51.2 26.2	M-7BB M-5AB FB060309 M-23B M-23009B 9159499MB 9160222MB	J+ (all detects) J+ (all detects)	A

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/12/09	014F1401	2	Naled Azinphos-methyl	60.9 31.0	M-7BB M-5AB FB060309 M-23B M-23009B 9159499MB 9160222MB	J+ (all detects) J+ (all detects)	A
6/21/09	003F0301	1	Dichlorvos	34.2	PC-40B PC-4009B 9159433MB	J- (all detects) UJ (all non-detects)	A
6/21/09	003F0301	1	Naled	34.0	PC-40B PC-4009B 9159433MB	J+ (all detects)	A
6/21/09	003F0301	2	Dichlorvos  Trichloronate	29.3  21.6	PC-40B PC-4009B 9159433MB	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
6/21/09	003F0301	2	Naled	45.1	PC-40B PC-4009B 9159433MB	J+ (all detects)	A
6/17/09	003F0301	1	Dichlorvos  Mevinphos	29.1  20.2	PC-40BRE PC-4009BRE 9167134MB	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
6/17/09	003F0301	1	Naled	42.3	PC-40BRE PC-4009BRE 9167134MB	J+ (all detects)	A
6/17/09	003F0301	2	Dichlorvos	24.7	PC-40BRE PC-4009BRE 9167134MB	J- (all detects) UJ (all non-detects)	A
6/17/09	003F0301	2	Naled	50.3	PC-40BRE PC-4009BRE 9167134MB	J+ (all detects)	A

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/1/09	010F1001	1	Naled	29.0	All samples in SDG 8304603	J- (all detects) UJ (all non-detects)	P
6/1/09	010F1001	2	Naled	35.8	All samples in SDG 8304603	J- (all detects) UJ (all non-detects)	P

### III. Blanks

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

Sample FB060309 was identified as a field blank. No organophosphorus pesticide contaminants were found in this blank.

### IV. Accuracy and Precision Data

#### a. Surrogate Recovery

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

#### b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

#### c. Laboratory Control Samples

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

### V. Target Compound Identification

Raw data were not reviewed for this SDG.

### VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:



Sample	Finding	Flag	A or P
All samples in SDG 8304603	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

## VII. System Performance

Raw data were not reviewed for this SDG.

## \*VIII. Overall Assessment of Data

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

Sample	Compound	*Flag	A or P
PC-40BRE PC-4009BRE	All TCL compounds	X	A

\*Corrected Flag in above table from "R" to "X".

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

## IX. Field Duplicates

Samples M-23B and M-23009B, samples PC-40B and PC-4009B, and samples PC-40BRE and PC-4009BRE were identified as field duplicates. No organophosphorus pesticides were detected in any of the samples.

**\*Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304603**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304603	PC-40BRE PC-4009BRE	All TCL compounds	J- (all detects) R (all non-detects)	P	Technical holding times (h)
8304603	M-7BB M-5AB FB060309 M-23B M-23009B	Naled Azinphos-methyl	J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
8304603	PC-40B PC-4009B PC-40BRE PC-4009BRE	Naled	J+ (all detects)	A	Continuing calibration (%D) (c)
8304603	PC-40B PC-4009B	Dichlorvos  Trichloronate	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304603	PC-40BRE PC-4009BRE	Dichlorvos  Mevinphos	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304603	M-7BB M-5AB FB060309 M-23B M-23009B PC-40B PC-40BRE PC-4009B PC-4009BRE	Naled	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304603	M-7BB M-5AB FB060309 M-23B M-23009B PC-40B PC-40BRE PC-4009B PC-4009BRE	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
*8304603	PC-40BRE PC-4009BRE	All TCL compounds	*X	A	Overall assessment of data (0)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG  
8304603**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG  
8304603**

No Sample Data Qualified in this SDG

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

LDC #: 21494C17  
 SDG #: 8304603  
 Laboratory: Test America

Date: 9/10/09  
 Page: 1 of 1  
 Reviewer: JVG  
 2nd Reviewer: [Signature]

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

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: <u>6/01-05/09</u>
IIa.	Initial calibration	A	$\frac{2}{3}$ RSD $\leq 20\%$ <u>ry</u>
IIb.	Calibration verification/ICV	SW	CV/IN $\leq 20\%$
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	Client spec (insufficient sample)
IVc.	Laboratory control samples	SW	LCS /D
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	SW	
IX.	Field duplicates	ND	$D_1 = 4, 5$ $D_2 = 6, 8$ $D_3 = 7, 9$
X.	Field blanks	ND	FB = 3

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

Validated Samples: Water

1	M-7BB	11	9159499 MB	21	31
2	M-5AB	12	9160222 MB	22	32
3	FB060309	13	9159433 MB	23	33
4	M-23B $D_1$	14	9167134 MB	24	34
5	M-23009B $D_1$	15		25	35
6	PC-40B $D_2$	16		26	36
7	PC-40BRE $D_3$	17		27	37
8	PC-4009B $D_1$	18		28	38
9	PC-4009BRE $D_3$	19		29	39
10		20		30	40

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

VALIDATION FINDINGS WORKSHEET

METHOD: / GC HPLC

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

Notes:

**VALIDATION FINDINGS WORKSHEET**  
**Technical Holding Times**

LDC #: 21494c17  
SDG #: Jrc Casey

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

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

METHOD: <u>GC</u> <u>HPLC</u>							
Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
79	W	N	6/17/09	6/16/09	6/17/09	15	J-R/P (h)

**TECHNICAL HOLDING TIME CRITERIA**  
**VOLATILES:** Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.  
 Water preserved: Both within 14 days of sample collection.  
 Soils: Both within 14 days of sample collection.  
**EXTRACTABLES:**  
 Water: Extracted within 7 days, analyzed within 40 days.  
 Soil: Extracted within 14 days, analyzed within 40 days.

METHOD: GC HPLC

2nd Reviewer: [Signature]

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
 What type of continuing calibration calculation was performed? %D or RPD  
 Were continuing calibration standards analyzed at the required frequencies?  
 Y N / N/A  
 Y N / N/A  
 Did the continuing calibration standards meet the %D / RPD validation criteria of ±20.0%?

Level IV Only  
 Y N / N/A

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

#	Date	Standard ID	Detector/ (Column)	Compound	%D / RPD (Limit $\pm 20.0$ )	RT (limit)	Associated Samples	Qualifications
	6/6/09	010 F1001 (CON)	Col. 1	G (+)	178.0	( )	All + Bills	J+ dets / A (C)
				F (-)	29.0	( )		J- / MS / P
				D (-)	78.1	( )		D- / R / P
			Col. 2	G (+)	223.9	( )		J+ dets / P
				F (-)	35.8	( )		J- / MS / P
				D (-)	89.0	( )		D- / R / P
	6/8/09	014 F1401 (CON)	Col. 1	F (+)	51.2	( )	1-5, 9159499 MB, 9160222 MB	J+ dets / A
			Col. 2	Y (+)	26.2	( )		
				F (+)	60.9	( )		
				Y (+)	31.0	( )		
	6/12/09	003 F0301 (CON)	Col. 1	A (-)	34.2	( )	6, 8, 9159433 MB	J- / MS / A
				F (+)	34.0	( )		J+ dets / A
			Col. 2	A (-)	29.3	( )		J- / MS / A
				F (+)	45.1	( )		J+ dets / A
				BB (-)	21.6	( )		J- / MS / A
	6/17/09	002 F0201	Col. 1	A (-)	29.1	( )	7, 9, 9167134 MB	J- / MS / A
				B (-)	20.2	( )		
				F (+)	42.3	( )		J+ dets / A
			Col. 2	A (-)	24.7	( )		J- / MS / A
				F (+)	50.3	( )		J+ dets / A





LDC #: 21494 C17  
SDG #: See cover

VALIDATION FINDINGS WORKSHEET  
Overall Assessment of Data

Page: 1 of 1  
Reviewer: JK  
2nd Reviewer: J

METHOD:  GC  HPLC

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

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

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

#	Sample # Compound Name	Finding	Associated Samples	Qualifications
	7, 9	But side H.T.		X R/A (0)

Comments:

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** June 8 through June 12, 2009

**LDC Report Date:** October 22, 2009

**Matrix:** Water

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304604

### Sample Identification

M-44B  
M-44BRE  
M-6AB  
M-6ABRE  
M-142B

## Introduction

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

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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 with the following exceptions:

Sample	Analyte	Total Days From Sample Collection Until Analysis	Required Holding Time (in Days) From Sample Collection Until Analysis	Flag	A or P
M-44BRE	All TCL compounds	11	7	J- (all detects) UJ (all non-detects)	A
M-6ABRE	All TCL compounds	20	7	J- (all detects) R (all non-detects)	A

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

## II. Calibration

### a. Initial Calibration

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

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

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

### b. Calibration Verification

Calibration verification was performed at the required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/17/09	003F0301	1	Dichlorvos Mevinphos	29.1 20.2	M-44B 9162333MB	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
6/17/09	003F0301	1	Naled	42.3	M-44B 9162333MB	J+ (all detects)	A

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/17/09	003F0301	2	Dichlorvos	24.7	M-44B 9162333MB	J- (all detects) UJ (all non-detects)	A
6/17/09	003F0301	2	Naled	50.3	M-44B 9162333MB	J+ (all detects)	A
6/24/09	027F2701	1	Fensulfothion	21.7	M-44BRE 9170431MB	J+ (all detects)	A
6/24/09	027F2701	2	Dichlorvos Thionazin Naled Demeton-S Chlorpyrifos Fenthion Tokuthion Parathion-methyl Famphur Azinphos-methyl Coumaphos	24.9 22.7 24.6 23.1 21.3 20.9 21.5 21.2 25.0 25.8 26.1	M-44BRE 9170431MB	J- (all detects) UJ (all non-detects)	A
7/2/09	003F0301	1	Phorate Naled	21.2 25.2	M-6ABRE 9181503MB	J+ (all detects) J+ (all detects)	A
7/2/09	003F0301	2	Dichlorvos Mevinphos Dimethoate Fensulfothion	21.1 45.9 49.7 44.0	M-6ABRE 9181503MB	J- (all detects) UJ (all non-detects)	A
7/2/09	003F0301	2	Naled EPN	28.9 21.2	M-6ABRE 9181503MB	J+ (all detects) J+ (all detects)	A

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/1/09	010F1001	1	Naled	29.0	M-44B 9162333MB	J- (all detects) UJ (all non-detects)	P
6/1/09	010F1001	2	Naled	35.8	M-44B 9162333MB	J- (all detects) UJ (all non-detects)	P
6/23/09	010F1001	1	Naled	43.3	M-44BRE 9170431MB	J- (all detects) UJ (all non-detects)	P

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/23/09	010F1001	1	Naled Malathion Merphos	43.3 25.8 24.4	M-44BRE 9170431MB	J- (all detects) UJ (all non-detects)	P
6/26/09	010F1001	1	Naled  Disulfoton	40.1  20.6	M-6AB M-142B 9168145MB	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P
6/26/09	010F1001	2	Naled  Malathion	47.6  23.2	M-6AB M-142B 9168145MB	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P

\*Added Malathion to table above for 010F1001 Column 2 on 6/26/09

### III. Blanks

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

Sample FB060309-SO (from SDG 8304603) was identified as a field blank. No organophosphorus pesticide contaminants were found in this blank.

### IV. Accuracy and Precision Data

#### a. Surrogate Recovery

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
9162333MB	Not specified	Triphenylphosphate Chlormefos	45 (60-154) 9.4 (49-171)	All TCL compounds	J- (all detects) R (all non-detects)	P
M-6AB	Not specified	Triphenylphosphate Chlormefos	22 (60-154) 18 (49-171)	All TCL compounds	J- (all detects) UJ (all non-detects)	A

#### b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

### c. Laboratory Control Samples

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

### V. Target Compound Identification

Raw data were not reviewed for this SDG.

### VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304604	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

### VII. System Performance

Raw data were not reviewed for this SDG.

### VIII. Overall Assessment of Data

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

Sample	Compound	Flag	A or P
M-44BRE M-6ABRE	All TCL compounds	X	A

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.



**\*Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304604**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304604	M-44BRE	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
8304604	M-6ABRE	All TCL compounds	J- (all detects) R (all non-detects)	A	Technical holding times (h)
8304604	M-44B	Dichlorvos Mevinphos	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304604	M-44B	Naled	J+ (all detects)	A	Continuing calibration (%D) (c)
8304604	M-44BRE	Fensulfothion	J+ (all detects)	A	Continuing calibration (%D) (c)
8304604	M-44BRE	Dichlorvos Thionazin Naled Demeton-S Chlorpyrifos Fenthion Tokuthion Parathion-methyl Famphur Azinphos-methyl Coumaphos	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304604	M-6ABRE	Phorate Naled EPN	J+ (all detects) J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
8304604	M-6ABRE	Dichlorvos Mevinphos Dimethoate Fensulfothion	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304604	M-44B	Naled	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304604	M-44BRE	Naled Malathion Merphos	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
*8304604	M-6AB M-142B	Naled Disulfoton Malathion	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304604	M-6AB	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Surrogate recovery (%R) (s)
8304604	M-44B M-44BRE M-6AB M-6ABRE M-142B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
8304604	M-44BRE M-6ABRE	All TCL compounds	X	A	Overall assessment of data (0)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG  
8304604**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG  
8304604**

No Sample Data Qualified in this SDG

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

LDC #: 21494D17  
 SDG #: 8304604  
 Laboratory: Test America

Date: 9/10/09  
 Page: 1 of 1  
 Reviewer: JVG  
 2nd Reviewer: J

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

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 6/08-12/09
IIa.	Initial calibration	A	% RSD $\leq$ 20% r <sub>r</sub>
IIb.	Calibration verification/ICV	SW	COV/ICV $\leq$ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	N	Client spec (insufficient vol.)
IVc.	Laboratory control samples	SW	LCS/D
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	SW	
IX.	Field duplicates	N	
X.	Field blanks	ND	FB = FB060309 from 8304603

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: Water

1	M-44B	11	9162333 MB	21		31
2	M-44BRE	12	9170431 MB	22		32
3	M-6AB	13	9168145 MB	23		33
4	M-6ABRE	14	9181503 MB	24		34
5	M-142B	15	92	25		35
6		16		26		36
7		17		27		37
8		18		28		38
9		19		29		39
10		20		30		40

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

VALIDATION FINDINGS WORKSHEET

METHOD: GC\_HPLC

8310	8330	8151	8141	8141 (Cont)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fen硫fthion	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Bolstar	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X. EPN	EE. Ethyl Benzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	Y. Azinphos-methyl	SSS. O-Xylene
E. Benzo(a)pyrene	E. Tetryl	E. Dinosab	E. Ethoprop	Z. Coumaphos	RRR. MF-Xylene
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total Xylene
G. Benzo(g,h,i)perylene	G. 2,4,6-Trinitrotoluene	G. Dicamba	G. Sulfotep	BB. Trichloronate	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Trichlorinate	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotoluene	J. MCPA	J. Diazinon	EE. Def	
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowl	
L. Fluorene	L. 2-Nitrotoluene	L. 2,4,5-TP (silvex)	L. Parathion-methyl	GG. Ethion	
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel	HH. Tetrachlorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	II. Sulprofos	
O. Phenanthrene	O.		O. Chlorpyrifos	JJ. Thionazin	
P. Pyrene	P.		P. Fenthion	kk. Phosmet	
Q.	Q		Q. Parathion-ethyl	LL. O,O,O-Triethylphosphorothioate	
R.			R. Trichloronate	MM. Famphur	
S.			S. Merphos	NN. Carbo phenothion	
			T. Strofos	OO. Carbo phenothion - methyl	
			U. Tokuthion		

Notes:

LDC #: 21494 D17  
SDG #: See Copy

VALIDATION FINDINGS WORKSHEET  
Technical Holding Times

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

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

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
2	W	N	6/08/09	6/19/09	6/24/09	11	J- <u>UJ/A</u> (h)
4	↓	↓	6/10/09	6/30/09	7/02/09	20	J-R/A

METHOD:  GC  HPLC

TECHNICAL HOLDING TIME CRITERIA

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

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

LDC #: 21414 D17  
 SDG #: Sec. Cellar

**VALIDATION FINDINGS WORKSHEET**  
Continuing Calibration

Page: 1 of 3  
 Reviewer: JVL

METHOD: GC HPLC

2nd Reviewer: [Signature]

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
 What type of continuing calibration calculation was performed? %D or RPD  
 Were continuing calibration standards analyzed at the required frequencies?  
 Did the continuing calibration standards meet the %D / RPD validation criteria of ±20.0%?

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

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit $\leq 20$ )	RT (limit)	Associated Samples	Qualifications
	6/01/09	010 F 1001 (10N)	Col. 1	C (+)	17.8	( )	1, 9162333 MB	J+ dets / P (C)
				F (-)	29.0	( )		J- / WJ / P
				D (-)	7.81	( )		J- / R / P
			Col. 2	C (+)	22.2	( )		J+ dets / P
				F (-)	35.8	( )		J- / WJ / P
				D (-)	89.0	( )		J- / R / P
	6/23/09	010 F 1001 (10N)	Col. 1	C (+)	17.8	( )	2, 9170431 MB	J+ dets / P
				F (-)	43.3	( )		J- / WJ / P
				D (-)	85.7	( )		J- / R / P
			Col. 2	C (+)	24.4	( )		J+ dets / P
				F (-)	43.3	( )		J- / WJ / P
				D (-)	99.6	( )		J- / R / P
				N (-)	25.8	( )		J- / WJ / P
				S (-)	24.4	( )		J- / WJ / P
	6/27/09	003 F 0301 (00N)	Col. 1	A (-)	39.1	( )	1, 9162333 MB	J- / WJ / A
				B (-)	20.2	( )		J- / WJ / A
				F (+)	42.3	( )		J+ dets / A
			Col. 2	A (-)	24.7	( )		J- / WJ / A
				F (+)	50.3	( )		J+ dets / A

(10N - Ave 720)

LDC #: 21494 D17  
 SDG #: 54607

VALIDATION FINDINGS WORKSHEET  
 Continuing Calibration

Page: 2 of 3  
 Reviewer: JLG  
 2nd Reviewer: R

METHOD: GC HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
 What type of continuing calibration calculation was performed?  %D or  RPD  
 Were continuing calibration standards analyzed at the required frequencies? 20  
 Did the continuing calibration standards meet the %D / RPD validation criteria of <15.0%?

Level IV Only  
 Y N N/A

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

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit ≤ 15.0%)	RT (limit)	Associated Samples	Qualifications
	6/24/09	027 F2701 (CON)	Col. 1 Col. 2	V (+) A (-) J J (-)	21.7 24.9 22.7	( ) ( ) ( )	2, 9170431 MB	J + A/B / A (C) J - / MS / A
				F (-) D (-) O (-) P (-) M (-) L (-) M M (-) Y (-) Z (-)	24.6 23.1 21.3 20.9 21.5 21.2 25.0 25.8 26.1	( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )		
	6/26/09	010 F1001 (CON)	Col. 1 Col. 2	G (-) F (-) D (-) K (-) C (-) F (-) D (-) N (-)	187.8 40.1 83.7 20.6 215.0 47.6 85.2 23.7	( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )	3-5 9168145 MB	STATS/P J - / MS / P J - R / P J - / MS / P STATS/P J - / MS / A J - R / P J - / MS / A
	6/30/09	016 F1601 (CON)	Col. 2	SOC	nrmt page	( )		

LDC #: 21494 D17

SDG #: 54 Corry

METHOD: GC HPLC

**VALIDATION FINDINGS WORKSHEET**  
Continuing Calibration

Page: 3 of 3

Reviewer: JVG

2nd Reviewer: [Signature]

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
 What type of continuing calibration calculation was performed? 20 %D or 20 RPD  
 Were continuing calibration standards analyzed at the required frequencies? 20  
 Did the continuing calibration standards meet the %D / RPD validation criteria of ≤15.0%?  
 Level IV Only  
 Y  N  N/A

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

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit ≤ 15.0)	RT (limit)	Associated Samples	Qualifications
	<u>7/03/09</u>	<u>003F0201</u>	<u>Col. 1</u>	<u>H (+)</u>	<u>21.2</u>	( )	<u>191503 MB</u>	<u>J + dts / A (C)</u>
			<u>Col. 2</u>	<u>F (+)</u>	<u>25.2</u>	( )		<u>J - / MS / A</u>
				<u>A (-)</u>	<u>21.1</u>	( )		<u>J - / MS / A</u>
				<u>B (-)</u>	<u>45.9</u>	( )		<u>J + dts / A</u>
				<u>F (+)</u>	<u>28.9</u>	( )		<u>J - / MS / A</u>
				<u>I (-)</u>	<u>49.7</u>	( )		<u>J - / MS / A</u>
				<u>V (-)</u>	<u>44.0</u>	( )		<u>J + dts / A</u>
				<u>X (+)</u>	<u>21.2</u>	( )		<u>J + dts / A</u>
						( )		
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LDC #: 21494017  
 SDG #: SRC Gwy

### VALIDATION FINDINGS WORKSHEET

Surrogate Recovery

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

METHOD: GC HPLC

Are surrogates required by the method? Yes  or No

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

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

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

#	Sample ID	Detector/ Column	Surrogate Compound	%R (Limits)	Qualifications
	9162333 MB	Not specified	X	45 (60-154)	J-R/P (S)
			Z	9.4 (49-171)	
3			X	22	J-WJ/A
			Z	18	

Surrogate Compound	Surrogate Compound	Surrogate Compound	Surrogate Compound	Surrogate Compound
A Chlorobenzene (CBZ)	G Octoacetate	M Benz(a)Pyrene	S 1-Chloro-3-Nitrobenzene	Y Tetrachloro-m-xylene
B 4-Bromofluorobenzene (BFB)	H Ortho-Terphenyl	N Terphenyl-D14	T 3,4-Dinitrotoluene	Z Chlormetfals
C 1,1,1-Trifluorobenzene	I Fluorobenzene (FBZ)	O Decachlorobiphenyl (DCB)	U Triphenyltin	
D Bromochlorobenzene	J n-Trifluorobenzene	P 1-methylnaphthalene	V Tri-n-propyltin	
E 1,4-Dichlorobutane	K Hexoacetate	Q Dichlorophenyl Acetic Acid (DCAA)	W Tributyl Phosphate	
F 1,4-Difluorobenzene (DFB)	L Bromobenzene	R 4-Nitrobenzaldehyde	X Tributyl Phosphate	

LDC #: 21494 b17  
 SDG #: 54 carry

**VALIDATION FINDINGS WORKSHEET**  
**Laboratory Control Samples (LCS)**

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

METHOD: GC HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
 Y  N/A Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCS-D) analyzed for each matrix in this SDG?  
 Y  N/A Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

**Level 1/2 Only**  
 Y  N  N/A Was an LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

#	LCS/LCSD ID	Compound	LCS %R (Limits)	LCS-D %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	<u>G162333</u> <u>LCSA</u>	<u>P</u>	<u>58</u> ( <u>43-128</u> )	( )	( )	<u>1, 9162333 MB</u>	<u>No qual (LCS-D)</u>

LDC #: 21494 D7  
SDG #: Sa Gwy

VALIDATION FINDINGS WORKSHEET  
Overall Assessment of Data

Page: 1 of 1  
Reviewer: J/L  
2nd Reviewer: R

METHOD:  GC  HPLC

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

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

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

#	Sample ID Compound Name	Finding	Associated Samples	Qualifications
	2, 4	Outside H.T.	-	X R/A (0)

Comments:

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

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

**Collection Date:** June 10 through June 11, 2009

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

**Matrix:** Soil

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304605

**Sample Identification**

SA35-0.5B  
SA176-0.5B  
SA166-0.5B  
SA182-0.5B

## **Introduction**

This data review covers 4 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8141A for Organophosphorus Pesticides.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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

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

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

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

### b. Calibration Verification

Calibration verification was performed at the required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/19/09	051F5101	1	Dichlorvos Azinphos-methyl	24.2 30.9	All samples in SDG 8304605	J+ (all detects) J+ (all detects)	A
6/19/09	051F5101	1	Naled Disulfoton	38.2 26.8	All samples in SDG 8304605	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
6/19/09	051F5101	2	Naled	49.0	All samples in SDG 8304605	J- (all detects) UJ (all non-detects)	A
6/19/09	051F5101	2	Azinphos-methyl	35.3	All samples in SDG 8304605	J+ (all detects)	A

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/1/09	010F1001	1	Naled	29.0	All samples in SDG 8304605	J- (all detects) UJ (all non-detects)	P
6/1/09	010F1001	2	Naled	35.8	All samples in SDG 8304605	J- (all detects) UJ (all non-detects)	P

### III. Blanks

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

Sample FB072109-SO (from SDG 8304616) was identified as a field blank. No organophosphorus pesticide contaminants were found in this blank.

### IV. Accuracy and Precision Data

#### a. Surrogate Recovery

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

#### b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

#### c. Laboratory Control Samples

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

### V. Target Compound Identification

Raw data were not reviewed for this SDG.

### VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304605	All compounds reported below the PQL.	J (all detects)	A



Raw data were not reviewed for this SDG.

### **VII. System Performance**

Raw data were not reviewed for this SDG.

### **VIII. Overall Assessment of Data**

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

### **IX. Field Duplicates**

No field duplicates were identified in this SDG.

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304605**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304605	SA35-0.5B SA176-0.5B SA166-0.5B SA182-0.5B	Dichlorvos Azinphos-methyl	J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
8304605	SA35-0.5B SA176-0.5B SA166-0.5B SA182-0.5B	Naled  Disulfoton	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304605	SA35-0.5B SA176-0.5B SA166-0.5B SA182-0.5B	Naled	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304605	SA35-0.5B SA176-0.5B SA166-0.5B SA182-0.5B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG 8304605**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG 8304605**

No Sample Data Qualified in this SDG

**Tronox Northgate Henderson**  
**VALIDATION COMPLETENESS WORKSHEET**

LDC #: 21494E17  
SDG #: 8304605  
Laboratory: Test America

Stage 2B

Date: 9/11/09  
Page: 1 of 1  
Reviewer: JVC  
2nd Reviewer: [Signature]

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

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

Validation Area			Comments
I.	Technical holding times	A	Sampling dates: 6/10-11/09
IIa.	Initial calibration	A	% RSD ≤ 20% r <sub>r</sub>
IIb.	Calibration verification/ICV	SW	COV/ICV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	RSAM2-0.5B (from 8304607)
IVc.	Laboratory control samples	A	UCS
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	FB = FB072109-50 (from 8304616)

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

1	SA35-0.5B	11		21		31	
2	SA176-0.5B	12		22		32	
3	SA166-0.5B	13		23		33	
4	SA182-0.5B	14		24		34	
5	9166561 MB	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

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

VALIDATION FINDINGS WORKSHEET

METHOD: GC HPLC

8310	8330	8151	8141	8141(Cont)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensulfothion	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Bolstar	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X. EPN	EE. Ethyl Benzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	Y. Azinphos-methyl	SSS. O-Xylene
E. Benzo(a)pyrene	E. Tetryl	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. MP-Xylene
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total Xylene
G. Benzo(g,h,i)perylene	G. 2,4,6-Trinitrotoluene	G. Dicamba	G. Sulfotep	BB. Trichloronate	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Trichlorinate	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotoluene	J. MCPA	J. Diazinon	EE. Def	
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowl	
L. Fluorene	L. 2-Nitrotoluene	L. 2,4,5-TP (silvex)	L. Parathion-methyl	GG. Ethion	
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel	HH. Tetrachlorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	II. Sulprofos	
O. Phenanthrene	O.		O. Chlorpyrifos	JJ. Thionazin	
P. Pyrene	P.		P. Fenthion	KK. Phosmet	
Q.	Q		Q. Parathion-ethyl	LL. O,O,O-Triethylphosphorothioate	
R.			R. Trichloronate	MM. Famphur	
S.			S. Merphos	NN. Carbo phenethion	
			T. Stirofos	OO. Carbo phenethion - methyl	
			U. Tokuthion		

Notes:

METHOD: GC HPLC

2nd Reviewer: [Signature]

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

What type of continuing calibration calculation was performed? %D or RPD

Y ( ) N ( ) N/A

Were continuing calibration standards analyzed at the required frequencies?

Y ( ) N ( ) N/A

Level IV-Only

Y ( ) N ( ) N/A

Did the continuing calibration standards meet the %D / RPD validation criteria of  $\leq 10.0\%$ ?

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

#	Date	Standard ID	Detector/ (Column)	Compound	%D / RPD (Limit $\leq 10.0\%$ )	RT (limit)	Associated Samples	Qualifications
	6/01/09	010 F1001 (1CV)	Col. 1	<del>E (+)</del>	<del>178.0</del>	( )	All + B/k	J+dets/P-(C)
				F (-)	29.0	( )		J-/MJ/P
				D (-)	78.1	( )		J-/R/P
			Col. 2	<del>C (+)</del>	<del>223.9</del>	( )		J+dets/P
				F (-)	35.8	( )		J-/MJ/P
				<del>D (-)</del>	<del>89.0</del>	( )		<del>J-/R/P</del>
						( )		
						( )		
						( )		
6/19/09	051 F5101 (CCV)	Col. 1		A (+)	24.2	( )		J+dets/A
				F (-)	38.2	( )		J-/MJ/A
				K (-)	26.8	( )		J-/MJ/A
				Y (+)	30.9	( )		J+dets/A
			Col. 2	F (-)	49.0	( )		J-/MJ/A
				Y (+)	35.0 <sup>3</sup>	( )	✓	J+dets/A
						( )		
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## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** June 16 through July 19, 2009

**LDC Report Date:** October 22, 2009

**Matrix:** Soil

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304606

### Sample Identification

SA85-0.5B  
SA92-0.5B  
SA86-0.5B  
SA86-0.5BRE  
SA129-0.5B  
SA129-0.5BRE  
SA85-0.5BMS  
SA85-0.5BMSD  
SA86-0.5BMS  
SA86-0.5BMSD

## Introduction

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

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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 with the following exceptions:

Sample	Analyte	Total Days From Sample Collection Until Analysis	Required Holding Time (in Days) From Sample Collection Until Analysis	Flag	A or P
SA86-0.5BRE	All TCL compounds	20	14	J- (all detects) UJ (all non-detects)	A
SA129-0.5BRE	All TCL compounds	19	14	J- (all detects) UJ (all non-detects)	A

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

## II. Calibration

### a. Initial Calibration

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

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

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

### \*b. Calibration Verification

Calibration verification was performed at the required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
7/3/09	019F1901	1	Mevinphos Fensulfothion Azinphos-methyl	22.3 22.9 25.9	SA86-0.5B SA129-0.5B SA86-0.5BMS SA86-0.5BMSD 9175172MB	J- (all detects) UJ (all non-detects)	A

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
7/3/09	019F1901	1	Merphos	27.1	SA86-0.5B SA129-0.5B SA86-0.5BMS SA86-0.5BMSD 9175172MB	J+ (all detects)	A
7/3/09	019F1901	2	Mevinphos Dimethoate Fensulfothion Azinphos-methyl Coumaphos	55.8 57.8 59.4 23.1 20.8	SA86-0.5B SA129-0.5B SA86-0.5BMS SA86-0.5BMSD 9175172MB	J- (all detects) UJ (all non-detects)	A
7/3/09	019F1901	2	Naled	25.6	SA86-0.5B SA86-0.5BRE SA129-0.5B SA86-0.5BMS SA86-0.5BMSD 9175172MB	J+ (all detects)	A
7/13/09	003F0301	1	Naled	33.1	SA86-0.5BRE SA129-0.5BRE 9189494MB	J+ (all detects)	A
7/13/09	003F0301	2	Naled	24.7	SA86-0.5BRE SA129-0.5BRE 9189494MB	J+ (all detects)	A

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/23/09	010F1001	1	Naled	43.3	SA85-0.5B SA92-0.5B SA85-0.5BMS SA85-0.5BMSD 9170419MB	J- (all detects) UJ (all non-detects)	P
6/23/09	010F1001	1	Naled Malathion Merphos	43.3 25.8 24.4	SA85-0.5B SA92-0.5B SA85-0.5BMS SA85-0.5BMSD 9170419MB	J- (all detects) UJ (all non-detects)	P

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/26/09	010F1001	1	Naled Disulfoton	40.1 20.6	SA86-0.5B SA86-0.5BRE SA129-0.5B SA129-0.5BRE SA86-0.5BMS SA86-0.5BMSD 9175172MB 9189494MB	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P
6/26/09	010F1001	2	Naled Malathion	47.6 23.2	SA86-0.5B SA86-0.5BRE SA129-0.5B SA129-0.5BRE SA86-0.5BMS SA86-0.5BMSD 9175172MB 9189494MB	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P

\*Added Malathion to table above for 010F1001 Column 2 on 6/26/09

### III. Blanks

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

Sample FB072109-SO (from SDG 8304616) was identified as a field blank. No organophosphorus pesticide contaminants were found in this blank.

### IV. Accuracy and Precision Data

#### a. Surrogate Recovery

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
SA129-0.5B	Not specified	Triphenylphosphate	28 (47-161)	All TCL compounds	J- (all detects) UJ (all non-detects)	A

#### b. Matrix Spike/Matrix Spike Duplicates

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

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SA86-0.5BMS/MSD (SA86-0.5B)	Dimethoate	0 (10-156)	0 (10-156)	-	J- (all detects) R (all non-detects)	A

### c. Laboratory Control Samples

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
9175172LCS (SA86-0.5B SA129-0.5B 9175172MB)	Dimethoate	0 (10-156)	-	-	J- (all detects) R (all non-detects)	P

### V. Target Compound Identification

Raw data were not reviewed for this SDG.

### VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304606	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

### VII. System Performance

Raw data were not reviewed for this SDG.

### VIII. Overall Assessment of Data

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

Sample	Compound	Flag	A or P
SA86-0.5B SA129-0.5B	Dimethoate	X	A
SA86-0.5BRE SA129-0.5BRE	All TCL compounds except Dimethoate	X	A

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.

**\*Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304606**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304606	SA86-0.5BRE SA129-0.5BRE	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
8304606	SA86-0.5B SA129-0.5B	Merphos	J+ (all detects)	A	Continuing calibration (%D) (c)
8304606	SA86-0.5B SA129-0.5B	Mevinphos Dimethoate Fensulfothion Azinphos-methyl Coumaphos	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304606	SA86-0.5B SA129-0.5B SA86-0.5BRE SA129-0.5BRE	Naled	J+ (all detects)	A	Continuing calibration (%D) (c)
8304606	SA85-0.5B SA92-0.5B	Naled Malathion Merphos	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
*8304606	SA86-0.5B SA86-0.5BRE SA129-0.5B SA129-0.5BRE	Naled Disulfoton Malathion	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304606	SA129-0.5B	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Surrogate recovery (%R) (s)
8304606	SA86-0.5B	Dimethoate	J- (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
8304606	SA86-0.5B SA129-0.5B	Dimethoate	J- (all detects) R (all non-detects)	P	Laboratory control samples (%R) (l)
8304606	SA85-0.5B SA92-0.5B SA86-0.5B SA86-0.5BRE SA129-0.5B SA129-0.5BRE	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
8304606	SA86-0.5B SA129-0.5B	Dimethoate	X	A	Overall assessment of data (0)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304606	SA86-0.5BRE SA129-0.5BRE	All TCL compounds except Dimethoate	X	A	Overall assessment of data (0)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG  
8304606**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG  
8304606**

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

LDC #: 21494F17

SDG #: 8304606

Laboratory: Test America

Date: 9/15/09

Page: 1 of 1

Reviewer: JVL

2nd Reviewer: [Signature]

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

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

Validation Area			Comments
I.	Technical holding times	SW	Sampling dates: 6/6 - 19/09
IIa.	Initial calibration	A	2 RSD ≤ 20% RV
IIb.	Calibration verification/ICV	SW	CCV/ICV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	SW	
IVc.	Laboratory control samples	SW	UCS/B
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	SW	
IX.	Field duplicates	N	
X.	Field blanks	ND	FB = FB072109-50 from 8304616

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

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

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:

Soil

1	SA85-0.5B	11	9170419 MB	21		31
2	SA92-0.5B	12	9175172 MB	22		32
3	SA86-0.5B	13	9189494 MB	23		33
4	SA86-0.5BRE	14		24		34
5	SA129-0.5B	15		25		35
6	SA129-0.5BRE	16		26		36
7	SA85-0.5BMS	17		27		37
8	SA85-0.5BMSD	18		28		38
9	SA86-0.5BMS	19		29		39
10	SA86-0.5BMSD	20		30		40

Notes:



VALIDATION FINDINGS WORKSHEET

METHOD: GC\_HPLC

8310	8330	8151	8141	8141 (Cont)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensulfothion	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Boistar	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X. EPN	EE. Ethyl Benzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	Y. Azinphos-methyl	SSS. O-Xylene
E. Benzo(b)pyrene	E. Tetryl	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. MP-Xylene
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total Xylene
G. Benzo(g,h,i)perylene	G. 2,4,6-Trinitrotoluene	G. Dicamba	G. Sulfotep	BB. Trichloronate	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Trichlorinate	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotoluene	J. MCPA	J. Diazinon	EE. Def	
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowl	
L. Fluorene	L. 2-Nitrotoluene	L. 2,4,6-TP (silvex)	L. Parathion-methyl	GG. Ethion	
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel	HH. Tezschlorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	II. Sulprofos	
O. Phenanthrene	O.		O. Chlorpyrifos	JJ. Thionazin	
P. Pyrene	P.		P. Fenitlon	kk. Phosmet	
Q.	Q		Q. Parathion-ethyl	ll. O,O-Diethylphosphorothioate	
R.			R. Trichloronate	MM. Famphur	
S.			S. Merphos	NN. Carbo phenethion	
			T. Sirofos	OO. Carbo phenethion-methyl	
			U. Tokuthion		

Notes:

LDC #: 21494 F17  
SDG #: Su Co

VALIDATION FINDINGS WORKSHEET  
Technical Holding Times

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

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

METHOD: GC HPLC									
Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier		
4	S	N	6/18/09	7/6/09	7/13/09	20	J-05/A (h)		
6	S	N	6/19/09		7/13/09	19			

**TECHNICAL HOLDING TIME CRITERIA**  
**VOLATILES:** Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.  
Water preserved: Both within 14 days of sample collection.  
Soils: Both within 14 days of sample collection.  
**EXTRACTABLES:** Water: Extracted within 7 days, analyzed within 40 days.  
Soil: Extracted within 14 days, analyzed within 40 days.

LDC #: 21444 F17  
 SDG #: See Cont.

VALIDATION FINDINGS WORKSHEET  
 Continuing Calibration

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

METHOD: GC HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
 What type of continuing calibration calculation was performed?  %D or  RPD  
 Were continuing calibration standards analyzed at the required frequencies? 20  
 Did the continuing calibration standards meet the %D / RPD validation criteria of  $\leq 15.0\%$ ?  
 Level  Only  
 Y N (N/A)

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

#	Date	Standard ID	Detector/Column	Compound	%D / RPD (Limit $\leq 15.0\%$ )	RT (limit)	Associated Samples	Qualifications
	6/23/09	010 F1001 (100)	C-1.1	E (+)	171.8	( )	1, 2, 7, 8, 9, 17, 04, 19 MB	<del>J-WS/P</del> J-WS/P
				F (-)	43.3	( )		<del>J-WS/P</del> J-WS/P
				D (-)	85.7	( )		<del>J-WS/P</del> J-WS/P
			C-1.2	G (+)	244.6	( )		<del>J-WS/P</del> J-WS/P
				F (-)	43.3	( )		<del>J-WS/P</del> J-WS/P
				D (-)	44.6	( )		<del>J-WS/P</del> J-WS/P
				N (-)	25.8	( )		J-WS/P
				S (-)	24.4	( )		↓
	5/26/09	010 F1001 (100)	C-1.1	E (+)	187.8	( )	3-6, 9, 10, 917, 517, 2 MB	<del>J-WS/P</del> J-WS/P
				F (-)	40.1	( )	918, 944 MB	<del>J-WS/P</del> J-WS/P
				D (-)	83.1	( )		<del>J-WS/P</del> J-WS/P
				K (-)	20.6	( )		<del>J-WS/P</del> J-WS/P
				G (+)	215.0	( )		<del>J-WS/P</del> J-WS/P
			C-1.2	F (-)	47.6	( )		<del>J-WS/P</del> J-WS/P
				D (-)	85.2	( )		<del>J-WS/P</del> J-WS/P
				N (-)	23.2	( )		<del>J-WS/P</del> J-WS/P
	7/02/09	019 F1901 (CON)	C-1.1	B (-)	22.3	( )	3, 5, 9, 10, 917, 517, 2 MB	J-WS/A
				V (-)	22.9	( )	(3, 5)	↓
				Y (-)	25.9	( )		J-WS/A
				S (+)	27.1	( )		J-WS/A

LDC #: 21494 F17  
SDG #: Seq 600

**VALIDATION FINDINGS WORKSHEET**  
Continuing Calibration

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

METHOD:  GC  HPLC

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

#	Date	Standard ID	Detector/Column	Compound	%D / RPD (Limit ≤ 15.0%) (20 b)	RT (limit)	Associated Samples	Qualifications
	7/07/09	019 F1901 (CON)	Col. 2	B (-)	55.8	( )	3, 5, 9, 10, 11, 15, 17, 20 MB	J-M/A (C)
				F (+)	25.6	( )		J-M/A
				I (-)	57.8	( )		J-M/A
				V (-)	59.4	( )		
				Y (-)	23.1	( )		
				Z (-)	20.8	( )		
	7/12/09	003 F0301 (CON)	Col. 1	F (+)	33.1	( )	4, 6, 9, 18, 19, 194 MB	J-M/A
			Col. 2	F (+)	24.7	( )		
						( )		
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LDC #: 21494 F17  
SDG #: 59 Conv

# VALIDATION FINDINGS WORKSHEET

## Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1  
Reviewer: DZ  
2nd Reviewer: 2

METHOD: GC HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
 N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?  
 N N/A Was an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?  
 N N/A Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits?

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	<u>7/8</u>	<u>K</u>	( )	( )	<u>62</u> ( )	<u>1</u>	<u>No peak (3 Rin)</u>
	<u>9/10</u>	<u>A</u>	<u>13</u> (25-147)	<u>16</u> (25-147)	( )	<u>3</u>	<u>Negate (15 Rin)</u>
		<u>J</u>	<u>0</u> (10-156)	<u>0</u> (10-156)	( )		<u>J-R/A (5 Rin)</u>
		<u>E</u>	<u>53</u> (57-119)	<u>50</u> (57-119)	( )		<u>No peak (15 Rin)</u>
		<u>MM</u>	<u>29</u> (33-149)	( )	<u>39</u> ( )		
		<u>V</u>	<u>9.3</u> (47-123)	( )	( )		
		<u>P</u>	<u>0</u> (52-115)	<u>0</u> (52-115)	( )		
		<u>B</u>	<u>0</u> (15-143)	<u>0</u> (15-143)	( )		
		<u>JJ</u>	<u>40</u> (50-124)	<u>48</u> (50-124)	( )	<u>✓</u>	<u>✓</u>
			( )	( )	( )		
			( )	( )	( )		
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			( )	( )	( )		
			( )	( )	( )		

LDC #: 21444 F17

SDG #: See below

METHOD: GC HPLC

### VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

Page: 1 of 1  
Reviewer: JK  
2nd Reviewer: S

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG? Y  
Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits? N/A

Level I/VID Only  
Y N NA Was an LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

#	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	9170419 US/B	I	( )	( )	104 ( 98 )	1, 2, 9170419 MB	No. qual (2 Rm)
		K	( )	( )	97 ( 40 )		
	9175172 US	I	0 (10-156)	( )	( )	3, 5, 9175172 MB	J-R/P (1)
			( )	( )	( )		
	9189494 US/B	I	( )	9.0 ( )	( )	4, 6, 9189494 MB	No. qual (LCSin)
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
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			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

LDC #: 21494 F17  
 SDG #: See Conty

VALIDATION FINDINGS WORKSHEET  
Overall Assessment of Data

METHOD:  GC  HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
 All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

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

#	Compound Name	Finding	Associated Samples	Qualifications
	I	MS, MSD, LCS outside limits	3	X R/A (0)
	All except I	outside H.T.	4, 6	
	I	LCS outside limits	5	

Comments:



## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** June 16 through June 19, 2009

**LDC Report Date:** October 22, 2009

**Matrix:** Water

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304607

### Sample Identification

M-39B  
M-123B  
M-123009B  
M-34B

## Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8141A for Organophosphorus Pesticides.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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

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

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

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

### \*b. Calibration Verification

Calibration verification was performed at the required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/30/09	019F1901	1	Naled	21.6	All samples in SDG 8304607	J- (all detects) UJ (all non-detects)	A

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/26/09	010F1001	1	Naled	40.1	All samples in SDG 8304607	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P
			Disulfoton	20.6			
6/26/09	010F1001	2	Naled	47.6	All samples in SDG 8304607	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P
			Malathion	23.2			

\*Indicates change as the result of report review.  
SDG 8304607

\*Added Malathion to table above for 010F1001 Column 2 on 6/26/09

### III. Blanks

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

Sample FB060309-SO (from SDG 8304616) was identified as a field blank. No organophosphorus pesticide contaminants were found in this blank.

### IV. Accuracy and Precision Data

#### a. Surrogate Recovery

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

#### b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

#### c. Laboratory Control Samples

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

### V. Target Compound Identification

Raw data were not reviewed for this SDG.

### VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304607	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

### VII. System Performance

Raw data were not reviewed for this SDG.

### **VIII. Overall Assessment of Data**

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

### **IX. Field Duplicates**

Samples M-123B and M-123009B were identified as field duplicates. No organophosphorus pesticides were detected in any of the samples.

**\*Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304607**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304607	M-39B M-123B M-123009B M-34B	Naled	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
*8304607	M-39B M-123B M-123009B M-34B	Naled Disulfoton Malathion	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304607	M-39B M-123B M-123009B M-34B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG 8304607**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG 8304607**

No Sample Data Qualified in this SDG

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

LDC #: 21494G17  
 SDG #: 8304607  
 Laboratory: Test America

Date: 9/15/09  
 Page: 1 of 1  
 Reviewer: JG  
 2nd Reviewer: [Signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: <u>6/16-19/09</u>
IIa.	Initial calibration	A	<u>2 RSD ≤ 20% r<sub>r</sub></u>
IIb.	Calibration verification/ICV	SW	<u>CV/ICV ≤ 20%</u>
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	<u>Client spec</u> (insufficient vol)
IVc.	Laboratory control samples	A	<u>LCS/D</u>
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	<u>D = 2, 3</u>
X.	Field blanks	ND	<u>FB = FB060309 from 8304603</u>

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

Validated Samples: water

1	M-39B	11	<u>9173103 MB</u>	21		31	
2	M-123B	12		22		32	
3	M-123009B	13		23		33	
4	M-34B	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

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



VALIDATION FINDINGS WORKSHEET

METHOD: GC HPLC

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

Notes:

**VALIDATION FINDINGS WORKSHEET**  
Continuing Calibration

METHOD: GC HPLC  
 2nd Reviewer: [Signature]

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

What type of continuing calibration calculation was performed?    %D or    RPD

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

N  N/A Did the continuing calibration standards meet the %D / RPD validation criteria of ±100%?

Level IV Only

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

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit ≤ 15.0) (20.2)	RT (limit)	Associated Samples	Qualifications
	6/26/09	016 F100 (16A)	Col.1 ↓	<del>G(-)</del> F(-) <del>D(-)</del>	<del>13.7.8</del> 40.1 <del>8.4</del>	( ) ( ) ( )	.All + B1K	<del>J-L/MS/P</del> J-/MS/P <del>J-R/P</del> J-/MS/P <del>J-L/MS/P</del> J-/MS/P <del>J-R/P</del> J-/MS/P
	6/30/09	019 F1901 (60A)	Col.2 ↓	<del>G(-)</del> F(-) <del>D(-)</del> N(-) F(-)	<del>215.0</del> 47.6 <del>85.7</del> 23.2 21.6	( ) ( ) ( ) ( ) ( )	↓	J-/MS/A

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** June 23, 2009

**LDC Report Date:** October 22, 2009

**Matrix:** Water

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 4

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304608

### Sample Identification

M-125B  
M-125BMS  
M-125BMSD

## Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8141A for Organophosphorus Pesticides.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

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

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

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

Retention time windows were evaluated and considered technically acceptable.

### \*b. Calibration Verification

Calibration verification was performed at the required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were less than or equal to 20.0%.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/26/09	010F1001	1	Naled Disulfoton	40.1 20.6	All samples in SDG 8304608	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P
6/26/09	010F1001	2	Naled Malathion	47.6 23.2	All samples in SDG 8304608	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P

\*Added Malathion to table above for 010F1001 Column 2 on 6/26/09

Retention times (RT) of all compounds in the calibration standards were within QC limits.

\*Indicates change as the result of report review.  
SDG 8304608

### III. Blanks

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

No field blanks were identified in this SDG.

### IV. Accuracy and Precision Data

#### a. Surrogate Recovery

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

#### b. Matrix Spike/Matrix Spike Duplicates

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

#### c. Laboratory Control Samples

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

### V. Target Compound Identification

All target compound identifications were within validation criteria.

### VI. Project Quantitation Limit

All project quantitation limits PQLs were within validation criteria.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304608	All compounds reported below the PQL.	J (all detects)	A

### VII. System Performance

The system performance was acceptable.

### **VIII. Overall Assessment of Data**

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

### **IX. Field Duplicates**

No field duplicates were identified in this SDG.



**\*Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304608**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
*8304608	M-125B	Naled Disulfoton Malathion	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304608	M-125B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG  
8304608**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG  
8304608**

No Sample Data Qualified in this SDG

\*Indicates change as the result of report review.  
SDG 8304608

**Tronox Northgate Henderson**

LDC #: 21494H17  
 SDG #: 8304608  
 Laboratory: Test America

**VALIDATION COMPLETENESS WORKSHEET**  
 Stage 2B 4

Date: 9/11/09  
 Page: 1 of 1  
 Reviewer: *JB*  
 2nd Reviewer: *[Signature]*

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/23/09
IIa.	Initial calibration	A	$\sigma_2$ RSD = 20% r <sup>2</sup>
IIb.	Calibration verification/ICV	SW	CCV/ICV = 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS <del>TR</del>
V.	Target compound identification	NA	
VI.	Compound Quantitation and CRQLs	NA	
VII.	System Performance	NA	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	FB = FBOG0309 from 8304603

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: *Water*

1	M-125B	11		21		31	
2	M-125BMS	12		22		32	
3	M-125BMSD	13		23		33	
4	<i>9177142-MB</i>	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

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

LDC #: 21494 H17  
 SDG #: See Cover

**VALIDATION FINDINGS CHECKLIST**

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

Method: GC HPLC

Validation Area	Yes	No	NA	Findings/Comments
<b>III. 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>IV. 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) < 20%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the RT windows properly established?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>V. Continuing Calibration</b>				
Was a continuing calibration analyzed daily?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) < 15% <sup>20</sup> or percent recoveries <del>85-110</del> %?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all the retention times within the acceptance windows?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<b>VI. 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 checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<b>VII. Surrogate Spikes</b>				
Were all surrogate %R within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<b>VIII. Matrix Spike/Main 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>IX. 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 QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>X. 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"/>	

LDC #: 21464 H17  
 SDG #: See Cover

**VALIDATION FINDINGS CHECKLIST**

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

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

# VALIDATION FINDINGS WORKSHEET

METHOD: GC HPLC

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

Notes:

LDC #: 2494 H17  
SDG #: See Convoy

Page: 1 of 1  
Reviewer: J/C

**VALIDATION FINDINGS WORKSHEET**  
Continuing Calibration

METHOD: GC HPLC

2nd Reviewer: [Signature]

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
What type of continuing calibration calculation was performed? RPD %D or RPD %D or RPD  
Were continuing calibration standards analyzed at the required frequencies?  
Did the continuing calibration standards meet the %D / RPD validation criteria of ≤160%?  
Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Detector/Column	Compound	%D / RPD (Limit ≤ 150%)	RT (limit)	Associated Samples	Qualifications
	4/26/09	016 F1001 (10A2)	Col.1	G(-)	187.8	( )	All + Blk	J-/MT/P (C)
				F(-)	40.1	( )		J-/MT/P
				D(-)	83.7	( )		J-/MT/P
				K(-)	20.6	( )		J-/MT/P
			Col.2	G(+)	25.0	( )		J-/MT/P
				F(-)	47.6	( )		J-/MT/P
				D(-)	85.7	( )		J-/MT/P
				N(-)	23.7	( )		J-/MT/P
						( )		
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LDC #: 21444 717  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
Initial Calibration Calculation Verification

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

METHOD: GC  HPLC

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

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

#	Standard ID	Calibration Date	Compound	Reported		Recalculated		Reported		Recalculated	
				CF ( $\pm$ std)	CF ( $\pm$ std)	Average CF (initial)	Average CF (initial)	%RSD	%RSD		
1	1 CAL	6/26/09	Dichlorvos (8141-1) Phorate Malathion	1.76366 1.82370 see	1.76369 1.82370 r <sub>2</sub>	1.74977 1.81476	1.74977 1.81476	7.99554 5.60901	7.99554 5.60922	7.99566 5.60922	
2			Dichlorvos (8142-2) Phorate Malathion	2.17503 1.69491 1.17724	2.17503 1.69691 1.17724	2.01995 1.76915 1.20369	2.01995 1.76315 1.20369	7.32345 8.53546 3.60443	7.32345 8.53913 3.60500	7.32345 8.53913 3.60500	
3											
4											

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

IS - 70CP

LDC # 21999 #17  
 SDG# See Card

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

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

**METHOD:** GC EPA SW 846 Method 8141A

**Parameter:** Malathion

Date	Column	Compound	Y Area ratio	X Conc ratio	X <sup>2</sup>
06/26/2009	(8141A-1)	Malathion	0.14584	0.100	
			0.29331	0.250	
			0.55883	0.500	
			0.89027	1.000	
			1.76202	1.500	
			2.36769	2.000	
			2.77727	2.500	

Regression Output:		Reported
Constant	-0.02062	c = -0.02066
Std Err of Y Est	0.12319	
R Squared	0.99000	r <sup>2</sup> = 0.99783
Nc. of Observations	7.00000	
Degrees of Freedom	5.00000	
X Coefficient(s)	1.1388	a
Std Err of Coef.	0.054985	1.14436E+000

iS = TOCP = 2.0ug/mL  
 Lab used weighted linear regression



LDC #: 21494 #17  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
Continuing Calibration Results Verification

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

METHOD: GC  HPLC

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

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

#	Standard ID	Calibration Date	Compound	Average CF (cal)/ CCV Conc.	Reported		Recalculated	
					CF/Conc. CCV	%D	CF/Conc. CCV	%D
1	016 F1601	6/20/09	Pichlorvos (8191-1)	3.00	2.6730	10.9	2.6730	10.9
			Phorate		2.9700	1.0	2.9700	1.0
			Malathion		3.0698	2.2	3.0698	2.2
2			Dichlorvos (8191-2)		2.6533	11.6	2.6533	11.6
			Phorate		3.1758	5.9	3.1758	5.9
			Malathion		3.0056	0.2	3.0056	0.2
3								
4								

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

LDC #: 21994 H17  
 SDG #: See Cover

METHOD: GC HPLC

VALIDATION FINDINGS WORKSHEET  
 Surrogate Results Verification

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

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: # |

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery		Percent Difference
				Reported	Recalculated	
TPP	Col. 1	1.00	0.59488	77	77	0
Chloroform	1		0.76771	59	59	0

Sample ID:

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

Sample ID:

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

LDC #: 2/494 4/17  
 SDG #: See Cover

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

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

METHOD: GC HPLC

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

%Recovery =  $100 * ((SSC - SC) / SA)$  Where SSC = Spiked sample concentration SA = Spike added MS = Matrix spike  
 RPD =  $(((SSCMS - SSCMSD) * 2) / ((SSCMS + SSCMSD)) * 100)$  MS = Matrix spike  
 MS/MSD samples: 2/3

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD		MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
bichlorvos (8141)	2.86	3.93	♀	2.87	2.92	74	74	74	74	1.8	1.7
Malathion ↓	↓	↓	♂	2.73	2.99	71	71	76	76	9.0	9.1

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

LDC #: 21494 417  
 SDG #: See Cover

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

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

METHOD: GC HPLC

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

% Recovery =  $100 \cdot (SSC - SC) / SA$   
 RPD =  $100 \cdot |LCS - LCSD| / (LCS + LCSD)$

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

LCS/LCSD samples: 9177142 LCS

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS		LCSD		LCS		LCSD		LCS/LCSD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)														
Diesel (8015)														
Benzene (8021B)														
Methane (RSK-175)														
2,4-D (8151)														
Dinoseb (8151)														
Naphthalene (8310)														
Anthracene (8310)														
HMX (8330)														
2,4,6-Trinitrotoluene (8330)														
Dichlorvos (8141)	4.00	NA	2.70	NA	68	68								
Methidathion			2.66		66	66								

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

LDC #: 21494 H17  
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET  
Sample Calculation Verification

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

METHOD:  GC  HPLC

Y  N  N/A  
 Y  N  N/A

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

Concentration =  $\frac{A \times (F_v)(D_f)}{(R_f)(V_s \text{ or } W_s)(\%S/100)}$

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

Example:

Sample ID: \_\_\_\_\_ Compound Name: MD

Concentration = \_\_\_\_\_

#	Sample ID	Compound	Reported Concentrations	Recalculated Results Concentrations	Qualifications

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

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

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

**Collection Date:** June 29, 2009

**LDC Report Date:** October 22, 2009

**Matrix:** Water

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304609

**Sample Identification**

M-111AB  
EB062909-GW

## Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8141A for Organophosphorus Pesticides.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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

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

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

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

### \*b. Calibration Verification

Calibration verification was performed at the required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
7/7/09	004F0401	1	Naled	44.4	All samples in SDG 8304609	J+ (all detects)	A
7/7/09	004F0401	2	Naled	24.0	All samples in SDG 8304609	J+ (all detects)	A

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/26/09	010F1001	1	Naled	40.1	All samples in SDG 8304609	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P
			Disulfoton	20.6			

\*Indicates change as the result of report review.  
SDG 8304609

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/26/09	010F1001	2	Naled Malathion	47.6 23.2	All samples in SDG 8304609	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P

\*Added Malathion to table above for 010F1001 Column 2 on 6/26/09

### III. Blanks

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

Sample EB062909-GW was identified as an equipment blank. No organophosphorus pesticide contaminants were found in this blank.

### IV. Accuracy and Precision Data

#### a. Surrogate Recovery

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

#### b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

#### c. Laboratory Control Samples

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

### V. Target Compound Identification

Raw data were not reviewed for this SDG.

### VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304609	All compounds reported below the PQL.	J (all detects)	A

\*Indicates change as the result of report review.  
SDG 8304609

Raw data were not reviewed for this SDG.

### **VII. System Performance**

Raw data were not reviewed for this SDG.

### **VIII. Overall Assessment of Data**

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

### **IX. Field Duplicates**

No field duplicates were identified in this SDG.

**\*Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304609**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304609	M-111AB EB062909-GW	Naled	J+ (all detects)	A	Continuing calibration (%D) (c)
*8304609	M-111AB EB062909-GW	Naled Disulfoton Malathion	J- (all detects) UU (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304609	M-111AB EB062909-GW	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG 8304609**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG 8304609**

No Sample Data Qualified in this SDG

\*Indicates change as the result of report review.  
SDG 8304609

**Tronox Northgate Henderson**

LDC #: 21494117

**VALIDATION COMPLETENESS WORKSHEET**

SDG #: 8304609

Stage 2B

Laboratory: Test America

Date: 9/11/09

Page: 1 of 1

Reviewer: JVG

2nd Reviewer: J

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: <u>6/29/09</u>
IIa.	Initial calibration	A	<u>2 RSD <math>\leq</math> 20% r<sup>2</sup></u>
IIb.	Calibration verification/ICV	<u>SW</u>	<u>CV/ ICV <math>\leq</math> 20%</u>
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	<u>Client spec (insufficient sample)</u>
IVc.	Laboratory control samples	A	<u>LCS 10</u>
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	<u>ND</u>	<u>EB = 2</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-111AB	11		21		31	
2	EB062909-GW	12		22		32	
3	<u>9182412 MB</u>	13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

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

VALIDATION FINDINGS WORKSHEET

METHOD: GC HPLC

8310	8330	8151	8141	8141 (Cont)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensulfothion	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Boletar	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X. EPN	EE. Ethyl Benzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	Y. Azinphos-methyl	SSS. O-Xylene
E. Benzo(b)pyrene	E. Tetryl	E. Dinoseb	E. Ethoprop	Z. Courmaphos	RRR. MP-Xylene
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total Xylene
G. Benzo(g,h,i)perylene	G. 2,4,6-Trinitrotoluene	G. Dicamba	G. Sulfotep	BB. Trichloronate	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Trichlorinate	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotoluene	J. MCPA	J. Diazinon	EE. Dsf	
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowl	
L. Fluorene	L. 2-Nitrotoluene	L. 2,4,5-TP (silvex)	L. Parathion-methyl	GG. Ethion	
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel	HH. Tetrachlorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	II. Sulprofos	
O. Phenanthrene	O.		O. Chlorpyrifos	JJ. Thionazin	
P. Pyrene	P.		P. Fenthion	KK. Phosmet	
Q.	Q		Q. Parathion-ethyl	LL. O,O,O-Triethylphosphorothioate	
R.			R. Trichloronate	MM. Famphur	
S.			S. Merphos	NN. Carbo phenethion	
			T. Sirofos	OO. Carbo phenethion - methyl	
			U. Tokuthion		

Notes:

METHOD: GC HPLC  
 2nd Reviewer: JL

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

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit $\leq \pm 20$ )	RT (limit)	Associated Samples	Qualifications
	6/26/09	016 F1001 (100)	Col.1	C (+)	187.8	( )	All + Blk	JL-MS/P (C)
				F (-)	40.1	( )		JL-MS/P
				D (-)	82.1	( )		JL-MS/P
				K (-)	20.6	( )		JL-MS/P
			Col.2	C (+)	245.0	( )		JL-MS/P
				F (-)	47.6	( )		JL-MS/P
				D (-)	85.2	( )		JL-MS/P
				N (-)	23.2	( )		JL-MS/P
	7/07/09	001 F0401 (CV)	Col.1	F (+)	44.4	( )		JL-MS/P
			Col.2	F (+)	24.0	( )		JL-MS/P
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** June 26 through June 1, 2009

**LDC Report Date:** October 22, 2009

**Matrix:** Soil/Water

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304610

### Sample Identification

EB062609-SO  
EB062609-SORE  
SA106-0.5B  
SA82-0.5B  
SA82-10B  
SA82-29B  
SA106-0.5BMS  
SA106-0.5BMSD  
SA82-0.5BMS  
SA82-0.5BMSD



## Introduction

This data review covers 8 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8141A for Organophosphorus Pesticides.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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 with the following exceptions:

Sample	Analyte	Total Days From Sample Collection Until Analysis	Required Holding Time (in Days) From Sample Collection Until Analysis	Flag	A or P
EB062609-SORE	All TCL compounds	12	7	J- (all detects) UJ (all non-detects)	A

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

## II. Calibration

### a. Initial Calibration

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

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

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

### \*b. Calibration Verification

Calibration verification was performed at the required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
7/2/09	003F0301	1	Dichlorvos Mevinphos Dimethoate Fensulfothion	21.1 45.9 49.7 44.0	EB062609-SO 9180507MB	J- (all detects) UJ (all non-detects)	A
7/2/09	003F0301	1	Naled EPN	28.9 21.2	EB062609-SO 9180507MB	J+ (all detects) J+ (all detects)	A
7/2/09	003F0301	2	Mevinphos Fensulfothion Azinphos-methyl	22.3 22.9 25.9	EB062609-SO 9180507MB	J- (all detects) UJ (all non-detects)	A

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
7/2/09	003F0301	2	Merphos	27.1	EB062609-SO 9180507MB	J+ (all detects)	A
7/13/09	010F1001	1	Naled	43.2	SA106-0.5B SA82-0.5B SA82-10B SA82-29B SA106-0.5BMS SA106-0.5BMSD SA82-0.5BMS SA82-0.5BMSD 9188427MB	J+ (all detects) J+ (all detects)	A
7/13/09	010F1001	2	Naled	32.5	SA106-0.5B SA82-0.5B SA82-10B SA82-29B SA106-0.5BMS SA106-0.5BMSD SA82-0.5BMS SA82-0.5BMSD 9188427MB	J+ (all detects) J+ (all detects)	A

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/26/09	010F1001	1	Naled Disulfoton	40.1 20.6	All samples in SDG 8304610	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P
6/26/09	010F1001	2	Naled Malathion	47.6	All samples in SDG 8304610	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P

\*Added Malathion to table above for 010F1001 Column 2 on 6/26/09

### III. Blanks

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

Samples EB062609-SO and EB062609-SORE were identified as equipment blanks. No organophosphorus pesticide contaminants were found in these blanks.

Sample FB072109-SO (from SDG 8304616) was identified as a field blank. No organophosphorus pesticide contaminants were found in this blank.

#### IV. Accuracy and Precision Data

##### a. Surrogate Recovery

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
EB062609-SO	Not specified	Triphenylphosphate Chlormefos	46 (60-154) 37 (49-171)	All TCL compounds	J- (all detects) UJ (all non-detects)	A
9180507MB	Not specified	Triphenylphosphate Chlormefos	25 (60-154) 30 (49-171)	All TCL compounds	J- (all detects) UJ (all non-detects)	P

##### b. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Although the MS/MSD percent recoveries (%R) and relative percent differences (RPD) was not within QC limits for several compounds, the MS, MSD, or LCS percent recoveries (%R) were within QC limits and no data were qualified.

##### c. Laboratory Control Samples

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

#### V. Target Compound Identification

Raw data were not reviewed for this SDG.

#### VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304610	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

**VII. System Performance**

Raw data were not reviewed for this SDG.

**VIII. Overall Assessment of Data**

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

Sample	Compound	Flag	A or P
EB062609-SORE	All TCL compounds	X	A

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.

**\*Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304610**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304610	EB062609-SORE	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
8304610	EB062609-SO	Dichlorvos Mevinphos Dimethoate Fensulfothion Azinphos-methyl	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304610	EB062609-SO	Naled EPN Merphos	J+ (all detects) J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
8304610	SA106-0.5B SA82-0.5B SA82-10B SA82-29B	Naled	J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
*8304610	EB062609-SO EB062609-SORE SA106-0.5B SA82-0.5B SA82-10B SA82-29B	Naled Disulfoton Malathion	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304610	EB062609-SO	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Surrogate recovery (%R) (s)
8304610	EB062609-SO EB062609-SORE SA106-0.5B SA82-0.5B SA82-10B SA82-29B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
8304610	EB062609-SORE	All TCL compounds	X	A	Overall assessment of data (0)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG  
8304610**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG  
8304610**

No Sample Data Qualified in this SDG



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

LDC #: 21494J17  
 SDG #: 8304610  
 Laboratory: Test America

Date: 9/15/09  
 Page: 1 of 1  
 Reviewer: JVG  
 2nd Reviewer: \_\_\_\_\_

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

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

Validation Area		Comments	
I.	Technical holding times	SW	Sampling dates: 6/26 - 7/01/09
IIa.	Initial calibration	A	2 RSD ≤ 20% r <sup>2</sup>
IIb.	Calibration verification/ICV	SW	CW/ICV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	SW	
IVc.	Laboratory control samples	A	LCS/D
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	SW	
IX.	Field duplicates	N	
X.	Field blanks	ND	EB = 1, 2      FB = FB072109-SO from 8304610

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

Validated Samples: Water + Soil

1	EB062609-SO	W	11	9180507 MB	21	31
2	EB062609-SORE	↓	12	9189451 MB	22	32
3	SA106-0.5B	S	13	9188427 MB	23	33
4	SA82-0.5B		14		24	34
5	SA82-10B		15		25	35
6	SA82-29B		16		26	36
7	SA106-0.5BMS		17		27	37
8	SA106-0.5BMSD		18		28	38
9	SA82-0.5BMS		19		29	39
10	SA82-0.5BMSD	✓	20		30	40

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

VALIDATION FINDINGS WORKSHEET

METHOD: GC HPLC

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

Notes:

LDC #: 21494 J17  
 SDG #: JL Gary

**VALIDATION FINDINGS WORKSHEET**  
**Technical Holding Times**

Page: 1 of 1  
 Reviewer: JYC  
 2nd Reviewer: \_\_\_\_\_

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

METHOD: GC HPLC							
Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
2	W	N	6/26/09	7/08/09	7/10/09	12	J-/NJA Ch

**TECHNICAL HOLDING TIME CRITERIA**  
**VOLATILES:** Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.  
 Water preserved: Both within 14 days of sample collection.  
 Soils: Both within 14 days of sample collection.  
**EXTRACTABLES:** Water: Extracted within 7 days, analyzed within 40 days.  
 Soil: Extracted within 14 days, analyzed within 40 days.

VALIDATION FINDINGS WORKSHEET  
 Continuing Calibration

LDC #: 2404 17  
 SDG #: See Envoy

2nd Reviewer:

METHOD: GC HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
 What type of continuing calibration calculation was performed? %D or RPD  
 Y N N/A  
 Y N N/A  
 Did the continuing calibration standards meet the %D / RPD validation criteria of  $\leq 100\%$ ?

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

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit $\leq 100\%$ )	RT (limit)	Associated Samples	Qualifications
	6/26/09	010 F1001 (CAL)	Col.1	C (+)	137.8	( )	All + Bulk	<del>J-MS/P</del> J-MS/P
				F (-)	40.1	( )		<del>J-MS/P</del>
				P (+)	82.7	( )		J-MS/P
				K (-)	20.6	( )		J-MS/P
			Col.2	G (+)	25.0	( )		<del>J-MS/P</del>
				F (-)	47.6	( )		J-MS/P
				D (-)	65.4	( )		<del>J-MS/P</del>
				N (-)	23.7	( )		J-MS/P
	7/02/09	003 F0301 (CCV)	Col.1	A (-)	21.1	( )	1, 9180567 MB	J-MS/A
				B (-)	45.9	( )		J+MS/A
				F (+)	28.9	( )		J-MS/A
				I (-)	49.7	( )		J-MS/A
				V (-)	44.0	( )		J+MS/A
				X (+)	21.7	( )		J-MS/A
				B (-)	22.3	( )		J+MS/A
				V (-)	22.9	( )		J-MS/A
				Y (-)	25.9	( )		J+MS/A
				S (+)	27.1	( )		J+MS/A
	7/10/09	010 F1001 (CCV)	Col.1	F (+)	43.7	( )	3-10, 9188427 MB	J+MS/A
			Col.2	F (+)	32.5	( )		J+MS/A



LDC #: 21494317  
SDG #: See Copy

**VALIDATION FINDINGS WORKSHEET**  
**Matrix Spike/Matrix Spike Duplicates**

Page: 1 of 1  
Reviewer: JG  
2nd Reviewer: \_\_\_\_\_

**METHOD:**  GC  HPLC

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

- N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?
- N N/A Was an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?
- Y A N/A Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits?

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	7/8	I	0 (10-15)	0 (10-15)	( )	3	No qual
		V	35 (47-123)	16 (72-123)	75 (49)		(either LCS
		B	10 (15-143)	2.3 (15-143)	92 (78)		or MS/MSD is)
		Y	( )	( )	50 (43)		
		O	( )	55 (57-115)	( )		
		J	( )	48 (49-127)	( )		
		N	( )	46 (49-124)	( )		
		H	( )	40 (45-115)	( )		
		MM	( )	( )	44 (31)		
		Z	( )	( )	36 (37)		
			( )	( )	( )		
			( )	( )	( )		
9/10		O	54 (57-115)	( )	( )	4	No qual
		J	43 (45-120)	( )	( )		(either MSD
		I	7.7 (10-156)	( )	107 (98)		or LCS in)
		V	44 (47-124)	( )	( )		
		N	48 (49-124)	( )	( )		
		B	12 (15-143)	( )	79 (78)		
		H	39 (45-115)	44 (45-115)	( )		
		JJ	47 (50-124)	( )	( )		
		BB	49 (50-115)	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

LDC #: 21494 J17  
 SDG #: SRC Env

**VALIDATION FINDINGS WORKSHEET**  
**Overall Assessment of Data**

Page: 1 of 1  
 Reviewer: JVC  
 2nd Reviewer:

METHOD:  GC  HPLC

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

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

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

#	Sample ID Component Name	Finding	Associated Samples	Qualifications
	2	outside H.T.		X R/A (6)

Comments:

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** July 9 through July 10, 2009

**LDC Report Date:** October 22, 2009

**Matrix:** Soil/Water

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304612

### Sample Identification

RSAM2-10B  
RSAM2-35B  
SA35-10B  
SA35-32B  
SA35009-32B  
SA85-33B  
EB071009-SO



## Introduction

This data review covers 6 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8141A for Organophosphorus Pesticides.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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

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

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

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

### \*b. Calibration Verification

Calibration verification was performed at the required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
7/24/09	003F0301	1	Dichlorvos	20.6	RSAM2-10B 9203338-MB	J- (all detects) UJ (all non-detects)	A
7/24/09	003F0301	1	Naled	32.6	RSAM2-10B 9203338-MB	J+ (all detects)	A
7/24/09	003F0301	2	Naled	34.7	RSAM2-10B 9203338-MB	J+ (all detects)	A
7/16/09	019F1901	2	Naled	28.1	RSAM2-35B SA35-10B SA35-32B SA35009-32B SA85-33B 9194431-MB	J- (all detects) UJ (all non-detects)	A

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

\*Indicates change as the result of report review.  
SDG 8304612

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/26/09	010F1001	1	Naled Disulfoton	40.1 20.6	All samples in SDG 8304612	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P
6/26/09	010F1001	2	Naled  Malathion	47.6  23.2	All samples in SDG 8304612	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P

\*Added Malathion to table above for 010F1001 Column 2 on 6/26/09

### III. Blanks

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

Sample EB071009-SO was identified as an equipment bank. No organophosphorus pesticide contaminants were found in this blank.

Sample FB072109-SO (from SDG 8304616) was identified as a field bank. No organophosphorus pesticide contaminants were found in this blank.

### IV. Accuracy and Precision Data

#### a. Surrogate Recovery

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

#### b. Matrix Spike/Matrix Spike Duplicates

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

#### c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Although the relative percent difference (RPD) was not within QC limits for one compound, the LCS and LCSD percent recoveries (%R) were within QC limits and no data were qualified.

### V. Target Compound Identification

Raw data were not reviewed for this SDG.

\*Indicates change as the result of report review.  
SDG 8304612

## VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304612	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

## VII. System Performance

Raw data were not reviewed for this SDG.

## VIII. Overall Assessment of Data

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

## IX. Field Duplicates

Samples SA35-32B and SA35009-32B were identified as field duplicates. No organophosphorus pesticides were detected in any of the samples.

**\*Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304612**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304612	RSAM2-10B	Dichlorvos	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304612	RSAM2-10B	Naled	J+ (all detects)	A	Continuing calibration (%D) (c)
8304612	RSAM2-35B SA35-10B SA35-32B SA35009-32B SA85-33B	Naled	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
*8304612	RSAM2-10B RSAM2-35B SA35-10B SA35-32B SA35009-32B SA85-33B EB071009-SO	Naled Disulfoton Malathion	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304612	RSAM2-10B RSAM2-35B SA35-10B SA35-32B SA35009-32B SA85-33B EB071009-SO	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG 8304612**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG 8304612**

No Sample Data Qualified in this SDG

\*Indicates change as the result of report review.  
SDG 8304612

**Tronox Northgate Henderson**

LDC #: 21494L17

**VALIDATION COMPLETENESS WORKSHEET**

SDG #: 8304612

Stage 2B

Laboratory: Test America

Date: 9/11/09

Page: 1 of 1

Reviewer: SVG

2nd Reviewer: [Signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/09 - 10/09
IIa.	Initial calibration	A	2 RSD ≤ 20% r2
IIb.	Calibration verification/ICV	SW	CCV/ICV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	D9C020173-061D
IVc.	Laboratory control samples	SW	LCS 1
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	D = 4, 5
X.	Field blanks	ND	EB = 7 FB = FB072109-SO (from 8304612)

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

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

D = Duplicate  
 TB = Trip blank  
 EB = Equipment blank

Validated Samples:

*Soil + Water*

1	RSAM2-10B	S	11	9203338-MB	21		31
2	RSAM2-35B		12	9194431-MB	22		32
3	SA35-10B		13	9198202-MB	23		33
4	SA35-32B	D	14		24		34
5	SA35009-32B	b	15		25		35
6	SA85-33B		16		26		36
7	EB071009-SO	W	17		27		37
8			18		28		38
9			19		29		39
10			20		30		40

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

VALIDATION FINDINGS WORKSHEET

METHOD: GC HPLC

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

Notes:



VALIDATION FINDINGS WORKSHEET  
 Continuing Calibration

METHOD: GC HPLC

Please see qualifications below for all questions answered "N". Not-applicable questions are identified as "N/A".  
 What type of continuing calibration calculation was performed? %D or %RPD  
 Y N N/A  
 Were continuing calibration standards analyzed at the required frequencies?  
 Y N N/A  
 Did the continuing calibration standards meet the %D / RPD validation criteria of <math>\leq 100\%</math>?  
 Level IV Only  
 Y N N/A  
 Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit $\leq 100$ )	RT (limit)	Associated Samples	Qualifications
	6/26/09	016 F1001 (100)	Col. 1	C (+)	137.8	( )	All + B/K/S	<del>J-MS/P</del> J-MS/P J-MS/P J-MS/P J-MS/P J-MS/P J-MS/P
				F (-)	40.1	( )		
				D (+)	83.1	( )		
				K (-)	20.6	( )		
			Col. 2	G (+)	215.0	( )		
				F (-)	47.6	( )		
				D (-)	85.7	( )		
				N (-)	23.2	( )		
	7/29/09	003 F0301 (GEN)	Col. 1	A (-)	20.6	( )	1, 9203338-MB	J-MS/A J-MS/A
				F (+)	32.6	( )		J-MS/A
			Col. 2	F (-)	34.7	( )		↓
	7/16/09	019 F1901 (CCV)	Col. 2	F (-)	28.1	( )	2-6, 9194431-MB	J-MS/A

LDC #: 21494 L17  
 SDG #: St. Geny

VALIDATION FINDINGS WORKSHEET  
Laboratory Control Samples (LCS)

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

METHOD: GC HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
 Y  N  N/A  
 Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG?  
 Y  N  N/A  
 Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

Level LW/D Only  
 Y  N  N/A  
 Was an LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

#	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	<u>920338-LCS</u>	<u>K</u>	( )	( )	<u>82 (40-100)</u>	<u>1, 920338-MB</u>	<u>None (USDA)</u>
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
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## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** July 13, 2009

**LDC Report Date:** October 22, 2009

**Matrix:** Soil

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304613

### Sample Identification

SA176-10B  
SA176009-37B  
SA176-37B  
RSAM3-30B

## Introduction

This data review covers 4 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8141A for Organophosphorus Pesticides.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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

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

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

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

### \*b. Calibration Verification

Calibration verification was performed at the required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
7/25/09	003F0301	1	Dichlorvos Ethoprop Tokuthion	23.2 20.4 21.1	All samples in SDG 8304613	J- (all detects) UJ (all non-detects)	A
7/25/09	003F0301	2	Naled	63.4	All samples in SDG 8304613	J- (all detects) UJ (all non-detects)	A

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/26/09	010F1001	1	Naled Disulfoton	40.1 20.6	All samples in SDG 8304613	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P

\*Indicates change as the result of report review.  
SDG 8304613

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/26/09	010F1001	2	Naled Malathion	47.6 23.2	All samples in SDG 8304613	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P

\*Added Malathion to table above for 010F1001 Column 2 on 6/26/09

### III. Blanks

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

Sample FB072109-SO (from SDG 8304616) was identified as a field blank. No organophosphorus pesticide contaminants were found in this blank.

### IV. Accuracy and Precision Data

#### a. Surrogate Recovery

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

#### b. Matrix Spike/Matrix Spike Duplicates

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

#### c. Laboratory Control Samples

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

### V. Target Compound Identification

Raw data were not reviewed for this SDG.

### VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

\*Indicates change as the result of report review.  
SDG 8304613

Sample	Finding	Flag	A or P
All samples in SDG 8304613	All compounds reported below the PQL	J (all detects)	A

Raw data were not reviewed for this SDG.

### VII. System Performance

Raw data were not reviewed for this SDG.

### VIII. Overall Assessment of Data

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

### IX. Field Duplicates

Samples SA176009-37B and SA176-37B were identified as field duplicates. No organophosphorus pesticides were detected in any of the samples.



**\*Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304613**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304613	SA176-10B SA176009-37B SA176-37B RSAM3-30B	Dichlorvos Ethoprop Tokuthion Naled	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
*8304613	SA176-10B SA176009-37B SA176-37B RSAM3-30B	Naled Disulfoton Malathion	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304613	SA176-10B SA176009-37B SA176-37B RSAM3-30B	All compounds reported below the PQL	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG  
8304613**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG  
8304613**

No Sample Data Qualified in this SDG

\*Indicates change as the result of report review.  
SDG 8304613

**Tronox Northgate Henderson**

LDC #: 21494M17

**VALIDATION COMPLETENESS WORKSHEET**

SDG #: 8304613

Stage 2B

Laboratory: Test America

Date: 9/11/09

Page: 1 of 1

Reviewer: JVC

2nd Reviewer: [Signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/13/09
IIa.	Initial calibration	A	% RSD ≤ 20
IIb.	Calibration verification/ICV	SW	CCV/ICV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	D9C020173-066
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	D = 23
X.	Field blanks	ND	FB = TB072109-50 (from 8304613)

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

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

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:

Soil

1	SA176-10B	11		21		31	
2	SA176009-37B D	12		22		32	
3	SA176-37B D	13		23		33	
4	RSAM3-30B	14		24		34	
5	9204174-MB	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

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

VALIDATION FINDINGS WORKSHEET

METHOD: GC HPLC

8310	8330	8151	8141	8141 (Cont)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensulfothion	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Bolstar	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X. EPN	EE. Ethyl Benzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	Y. Azinphos-methyl	SSS. O-Xylene
E. Benzo(a)pyrene	E. Tetryl	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. MP-Xylene
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total Xylene
G. Benzo(g,h,i)perylene	G. 2,4,6-Trinitrotoluene	G. Dlcamba	G. Sulfotep	BB. Trichloronate	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Trichlorinate	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenzo(a,h)anthracene	J. 2,4-Dinitrotoluene	J. MCPA	J. Diazinon	EE. Def	
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowl	
L. Fluorene	L. 2-Nitrotoluene	L. 2,4,5-TP (silvex)	L. Parathion-methyl	GG. Ethion	
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel	HH. Tetrachlorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	II. Sulprofos	
O. Phenanthrene	O.		O. Chlorpyrifos	JJ. Thionazin	
P. Pyrene	P.		P. Fenithion	KK. Phosmet	
Q.	Q		Q. Parathion-ethyl	LL. O,O,O-Triethylphosphorothioate	
R.			R. Trichloronate	MM. Famphur	
S.			S. Merphos	NN. Carbo phenethion	
			T. Sirofos	OO. Carbo phenethion - methyl	
			U. Tokuthion		

Notes:

VALIDATION FINDINGS WORKSHEET  
Continuing Calibration

METHOD: GC HPLC

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

- X N N/A What type of continuing calibration calculation was performed? %D or RPD
- Y N N/A Were continuing calibration standards analyzed at the required frequencies?
- Y N N/A Did the continuing calibration standards meet the %D / RPD validation criteria of  $\leq 100\%$ ?
- Y N N/A Level IV Only
- Y N N/A Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit $\leq 100\%$ )	RT (limit)	Associated Samples	Qualifications
	6/26/09	016 F1001 (10A)	Col.1	G (-)	137.8	( )	All + Blk	J- / MS / P (C)
				F (-)	40.1	( )		J- / MS / P
				D (-)	82.1	( )		J- / MS / P
				K (-)	20.6	( )		J- / MS / P
			Col.2	C (-)	215.0	( )		J- / MS / P
				F (-)	47.6	( )		J- / MS / P
				D (-)	83.7	( )		J- / MS / P
				N (-)	23.7	( )		J- / MS / P
	7/25/09	003 F0201 (00A)	Col.1	A (-)	23.7	( )		J- / MS / P
				E (-)	20.4	( )		J- / MS / P
				U (-)	21.1	( )		J- / MS / P
			Col.2	F (-)	63.4	( )		J- / MS / P

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

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

**Collection Date:** July 14, 2009

**LDC Report Date:** October 22, 2009

**Matrix:** Water

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304614

**Sample Identification**

TR-8B

## Introduction

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

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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

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

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

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

### \*b. Calibration Verification

Calibration verification was performed at the required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were less than or equal to 20.0%.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/26/09	010F1001	1	Naled Disulfoton	40.1 20.6	All samples in SDG 8304614	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P
6/26/09	010F1001	2	Naled Malathion	47.6 23.2	All samples in SDG 8304614	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P

\*Added Malathion to table above for 010F1001 Column 2 on 6/26/09



**III. Blanks**

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

No field blanks were identified in this SDG.

**IV. Accuracy and Precision Data****a. Surrogate Recovery**

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

**b. Matrix Spike/Matrix Spike Duplicates**

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

**c. Laboratory Control Samples**

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

**V. Target Compound Identification**

Raw data were not reviewed for this SDG.

**VI. Project Quantitation Limit**

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304614	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

**VII. System Performance**

Raw data were not reviewed for this SDG.

**VIII. Overall Assessment of Data**

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

\*Indicates change as the result of report review.  
SDG 8304614

## **IX. Field Duplicates**

No field duplicates were identified in this SDG.

**\*Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304614**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
*8304614	TR-8B	Naled Disulfoton Malathion	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304614	TR-8B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG  
8304614**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG  
8304614**

No Sample Data Qualified in this SDG

\*Indicates change as the result of report review.  
SDG 8304614

Tronox Northgate Henderson

LDC #: 21494N17

VALIDATION COMPLETENESS WORKSHEET

SDG #: 8304614

Stage 2B

Laboratory: Test America

Date: 9/11/09

Page: 1 of 1

Reviewer: JVE

2nd Reviewer: [Signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/14/09
IIa.	Initial calibration	A	% RSD ≤ 20% r <sup>2</sup>
IIb.	Calibration verification/ICV	SW	COV/100 ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	Client spec (insufficient sample)
IVc.	Laboratory control samples	A	LCS/D
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

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

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

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:

1	TR-8B	11		21		31	
2	9198202-MB	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

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

VALIDATION FINDINGS WORKSHEET

METHOD: GC HPLC

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

Notes:

**VALIDATION FINDINGS WORKSHEET**  
Continuing Calibration

METHOD: GC HPLC

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

What type of continuing calibration calculation was performed?        %D or        RPD  
 Y  N  N/A     Were continuing calibration standards analyzed at the required frequencies?  
 Y  N  N/A     Did the continuing calibration standards meet the %D / RPD validation criteria of  $\leq 100\%$ ?

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

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit $\leq 150\%$ ) ( $\leq 20\%$ )	RT (limit)	Associated Samples	Qualifications
	<u>6/26/09</u>	<u>016.F1001</u> <u>(1002)</u>	<u>Col.1</u>	<u>C (+)</u>	<u>187.8</u>	( )	<u>All + B1K</u>	<del>JVC</del> <u>J-/MS/P</u>
				<u>F (-)</u>	<u>40.1</u>	( )		<del>JVC</del> <u>J-/MS/P</u>
				<u>D (-)</u>	<u>83.1</u>	( )		<del>JVC</del> <u>J-/MS/P</u>
				<u>K (-)</u>	<u>20.6</u>	( )		<del>JVC</del> <u>J-/MS/P</u>
			<u>Col.2</u>	<u>S (+)</u>	<u>21.50</u>	( )		<del>JVC</del> <u>J-/MS/P</u>
				<u>F (-)</u>	<u>47.6</u>	( )		<del>JVC</del> <u>J-/MS/P</u>
				<u>D (-)</u>	<u>85.2</u>	( )		<del>JVC</del> <u>J-/MS/P</u>
				<u>N (-)</u>	<u>23.2</u>	( )		<del>JVC</del> <u>J-/MS/P</u>
	<u>7/21/09</u>	<u>018.F1801</u> <u>(-602)</u>				( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		

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

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

**Collection Date:** July 21, 2009

**LDC Report Date:** September 19, 2009

**Matrix:** Water

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304615

**Sample Identification**

M-97B

## **Introduction**

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

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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



The following are definitions of the data qualifiers:

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. Calibration

### a. Initial Calibration

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

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

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

Date	Column	Compound	$r^2$	Associated Samples	Flag	A or P
8/6/09	2	Trichloronate	0.98937	All samples in SDG 8304615	J (all detects) UJ (all non-detects)	A

### b. Calibration Verification

Calibration verification was performed at the required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were less than or equal to 20.0%.

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

## III. Blanks

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

No field blanks were identified in this SDG.

#### IV. Accuracy and Precision Data

##### a. Surrogate Recovery

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

##### b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

##### c. Laboratory Control Samples

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

#### V. Target Compound Identification

Raw data were not reviewed for this SDG.

#### VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304615	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

#### VII. System Performance

Raw data were not reviewed for this SDG.

#### VIII. Overall Assessment of Data

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

#### IX. Field Duplicates

No field duplicates were identified in this SDG.

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304615**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304615	M-97B	Trichloronate	J (all detects) UJ (all non-detects)	A	Initial calibration ( $r^2$ ) (c)
8304615	M-97B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG 8304615**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG 8304615**

No Sample Data Qualified in this SDG

**Tronox Northgate Henderson**

LDC #: 21494017  
 SDG #: 8304615  
 Laboratory: Test America

**VALIDATION COMPLETENESS WORKSHEET**  
 Stage 2B

Date: 9/11/09  
 Page: 1 of 1  
 Reviewer: SVG  
 2nd Reviewer: [Signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/21/09
IIa.	Initial calibration	SW	2 RSD ≤ 20% ✓
IIb.	Calibration verification/ICV	<del>SWA</del>	CV/ICV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	Client spec (insufficient sample)
IVc.	Laboratory control samples	A	LCS/D
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	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: water

1	M-97B	11		21		31	
2	9205274 MB	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

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

VALIDATION FINDINGS WORKSHEET

METHOD: GC HPLC

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

Notes:



## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** July 21 through July 24, 2009

**LDC Report Date:** September 23, 2009

**Matrix:** Soil/Water

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 4

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304616

### Sample Identification

EB072109-SO  
FB072109-SO  
SA166-10B  
SA166-31B  
EB072209-SO  
SA182-10B  
SA182-38B  
RSAH3-0.5B  
RSAH3009-0.5B  
RSAH3-32B  
EB072309-SO  
SA131-0.5B  
SA131009-0.5B  
SA131-10B  
SA131-27B  
EB072409-SO  
RSAH3-0.5BMS  
RSAH3-0.5BMSD



## Introduction

This data review covers 13 soil samples and 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8141A for Organophosphorus Pesticides.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

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

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

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

Date	Column	Compound	$r^2$	Associated Samples	Flag	A or P
8/6/09	2	Trichloronate	0.98937	EB072109-SO FB072109-SO 9205274MB	J (all detects) UJ (all non-detects)	A

Retention time windows were evaluated and considered technically acceptable.

### b. Calibration Verification

Calibration verification was performed at the required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
8/10/09	003F0301	1	Dichlorvos Mevinphos	56.2 36.1	SA166-10B SA166-31B 9216459MB	J+ (all detects) J+ (all detects)	A
8/10/09	003F0301	1	Naled	44.1	SA166-10B SA166-31B 9216459MB	J- (all detects) UJ (all non-detects)	A

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
8/10/09	003F0301	2	Dichlorvos Mevinphos	81.4 25.9	SA166-10B SA166-31B 9216459MB	J+ (all detects) J+ (all detects)	A
8/10/09	003F0301	2	Naled Parathion-ethyl Bolstar	38.1 42.8 25.4	SA166-10B SA166-31B 9216459MB	J- (all detects) UJ (all non-detects)	A
8/8/09	066F6601	1	Mevinphos	23.9	SA131-0.5B SA131009-0.5B SA131-10B SA131-27B	J+ (all detects)	A
8/8/09	066F6601	2	Dichlorvos	21.5	SA131-0.5B SA131009-0.5B SA131-10B SA131-27B	J+ (all detects)	A

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
8/6/09	010F1001 (19:10)	1	Mevinphos	22.2	SA166-10B SA166-31B SA182-10B SA182-38B RSAH3-0.5B RSAH3009-0.5B RSAH3-32B SA131-0.5B SA131009-0.5B SA131-10B SA131-27B RSAH3-0.5BMS RSAH3-0.5BMSD 9216459MB 9210468MB	J- (all detects) UJ (all non-detects)	P

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
8/6/09	010F1001 (19:10)	2	Mevinphos	21.1	SA166-10B SA166-31B SA182-10B SA182-38B RSAH3-0.5B RSAH3009-0.5B RSAH3-32B SA131-0.5B SA131009-0.5B SA131-10B SA131-27B RSAH3-0.5BMS RSAH3-0.5BMSD 9216459MB 9210468MB	J- (all detects) UJ (all non-detects)	P
8/6/09	010F1001 (19:10)	1	Mevinphos	23.8	EB072209-SO EB072309-SO EB072409-SO 9206112MB	J- (all detects) UJ (all non-detects)	P
8/6/09	010F1001 (19:10)	2	Mevinphos	21.4	EB072209-SO EB072309-SO EB072409-SO 9206112MB	J- (all detects) UJ (all non-detects)	P

Retention times (RT) of all compounds in the calibration standards were within QC limits.

### III. Blanks

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

Samples EB072109-SO, EB072209-SO, EB072309-SO, and EB072409-SO were identified as equipment blanks. No organophosphorus pesticide contaminants were found in these blanks.

Sample FB072109-SO was identified as a field blank. No organophosphorus pesticide contaminants were found in this blank.

### IV. Accuracy and Precision Data

#### a. Surrogate Recovery

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

**b. Matrix Spike/Matrix Spike Duplicates**

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

**c. Laboratory Control Samples**

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

**V. Target Compound Identification**

All target compound identifications were within validation criteria.

**VI. Project Quantitation Limit**

All project quantitation limits PQLs were within validation criteria.

The sample results for detected compounds from the two columns were within 40% relative percent difference (RPD) with the following exceptions:

Sample	Compound	RPD	Flag	A or P
SA131-0.5B	Coumaphos	58	J (all detects)	A

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304616	All compounds reported below the PQL.	J (all detects)	A

**VII. System Performance**

The system performance was acceptable.

**VIII. Overall Assessment of Data**

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

**IX. Field Duplicates**

Samples RSAH3-0.5B and RSAH3009-0.5B and samples SA131-0.5B and SA131009-0.5B were identified as field duplicates. No organophosphorus pesticides were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA131-0.5B	SA131009-0.5B				
Azinphos-methyl	20	14U	-	6 ( $\leq 14$ )	-	-
Coumaphos	6.1	14U	-	7.9 ( $\leq 14$ )	-	-

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304616**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304616	EB072109-SO FB072109-SO	Trichloronate	J (all detects) UJ (all non-detects)	A	Initial calibration (r <sup>2</sup> ) (c)
8304616	SA166-10B SA166-31B	Dichlorvos Mevinphos	J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
8304616	SA166-10B SA166-31B	Naled Parathion-ethyl Bolstar	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304616	SA131-0.5B SA131009-0.5B SA131-10B SA131-27B	Mevinphos	J+ (all detects)	A	Continuing calibration (%D) (c)
8304616	SA131-0.5B SA131009-0.5B SA131-10B SA131-27B	Dichlorvos	J+ (all detects)	A	Continuing calibration (%D) (c)
8304616	SA166-10B SA166-31B EB072209-SO SA182-10B SA182-38B RSAH3-0.5B RSAH3009-0.5B RSAH3-32B EB072309-SO SA131-0.5B SA131009-0.5B SA131-10B SA131-27B EB072409-SO	Mevinphos	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304616	SA131-0.5B	Coumaphos	J (all detects)	A	Project Quantitation Limit (PQL) (dc)



SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304616	EB072109-SO FB072109-SO SA166-10B SA166-31B EB072209-SO SA182-10B SA182-38B RSAH3-0.5B RSAH3009-0.5B RSAH3-32B EB072309-SO SA131-0.5B SA131009-0.5B SA131-10B SA131-27B EB072409-SO	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG  
8304616**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG  
8304616**

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #: 21494P17  
 SDG #: 8304616  
 Laboratory: Test America

VALIDATION COMPLETENESS WORKSHEET  
 Stage 2B 4

Date: 9/14/09  
 Page: 1 of 1  
 Reviewer: JVG  
 2nd Reviewer: [Signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/21-24/09
IIa.	Initial calibration	SW	% RSD ≤ 20% r <sub>r</sub>
IIb.	Calibration verification/ICV	SW	CCV/ICV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS/D
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	SW	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	*D <sub>1</sub> = 8, 9      D <sub>2</sub> = 12, 13
IX.	Field duplicates	SW	
X.	Field blanks	ND	EB = 1, 5, 11, 16      FB = 2

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

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

D = Duplicate  
 TB = Trip blank  
 EB = Equipment blank

Validated Samples:

Soil + Water

1	1	EB072109-SO	W	11	3	EB072309-SO	W	21	1	9205274-MB	31
2	1	FB072109-SO	↓	12	4	SA131-0.5B	D <sub>2</sub> S	22	2	9216459-MB	32
3	✓	SA166-10B	S	13	4	SA131009-0.5B	D <sub>2</sub> ↓	23	3	9206112-MB	33
4	✓	SA166-31B	↓	14	4	SA131-10B	↓	24	4	9210468-MB	34
5	3	EB072209-SO	W	15	4	SA131-27B	↓	25			35
6	4	SA182-10B	S	16	3	EB072409-SO	W	26			36
7	4	SA182-38B	↓	17	4	RSAH3-0.5BMS	S	27			37
8	4	RSAH3-0.5B	D <sub>1</sub> ↓	18	4	RSAH3-0.5BMSD	↓	28			38
9	4	RSAH3009-0.5B	D <sub>1</sub> ↓	19				29			39
10	4	RSAH3-32B	↓	20				30			40

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

LDC #: 21 994 P17  
 SDG #: See Cover

**VALIDATION FINDINGS CHECKLIST**

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

Method: GC HPLC

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. 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) < 20%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the RT windows properly established?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>III. Continuing calibration</b>				
Was a continuing calibration analyzed daily?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) ≤ 15% or percent recoveries 85-115%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all the retention times within the acceptance windows?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<b>IV. 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>V. Surrogate spikes</b>				
Were all surrogate %R within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<b>VI. 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>VII. 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 QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>VIII. 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"/>	

LDC #: 21494 P17  
 SDG #: See cover

**VALIDATION FINDINGS CHECKLIST**

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

Validation Area	Yes	No	NA	Findings/Comments
<b>X. Target compound identification</b>				
Were the retention times of reported detects within the RT windows?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>XI. Compound quantitation/CRQLs</b>				
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>XII. System performance</b>				
System performance was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>XIII. 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>XIV. Field duplicates</b>				
Field duplicate pairs were identified in this SDG.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Target compounds were detected in the field duplicates.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>XV. Field blanks</b>				
Field blanks were identified in this SDG.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Target compounds were detected in the field blanks.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

VALIDATION FINDINGS WORKSHEET

METHOD: GC HPLC

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

Notes:





**VALIDATION FINDINGS WORKSHEET**  
**I Continuing Calibration**

LDC #: 21494 P17  
 SDG #: Su Cney

Page: 1 of 1  
 Reviewer: DV

METHOD: GC HPLC

2nd Reviewer: R

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

What type of continuing calibration calculation was performed?     %D or     RPD

Y / N / N/A Were continuing calibration standards analyzed at the required frequencies? 20

Y / N / N/A Did the continuing calibration standards meet the %D / RPD validation criteria of ≤15-0%?

Level IV Only

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

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit $\leq 15.0$ )	RT (limit)	Associated Samples	Qualifications
	8/06/09	010 F1001 (1CN)	Col. 1	C (+)	230.0	( )	1, 2, 9205274 - MB	J + dets / P (C)
	16:09		Col. 2	D (-)	88.8	( )		J - / R / P
				C (+)	178.7	( )		J + dets / P
				D (-)	75.6	( )		J - / R / P
						( )		
						( )		
	8/06/09	010 F1001 (1CN)	Col. 1	B (-)	22.2	( )	3, 4, 9216459 MB	J - / MS / P
	19:10			C (+)	211.6	( )	6-10, 12-15, 17, 18,	<del>J + dets / P</del>
				D (-)	84.9	( )	9210468 - MB	<del>J - / MS / P</del>
			Col. 2	B (-)	21.1	( )		J - / MS / P
				C (+)	218.1	( )		<del>J + dets / P</del>
				D (-)	93.1	( )		<del>J - / MS / P</del>
						( )		
						( )		
	8/06/09	010 F1001 (1CN)	Col. 1	B (-)	23.8	( )	5, 11, 16, 9206112 MB	J - / MS / P
	19:10			C (+)	201.3	( )		<del>J + dets / P</del>
				D (-)	85.0	( )		J - / R / P
			Col. 2	C (+)	221.3	( )		J + dets / P
				D (-)	93.1	( )		<del>J - / R / P</del>
				B (-)	21.4	( )		J - / MS / P
						( )		
						( )		
						( )		



LDC #: 21494 P17  
SDG #: See Copy

VALIDATION FINDINGS WORKSHEET  
Compound Quantitation and Reported CRQLs

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

METHOD: GC HPLC

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

Level I/ID Only

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

Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?  
Did the reported results for detected target compounds agree within 10.0% of the recalculated results?  
Did the percent difference of detected compounds between two columns./detectors <40%?  
If no, please see findings below.

#	Compound Name	Sample ID	%RPD/ <sup>AD</sup> Between Two Columns/Detectors Limit (≤ 40%)	Qualifications
	Z	12	58	J det / A (dc)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21494 P17  
 SDG #: SCC Carey

VALIDATION FINDINGS WORKSHEET  
Field Duplicates

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

METHOD: GC HPLC

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

Compound	Concentration ( ug/kg )		%RPD Limit	Qualification Parent only / All Samples
	12	13		
Y	20	14 U	6 (±14 Diff)	
Z	6.1	↓	7.9 ↓	

Compound	Concentration ( )		%RPD Limit	Qualification Parent only / All Samples

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

METHOD: GC  HPLC

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

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

#	Standard ID	Calibration Date	Compound	Reported		Recalculated		Reported		Recalculated	
				CF (2.00 std)	CF (2.00 std)	CF (2.00 std)	Average CF (initial)	Average CF (initial)	%RSD	%RSD	
* 1	1CAL 12:58-15:12	8/06/09	Dichlorvos (814A-2)	See	r <sup>2</sup> calc.						
			Phorate	2.03409	2.03409	1.99571	1.99571	10.65160	10.65165		
			Malathion	See	r <sup>2</sup> calc.						
2			Dichlorvos (8141A-1)	0.84084				0.84507		13.29300	
			Phorate								
			Malathion								
* 3	1CAL 14:56-18:34	8/06/09	Dichlorvos (8141A-1)	0.86756	0.86756	0.84168	0.84168	3.52069	3.52061		
			Phorate	1.07117	1.07117	1.03104	1.03104	8.29536	8.29546		
			Malathion	1.08977	1.08977	1.00124	1.00124	8.6180	8.6180		
4			Dichlorvos (8141A-2)	0.86014	0.86014	0.83367	0.83367	4.86412	4.86412		
			Phorate	0.84084	0.84084	0.84507	0.84507	13.29300	13.29300		
			Malathion	See r <sup>2</sup> calc.							

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.

\* IS = TOCP = 2.0

\* \* = IS = Tributyl phosphate = 2.0 (Phorate & Dichlorvos)  
 IS = TOCP = 2.0 (Malathion)

LDC #: 21494 P17  
 SDG #: Su Cury

**VALIDATION FINDINGS WORKSHEET**  
Initial Calibration Calculation Verification

Page: 2 of 8  
 Reviewer: JVL  
 2nd Reviewer: R

METHOD: GC ✓ HPLC

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

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

#	Standard ID	Calibration Date	Compound	Reported		Recalculated		Reported		Recalculated	
				CF (20 std)	CF (20 std)	Average CF (Initial)	Average CF (Initial)	%RSD	%RSD		
1	ICAL (TOCP)	8/06/09 14:56-18:24	Dichlorvos	1.25265	1.25265	1.21037	1.21637	3.27378	3.27378	3.27378	3.27378
				1.54663	1.54663	1.48247	1.48247	7.9709	7.9709	7.9709	7.9709
				1.08977	1.08977	1.00124	1.00124	8.618	8.618	8.618	8.618
2			Dichlorvos	1.16144	1.16144	1.11641	1.11641	4.50356	4.50356	4.50356	4.50356
				1.13537	1.13537	1.12665	1.12665	16.03095	16.03095	16.03095	16.03095
				See $\rightarrow$	See $\rightarrow$	Calc. (same as other one)	Calc. (same as other one)				
3			Phorate								
4			Malathion								

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.

ICAL TOCP = IS used to TOCP for all calcs. Same raw data as the other ICAL.  
 Malathion

LDC # 21444 P17  
 SDG# Su Corel

**VALIDATION FINDINGS WORKSHEET**  
Initial Calibration Calculation Verification

Page: 3 of 8  
 Reviewer: NC  
 2nd Reviewer: R

**METHOD:** GC EPA SW 846 Method 8141A

**Parameter:** Dichlorvos

Date	Column	Compound	Y Area ratio	X Conc ratio	X <sup>2</sup>
08/06/2009 12:58-15:4v	(8141A-2)	Dichlorvos	0.16666	0.100	
			0.14234	0.250	
			1.14300	0.500	
			1.86832	1.000	
			2.84139	1.500	
			3.91604	2.000	
			4.54365	2.500	

Regression Output:		Reported
Constant	-0.04459	c = 0.00661
Std Err of Y Est	0.19659	
R Squared	0.9900	r <sup>2</sup> = 0.99400
No. of Observations	7.00000	
Degrees of Freedom	5.00000	
X Coefficient(s)	1.9024	a
Std Err of Coef.	0.087748	1.91742E+000

IS = TOCP = 2.0ug/mL  
 Lab used weighted linear regression

LDC # 21494 P17  
 SDG# see copy

**VALIDATION FINDINGS WORKSHEET**  
Initial Calibration Calculation Verification

Page: 4 of 8  
 Reviewer: JVC  
 2nd Reviewer: [Signature]

**METHOD:** GC EPA SW 846 Method 8141A

**Parameter:** Malathion

Date	Column	Compound	Y Area ratio	X Conc ratio	X <sup>2</sup>
08/06/2009 12:58-15:47	(8141A-2)	Malathion	0.08761	0.100	
			0.08110	0.250	
			0.66683	0.500	
			1.12291	1.000	
			1.66312	1.500	
			2.22001	2.000	
			2.69919	2.500	

Regression Output:		Reported
Constant	-0.02887	c = 0.01372
Std Err of Y Est	0.10316	
R Squared	0.99153	r <sup>2</sup> = 0.99453
No. of Observations	7.00000	
Degrees of Freedom	5.00000	
X Coefficient(s)	1.1137	a
Std Err of Coef.	0.046046	1.12630E+000

IS = TOCP = 2.0ug/mL  
 LAB used weighted linear regression

LDC # 21494 P17  
 SDG# SrC Gwy

**VALIDATION FINDINGS WORKSHEET**  
Initial Calibration Calculation Verification

Page: 2 of 8  
 Reviewer: JVC  
 2nd Reviewer: S

**METHOD:** GC EPA SW 846 Method 8141A

**Parameter:** Dichlorvos

Date	Column	Compound	Y Area ratio	X Conc ratio	X <sup>2</sup>
08/06/2009 12:58-15:47	(8141A-1)	Dichlorvos	0.17514	0.100	
			0.44788	0.250	
			1.21081	0.500	
			2.03738	1.000	
			3.11399	1.500	
			4.02458	2.000	
			5.10973	2.500	

Regression Output:		Reported
Constant	0.02613	c = 0.01094
Std Err of Y Est	0.09498	
R Squared	0.99782	r <sup>2</sup> = 0.99581
No. of Observations	7.00000	
Degrees of Freedom	5.00000	
X Coefficient(s)	2.0301	a
Std Err of Coef.	0.042397	2.07952E+000

IS = TOCP = 2.0ug/mL  
 Lab used weighted linear regression

LDC # 21494 P17  
 SDG# Sukm

**VALIDATION FINDINGS WORKSHEET**  
Initial Calibration Calculation Verification

Page: 8 of 8  
 Reviewer: JVC  
 2nd Reviewer: SA

**METHOD:** GC EPA SW 846 Method 8141A

**Parameter:** Malathion

Date	Column	Compound	Y Area ratio	X Conc ratio	X <sup>2</sup>
08/06/2009	(8141A-1)	Malathion	0.10725	0.100	
12:58-15:42			0.27812	0.250	
			0.73013	0.500	
			1.19616	1.000	
			1.74866	1.500	
			2.23552	2.000	
			2.89440	2.500	

Regression Output:		Reported
Constant		c =
Std Err of Y Est	0.04712	-0.00342
R Squared	0.07124	
No. of Observations	0.99605	r <sup>2</sup> =
Degrees of Freedom	7.00000	0.99300
	5.00000	
X Coefficient(s)	1.1287	a
Std Err of Coef.	0.031800	1.17261E+000
		0.00

IS = TOCP = 2.0ug/mL  
 Lab used weighted linear regression



LDC # 21414 P17  
 SDG# Sy Cur

**VALIDATION FINDINGS WORKSHEET**  
Initial Calibration Calculation Verification

Page: 7 of 8  
 Reviewer: JVz  
 2nd Reviewer: [Signature]

**METHOD:** GC EPA SW 846 Method 8141A

**Parameter:** Phorate

Date	Column	Compound	Y Area ratio	X Conc ratio	X <sup>2</sup>
08/06/2009 12:58-15:42	(8141A-1)	Phorate	0.18690	0.100	
			0.49767	0.250	
			1.18283	0.500	
			1.93715	1.000	
			2.80443	1.500	
			3.62669	2.000	
			4.57604	2.500	

Regression Output:		Reported
Constant	0.11374	c = -0.05994
Std Err of Y Est	0.10106	
R Squared	0.99682	r <sup>2</sup> = 0.99682
No. of Observations	7.00000	
Degrees of Freedom	5.00000	
X Coefficient(s)	1.7854	a
Std Err of Coef.	0.045109	1.79112E+000

IS = TOCP = 2.0ug/mL  
 LAb used weighted linear regression

LDC # 21444 P17  
 SDG# Su Cms

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

Page: 7 of 8  
 Reviewer: JLC  
 2nd Reviewer: [Signature]

**METHOD:** GC EPA SW 846 Method 8141A

**Parameter:** Malathion

Date	Column	Compound	Y Area ratio	X Conc ratio	X <sup>2</sup>
08/06/2009 14:56 - 18:34	(8141A-2)	Malathion	0.06172	0.100	
			0.16064	0.250	
			0.35869	0.500	
			0.71697	1.000	
			1.02499	1.500	
			1.35430	2.000	
			1.61327	2.500	

Regression Output:		Reported
Constant	0.02098	c = 0.01814
Std Err of Y Est	0.03472	
R Squared	0.99721	r <sup>2</sup> = 0.99782
No. of Observations	7.00000	
Degrees of Freedom	5.00000	
X Coefficient(s)	0.6553	a
Std Err of Coef.	0.015497	9.45490E-001

IS = Tributylphosphate = 2.0ug/mL  
 LAb used weighted linear regression

LDC #: 21494 P17  
 SDG #: Sec Cover

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

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

METHOD: GC ✓ HPLC \_\_\_\_\_

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

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

#	Standard ID	Calibration Date	Compound	Average CF(ical)/ CCV Conc.	Reported		Recalculated	
					CF/Conc. CCV	%D	CF/Conc. CCV	%D
1			1, 2 - analyzed right after 5, 11, 16					
2	003 F0301	8/10/09	Dichlorvos (8141-2) Phorate Malathion	2.500	3.9054 2.1678 2.2638	56.2 13.3 9.4	3.9057 2.1678 2.2638	56.2 13.3 9.4
3			Dichlorvos (8141-1) Phorate Malathion		4.5358 2.4096 2.0320	81.4 3.6 18.7	4.5358 2.4096 2.0320	81.4 3.6 18.7
4								

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

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

METHOD: GC ✓ HPLC

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

% Difference =  $100 * (\text{ave. CF} - \text{CF}) / \text{ave. CF}$

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

#	Standard ID	Calibration Date	Compound	Average CF (cal)/ CCV Conc.	Reported		Recalculated	
					CF/Conc. CCV	%D	CF/Conc. CCV	%D
1	052F5201	8/07/09	Dichlorvos (8141-1)	2.500	2.5653	2.6	2.6	2.6
			Phorate		2.4186	3.3	2.4186	3.3
			Malathion		2.4924	0.3	2.4924	0.3
2			Dichlorvos (8141-2)		2.8464	13.9	2.8464	13.9
			Phorate		2.4649	1.4	2.4649	1.4
			Malathion		2.4084	3.7	2.4084	3.7
3	066FG601	8/08/09	Dichlorvos (8141-1)		2.8136	12.5	2.8136	12.5
			Phorate		2.5067	0.3	2.5067	0.3
			Malathion		2.5036	0.1	2.5036	0.1
4			Dichlorvos (8141-2)		3.0385	21.5	3.0385	21.5
			Phorate		2.4347	2.6	2.4347	2.6
			Malathion		2.9180	3.3	2.9180	3.3

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

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

LDC #: 21444 P17  
 SDG #: See Cover

METHOD: GC HPLC

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

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

Sample ID: #

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery		Percent Difference
				Reported	Recalculated	
Tripheyl phosphate	CS.7	1.0	0.86945	87	87	0
Chlormefz	↓	↓	0.52199	52	52	↓

Sample ID:

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

Sample ID:

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

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

METHOD: GC HPLC

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

%Recovery =  $100 * (SSC - SC) / SA$  Where SSC = Spiked sample concentration SC = Sample concentration  
 RPD =  $\frac{((SSCMS - SSCMSD) * 2) / (SSCMS + SSCMSD)}{100}$  SA = Spike added MSD = Matrix spike  
 MS/MSD samples: 17 / 18

Compound	Spike Added (ug/kg)		Sample Conc. (ug/kg)	Spike Sample Concentration (ug/kg)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD		MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
Dichlorvos (8141)	131	130	0	119	107	91	91	82	82	10	11
Maldathion	↓	↓	↓	87.6	85	67	67	65	65	3.0	3

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

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

METHOD: GC HPLC

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

% Recovery =  $100 \times \frac{SSC - SC}{SSC} \times \frac{SA}{LCS}$  (SSC-SC)/SA Where: SSC = Spiked sample concentration SC = Concentration  
 RPD =  $100 \times \frac{LCS - LCSD}{LCS} \times \frac{SA}{LCS + LCSD}$  SA = Spike added  
 LCS = Laboratory control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 9205074 LCS 10

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS		LCSD		Percent Recovery		Percent Recovery		RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)														
Diesel (8015)														
Benzene (8021B)														
Methane (RSK-175)														
2,4-D (8151)														
Dinoseb (8151)														
Naphthalene (8310)														
Anthracene (8310)														
HMX (8330)														
2,4,6-Trinitrotoluene (8330)														
Dichlorvos (8141)	4.00	4.00	3.42	3.29	86	86	82	82	82	82	4.0	4		
Malathion	↓	↓	3.09	3.01	77	77	75	75	75	75	2.5	2.6		

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

VALIDATION FINDINGS WORKSHEET  
Sample Calculation Verification

METHOD: GC HPLC

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

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

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

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

Example:  
 Sample ID. # 2 Compound Name Coumaphos

$$\text{Concentration} = \frac{\left[ \frac{(2836)}{(919355)} \right]}{0.89074} \times 0.03696 \times 2 = 0.08107$$

$$\text{find conc.} = (0.08107) (2 \text{ ml}) (1000) = 6.1 \text{ ug/kg}$$

#	Sample ID	Compound	Reported Concentrations	Recalculated Results Concentrations	Qualifications

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



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

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

**Collection Date:** July 21 through July 22, 2009

**LDC Report Date:** September 24, 2009

**Matrix:** Soil

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 4

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304617

**Sample Identification**

SA166-10BSPLP  
SA166-10BSPLPDI  
SA182-10BSPLP  
SA182-10BSPLPDI  
SA166-10BSPLPMS  
SA166-10BSPLPMSD  
SA166-10BSPLPDIMS  
SA166-10BSPLPDIMSD

## **Introduction**

This data review covers 8 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8141A for Organophosphorus Pesticides.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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**

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

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

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

Retention time windows were evaluated and considered technically acceptable.

### **b. Calibration Verification**

Calibration verification was performed at the required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were less than or equal to 20.0%.

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

Retention times (RT) of all compounds in the calibration standards were within QC limits..

## **III. Blanks**

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

No field blanks were identified in this SDG.

## **IV. Accuracy and Precision Data**

### **a. Surrogate Recovery**

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

### **b. Matrix Spike/Matrix Spike Duplicates**

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

### **c. Laboratory Control Samples**

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

### **V. Target Compound Identification**

All target compound identifications were within validation criteria.

### **VI. Project Quantitation Limit**

All project quantitation limits PQLs were within validation criteria.

All compounds reported below the PQL were qualified as follows:

<b>Sample</b>	<b>Finding</b>	<b>Flag</b>	<b>A or P</b>
All samples in SDG 8304617	All compounds reported below the PQL.	J (all detects)	A

### **VII. System Performance**

The system performance was acceptable.

### **VIII. Overall Assessment of Data**

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

### **IX. Field Duplicates**

No field duplicates were identified in this SDG.

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
 Organophosphorus Pesticides - Data Qualification Summary - SDG 8304617**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304617	SA166-10BSPLP SA166-10BSPLPDI SA182-10BSPLP SA182-10BSPLPDI	All compounds reported below the PQL	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
 Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG 8304617**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
 Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG 8304617**

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #: 21494Q17  
 SDG #: 8304617  
 Laboratory: Test America

VALIDATION COMPLETENESS WORKSHEET

Stage 2B 4

Date: 9/15/09  
 Page: 1 of 1  
 Reviewer: JVC  
 2nd Reviewer: 9

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/21 - 22/09
IIa.	Initial calibration	A	2 RSD ≤ 20% r2
IIb.	Calibration verification/ICV	JVC/A	CV/AV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	JVC/A	
IX.	Field duplicates	N	
X.	Field blanks	N	

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

Validated Samples:

Soil

1	SA166-10BSPLP	11	9211412 MB	21		31	
2	SA166-10BSPLPRE DI	12	9211418 MB	22		32	
3	SA182-10BSPLP	13		23		33	
4	SA182-10BSPLPRE DI	14		24		34	
5	SA166-10BSPLPMS	15		25		35	
6	SA166-10BSPLPMSD	16		26		36	
7	SA166-10BSPLPREMS	17		27		37	
8	SA166-10BSPLPREMSD	18		28		38	
9		19		29		39	
10		20		30		40	

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

LDC #: 21494 Q17  
 SDG #: See Cover

**VALIDATION FINDINGS CHECKLIST**

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

Method: GC HPLC

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. Initial calibration</b>				
Did the laboratory perform a 5 point calibration prior to sample analysis?	/			
Were all percent relative standard deviations (%RSD) < 20%?	/			
Was a curve fit used for evaluation?	/			
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?	/			
Were the RT windows properly established?	/			
<b>III. Continuing calibration</b>				
Was a continuing calibration analyzed daily?	/			
Were all percent differences (%D) < 15%.0 or percent recoveries 85-115%?	/			
Were all the retention times within the acceptance windows?		/		
<b>IV. Blanks</b>				
Was a method blank associated with every sample in this SDG?	/			
Was a method blank analyzed for each matrix and concentration?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.			/	
<b>V. Surrogate spikes</b>				
Were all surrogate %R within the QC limits?	/			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			/	
<b>VI. 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.	/			
Was a MS/MSD analyzed every 20 samples of each matrix?	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	/			
<b>VII. 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 QC limits?	/			
<b>VIII. Regional Quality Assurance and Quality Control</b>				
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			/	



LDC #: 21444 Q17  
 SDG #: See cover

**VALIDATION FINDINGS CHECKLIST**

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

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

LDC #: 21444 Q17  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
Initial Calibration Calculation Verification

Page: 1 of 3  
 Reviewer: JVK  
 2nd Reviewer: [Signature]

METHOD: GC  HPLC

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

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

#	Standard ID	Calibration Date	Compound	Reported	Recalculated	Reported	Recalculated	Reported	Recalculated	
				CF (>.0 std)	CF (>.0 std)	Average CF (initial)	Average CF (initial)	%RSD	%RSD	
1	CAL	8/03/09	Dichlorvos (8141-1)	1.96501	1.96501	1.82706	1.82706	7.61929	7.61934	
			Phorate	See	r <sup>2</sup> calc.					
			Malathion	1.36616	1.36616	1.28601	1.28601	6.26779	6.26780	
2			Dichlorvos (8141-2)	1.68626	1.68626	1.55884	1.55884	5.64768	5.64782	
			Phorate/Ethioprop	See	r <sup>2</sup> calc.					
			Malathion	1.16461	1.16461	1.07563	1.07563	5.21237	5.21245	
3										
4										

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

IS = TOCP (2.0 ug/L)

LDC # 21494 Q17  
 SDG# See Copy

**VALIDATION FINDINGS WORKSHEET**  
Initial Calibration Calculation Verification

Page: 2 of 3  
 Reviewer: JVC  
 2nd Reviewer: [Signature]

**METHOD:** GC EPA SW 846 Method 8141A

**Parameter:** Phorate

Date	Column	Compound	Y Area ratio	X Conc ratio	X <sup>2</sup>
08/03/2009	(8141A-1)	Phorate	0.18145	0.100	
			0.53110	0.250	
			1.04001	0.500	
			2.13734	1.000	
			3.09373	1.500	
			3.53449	2.000	
			4.98370	2.500	

Regression Output:		Reported
Constant	0.07126	c = -0.02464
Std Err of Y Est	0.20117	
R Squared	0.99000	r <sup>2</sup> = 0.99500
No. of Observations	7.00000	
Degrees of Freedom	5.00000	
X Coefficient(s)	1.9112	a
Std Err of Coef.	0.089791	1.93230E+000

IS = TOCP = 2.0ug/mL  
 Lab used weighted linear regression

**VALIDATION FINDINGS WORKSHEET**  
Initial Calibration Calculation Verification

**METHOD:** GC EPA SW 846 Method 8141A

**Parameter:** Phorate/Ethoprop

Date	Column	Compound	Y Area ratio	X Conc ratio	X <sup>2</sup>
08/03/2009	(8141A-2)	Phorate/Ethoprop	0.29174	0.200	
			0.73456	0.500	
			1.50219	1.000	
			3.33981	2.000	
			4.68224	3.000	
			5.72258	4.000	
			7.80615	5.000	

Regression Output:		Reported
Constant	0.02499	c = 0.01406
Std Err of Y Est	0.23214	
R Squared	0.99424	r <sup>2</sup> = 0.99671
No. of Observations	7.00000	
Degrees of Freedom	5.00000	
X Coefficient(s)	1.5226	a
Std Err of Coef.	0.051808	1.55380E+000

IS = TOCP = 2.0ug/mL  
 Lab used weighted linear regression

VALIDATION FINDINGS WORKSHEET  
 Continuing Calibration Results Verification

METHOD: GC / HPLC

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

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

#	Standard ID	Calibration Date	Compound	Average CF(ical)/ CCV Conc.	Reported		Recalculated	
					CF/Conc. CCV	%D	CF/Conc. CCV	%D
1			All samples analyzed right after CAL					
2								
3								
4								

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

**VALIDATION FINDINGS WORKSHEET**

LDC #: 21494 & 17

Page: 1 of 1

SDG #: See Cover

Reviewer: JVC

2nd reviewer: [Signature]

METHOD: GC HPLC

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

% Recovery:  $SF/SS * 100$

Where: SF = Surrogate Found  
SS = Surrogate Spiked

Sample ID: # 1

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery		Percent Difference
				Reported	Recalculated	
Triphenyl phosphate	Col. 1	1.00	0.78998	79	79	0
Chloroform	Col. 2	1	0.58557	58	58	↓

Sample ID:

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

Sample ID:

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

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

METHOD: GC HPLC

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

%Recovery =  $100 * ((SSC - SC) / SA)$  Where SSC = Spiked sample concentration SC = Sample concentration  
 SA = Spike added MSD = Matrix spike duplicate

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

MS/MSD samples: 5/6

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD		MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
Dichlorobenzene (8141)	4.00	4.00	0	3.07	3.36	77	77	84	84	9.0	9
Malathion	↓	↓	↓	2.72	2.92	68	68	73	73	7.3	7.1

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

**VALIDATION FINDINGS WORKSHEET**

**Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification**

METHOD:  GC  HPLC

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

% Recovery =  $100 * (SSC-SC)/SA$   
 RPD =  $1 LCS - LCSD \cdot 2 / (LCS + LCSD)$

Where: SSC = Spiked sample concentration  
 SA = Spike added  
 LCS = Laboratory control sample percent recovery

SC = Concentration

LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 9211418 CS

Compound	Spike Added (µg/L)		Spiked Sample Concentration (µg/L)		LCS		LCSD	
	LCS	LCSD	LCS	LCSD	Percent Recovery	Recalc.	Percent Recovery	Recalc.
Gasoline (8015)					Reported	Recalc.	Reported	Recalc.
Diesel (8015)								
Benzene (8021B)								
Methane (RSK-175)								
2,4-D (8151)								
Dinoseb (8151)								
Naphthalene (8310)								
Anthracene (8310)								
HMX (8330)								
2,4,6-Trinitrotoluene (8330)								
Dichlorvos (8141)	4.00	NA	3.27	NA	82	82		
Malathion			2.77		69	69		

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



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

LDC #: 21494 Q17  
 SDG #: Sec Cury

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

METHOD: GC HPLC

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

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

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

#	Sample ID	Compound	Reported Concentrations	Recalculated Results Concentrations	Qualifications

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

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

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

**Collection Date:** July 29, 2009

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

**Matrix:** Soil/Water

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304620

**Sample Identification**

RSAU4-20  
RSAU4-50  
FB072909-SO  
SA73-0.5B  
SA73-30B  
RSAU4-20MS  
RSAU4-20MSD

## Introduction

This data review covers 6 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8141A for Organophosphorus Pesticides.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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

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

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

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

### b. Calibration Verification

Calibration verification was performed at the required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
8/9/09	048F4801	1	Naled	24.3	RSAU4-20 RSAU4-50 SA73-0.5B SA73-30B RSAU4-20MS RSAU4-20MSD 9215329MB	J- (all detects) UJ (all non-detects)	A
8/9/09	048F4801	2	Dichlorvos	24.8	RSAU4-20 RSAU4-50 SA73-0.5B SA73-30B RSAU4-20MS RSAU4-20MSD 9215329MB	J+ (all detects)	A

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
8/6/09	010F1001	1	Mevinphos	22.2	All samples in SDG 8304620	J- (all detects) UJ (all non-detects)	P
8/6/09	010F1001	2	Mevinphos	21.1	All samples in SDG 8304620	J- (all detects) UJ (all non-detects)	P

### III. Blanks

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

Sample FB072909-SO was identified as a field blank. No organophosphorus pesticide contaminants were found in this blank.

### IV. Accuracy and Precision Data

#### a. Surrogate Recovery

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

#### b. Matrix Spike/Matrix Spike Duplicates

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

#### c. Laboratory Control Samples

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

### V. Target Compound Identification

Raw data were not reviewed for this SDG.

### VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304620	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

## **VII. System Performance**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

No field duplicates were identified in this SDG.

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304620**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304620	RSAU4-20 RSAU4-50 SA73-0.5B SA73-30B	Naled	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304620	RSAU4-20 RSAU4-50 SA73-0.5B SA73-30B	Dichlorvos	J+ (all detects)	A	Continuing calibration (%D) (c)
8304620	RSAU4-20 RSAU4-50 FB072909-SO SA73-0.5B SA73-30B	Mevinphos	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304620	RSAU4-20 RSAU4-50 FB072909-SO SA73-0.5B SA73-30B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG 8304620**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG 8304620**

No Sample Data Qualified in this SDG



**Tronox Northgate Henderson**

**VALIDATION COMPLETENESS WORKSHEET**

LDC #: 21494T17  
 SDG #: 8304620  
 Laboratory: Test America

Stage 2B

Date: 9/15/09  
 Page: 1 of 1  
 Reviewer: JVG  
 2nd Reviewer: [Signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/29/09
IIa.	Initial calibration	A	2 RSD ≤ 20% RV
IIb.	Calibration verification/ICV	SW	CCV / 100 ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS / D
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	FB = 3

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

Validated Samples: Soil + Water

1	1	RSAU4-20	S	11	1	9215329 MB	21		31
2	1	RSAU4-50	↓	12	1	9215363 MB	22		32
3	1	FB072909-SO	W	13			23		33
4	1	SA73-0.5B	S	14			24		34
5	1	SA73-30B	↓	15			25		35
6	1	RSAU4-20MS		16			26		36
7	1	RSAU4-20MSD	↓	17			27		37
8				18			28		38
9				19			29		39
10				20			30		40

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

VALIDATION FINDINGS WORKSHEET

METHOD: GC HPLC

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

Notes:

VALIDATION FINDINGS WORKSHEET

Continuing Calibration

METHOD: GC HPLC

2nd Reviewer: [Signature]

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

What type of continuing calibration calculation was performed? %D or RPD

N  N/A Were continuing calibration standards analyzed at the required frequencies? 20

Y  N/A Did the continuing calibration standards meet the %D / RPD validation criteria of <15.0%?

Level W Only

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

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit <u>&lt;15.0%</u> )	RT (limit)	Associated Samples	Qualifications
	<u>8/06/09</u>	<u>010 F1001</u> <u>(1001)</u>	<u>Col. 1</u> ↓	<u>B (-)</u> <u>C (+)</u> <u>D (-)</u>	<u>22.2</u> <del>211.6</del> <u>89.9</u>	( ) ( ) ( )	<u>A11 + B1K5</u>	<u>J- / MS / P (C)</u> <del>F + MS / P</del> <del>J + MS / P</del>
			<u>Col. 2</u> ↓	<u>B (-)</u> <u>C (+)</u> <u>D (-)</u>	<u>21.1</u> <del>218.7</del> <u>93.7</u>	( ) ( ) ( )	↓	<u>J- / MS / P</u> <del>J + MS / P</del> <del>J + R / P</del>
	<u>8/09/09</u>	<u>048 F4801</u> <u>(CCV)</u>	<u>Col. 1</u> <u>Col. 2</u>	<u>F (-)</u> <u>A (+)</u>	<u>24.2</u> <u>24.8</u>	( ) ( )	<u>1, 2, 4-7, 9, 21, 53, 29 MB</u> ↓	<u>J- / MS / A</u> <u>J + MS / A</u>
	<u>9/08/09</u>	<u>014 F1401</u> <u>(CCV)</u>				( )	<u>3-9, 21, 53, 29 MB</u>	

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** July 31, 2009

**LDC Report Date:** October 6, 2009

**Matrix:** Soil

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304621

### Sample Identification

RSAU4-20BSPLP  
RSAU4-20BSPLPRE  
RSAU4-20BSPLPDI  
RSAU4-50BSPLP  
RSAU4-50BSPLPDI  
RSAU4-20BSPLPREMS  
RSAU4-20BSPLPREMSD

## Introduction

This data review covers 7 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8141A for Organophosphorus Pesticides.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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 with the following exceptions:

Sample	Analyte	Total Days From Sample Collection Until Analysis	Required Holding Time (in Days) From Sample Collection Until Analysis	Flag	A or P
RSAU4-20BSPLPRE RSAU4-20BSPLPREMS RSAU4-20BSPLPREMSD	All TCL compounds	21	14	J- (all detects) UJ (all non-detects)	A

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

## II. Calibration

### a. Initial Calibration

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

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

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

### b. Calibration Verification

Calibration verification was performed at the required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
8/14/09	040F4001	1	Naled	42.5	RSAU4-20BSPLP RSAU4-20BSPLPDI RSAU4-50BSPLP RSAU4-50BSPLPDI 9224150MB 9221012MB	J- (all detects) UJ (all non-detects)	A

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
8/14/09	040F4001	2	Naled	42.7	RSAU4-20BSPLP RSAU4-20BSPLPDI RSAU4-50BSPLP RSAU4-50BSPLPDI 9224150MB 9221012MB	J- (all detects) UJ (all non-detects)	A
8/25/09	003F0301	1	Dichlorvos Mevinphos	22.7 25.5	RSAU4-20BSPLPRE RSAU4-20BSPLPREMS RSAU4-20BSPLPREMSD 9232166MB	J+ (all detects) J+ (all detects)	A
8/25/09	003F0301	1	Naled	21.8	RSAU4-20BSPLPRE RSAU4-20BSPLPREMS RSAU4-20BSPLPREMSD 9232166MB	J- (all detects) UJ (all non-detects)	A
8/25/09	003F0301	2	Dichlorvos Mevinphos	31.4 29.3	RSAU4-20BSPLPRE RSAU4-20BSPLPREMS RSAU4-20BSPLPREMSD 9232166MB	J+ (all detects) J+ (all detects)	A

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
8/6/09	010F1001	1	Mevinphos	22.2	RSAU4-20BSPLPRE RSAU4-20BSPLPREMS RSAU4-20BSPLPREMSD 9232166MB	J- (all detects) UJ (all non-detects)	P
8/6/09	010F1001	2	Mevinphos	21.1	RSAU4-20BSPLPRE RSAU4-20BSPLPREMS RSAU4-20BSPLPREMSD 9232166MB	J- (all detects) UJ (all non-detects)	P

### III. Blanks

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

No field blanks were identified in this SDG.



#### IV. Accuracy and Precision Data

##### a. Surrogate Recovery

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
RSAU4-20BSPLP	Not specified	Triphenylphosphate Chlormefos	38 (60-154) 31 (49-171)	All TCL compounds	J- (all detects) UJ (all non-detects)	A

##### b. Matrix Spike/Matrix Spike Duplicates

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

##### c. Laboratory Control Samples

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

#### V. Target Compound Identification

Raw data were not reviewed for this SDG.

#### VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304621	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

#### VII. System Performance

Raw data were not reviewed for this SDG.

**\*VIII. Overall Assessment of Data**

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

Sample	Compound	*Flag	A or P
RSAU4-20BSPLPRE	All TCL compounds	X	A

\*Corrected Flag in above table from "R" to "X".

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.

**\*Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304621**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304621	RSAU4-20BSPLPRE	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
8304621	RSAU4-20BSPLP RSAU4-20BSPLPDI RSAU4-50BSPLP RSAU4-50BSPLPDI RSAU4-20BSPLPRE	Naled	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304621	RSAU4-20BSPLPRE	Dichlorvos Mevinphos	J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
8304621	RSAU4-20BSPLPRE	Mevinphos	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304621	RSAU4-20BSPLP	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Surrogate recovery (%R) (s)
8304621	RSAU4-20BSPLP RSAU4-20BSPLPRE RSAU4-20BSPLPDI RSAU4-50BSPLP RSAU4-50BSPLPDI	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
*8304621	RSAU4-20BSPLPRE	All TCL compounds	*X	A	Overall assessment of data (0)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG 8304621**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG 8304621**

No Sample Data Qualified in this SDG

**Tronox Northgate Henderson  
VALIDATION COMPLETENESS WORKSHEET**

LDC #: 21494U17  
SDG #: 8304621  
Laboratory: Test America

Stage 2B

Date: 9/14/09  
Page: 1 of 1  
Reviewer: JYK  
2nd Reviewer: [Signature]

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

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 7/31/09
IIa.	Initial calibration	A	? RSD < 20% r <sup>2</sup>
IIb.	Calibration verification/ICV	SW	CV/AV < 20%
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS / D
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	SW	
IX.	Field duplicates	N	
X.	Field blanks	N	

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

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

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:

Soil

1	1	RSAU4-20BSPLP	11	9224150 MB	21	31
2	2	RSAU4-20BSPLPREY	12	9232166 MB	22	32
3	3	RSAU4-20BSPLPRE2 DI	13	9221012 MB	23	33
4	1	RSAU4-50BSPLP	14		24	34
5	3	RSAU4-50BSPLPRE DI	15		25	35
6	2	RSAU4-20BSPLPRE MS	16		26	36
7	2	MSD17	17		27	37
8			18		28	38
9			19		29	39
10			20		30	40

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

**VALIDATION FINDINGS WORKSHEET**  
**Technical Holding Times**

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

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
2, 6, 7	Soil	N	7/21/09	8/21/09	8/25/09	21	J-UJ/A (Ch)

METHOD: GC HPLC

- TECHNICAL HOLDING TIME CRITERIA**  
**VOLATILES:** Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.  
 Water preserved: Both within 14 days of sample collection.  
 Soils: Both within 14 days of sample collection.  
**EXTRACTABLES:** Water: Extracted within 7 days, analyzed within 40 days.  
 Soil: Extracted within 14 days, analyzed within 40 days.

LDC #: 21444 1/17  
 SDG #: See Conty

**VALIDATION FINDINGS WORKSHEET**  
**Continuing Calibration**

Page: 1 of 1  
 Reviewer: [Signature]

METHOD:  GC  HPLC

2nd Reviewer: [Signature]

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

What type of continuing calibration calculation was performed?  %D or  RPD  
 Were continuing calibration standards analyzed at the required frequencies? 20  
 Did the continuing calibration standards meet the %D / RPD validation criteria of  $\leq 45.0\%$ ?

Level IV Only

Y N  N/A

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

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit $\leq 45.0\%$ )	RT (limit)	Associated Samples	Qualifications
	8/12/09	010 #1001 (100)	Col. 1 ↓ Col. 2	C (+) D (-) C (+) D (-)	197.8 74.9 233.0 96.3	( ) ( ) ( ) ( )	1, 3-5, 9224150 MB 9221012 MB	J+MS/P (C) J+MS/P J+MS/P J-R/P
	8/06/09	010 #1001 (100)	Col. 1 ↓ Col. 2	B (-) C (-) D (-) B (-) C (-) D (-)	22.2 211.6 84.9 21.1 218.7 92.1	( ) ( ) ( ) ( ) ( ) ( )	2, 6, 7, 9232166 MB	J-MS/P J+MS/P J-MS/P J-MS/P J+MS/P J-MS/P
	8/14/09	040 F4001 (CW)	Col. 1 Col. 2	F (-) F (-)	42.5 42.7	( ) ( )	1, 3-5, 9224150 MB, 9221012 MB	J-MS/A ↓
	8/25/09	003 F0301 (CW)	Col. 1 ↓ Col. 2	A (+) B (+) F (-) A (+) B (+)	22.7 25.5 21.8 21.4 29.3	( ) ( ) ( ) ( ) ( )	2, 6, 7, 9232166 MB	J+MS/A ↓ J-MS/A J+MS/A



LDC #: 21494 U17  
SDG #: Sg Curry

VALIDATION FINDINGS WORKSHEET  
Overall Assessment of Data

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

METHOD:  GC  HPLC

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

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

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

#	Sample # Compound Name	Finding	Associated Samples	Qualifications
	2	outside H.T.		X R/A (o)

Comments:



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

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

**Collection Date:** August 5, 2009

**LDC Report Date:** September 24, 2009

**Matrix:** Water

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304622

**Sample Identification**

FB080409-GW

## Introduction

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

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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

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

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

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

### b. Calibration Verification

Calibration verification was performed at the required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
8/9/09	031F3101	1	Naled Merphos	21.9 23.8	All samples in SDG 8304622	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
8/9/09	031F3101	2	Dichlorvos	21.4	All samples in SDG 8304622	J+ (all detects)	A

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
8/6/09	010F1001	1	Mevinphos	22.2	All samples in SDG 8304622	J- (all detects) UJ (all non-detects)	P

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
8/6/09	010F1001	2	Mevinphos	21.1	All samples in SDG 8304622	J- (all detects) UJ (all non-detects)	P

### III. Blanks

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

Sample FB080409-GW was identified as a field blank. No organophosphorus pesticide contaminants were found in this blank.

### IV. Accuracy and Precision Data

#### a. Surrogate Recovery

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

#### b. Matrix Spike/Matrix Spike Duplicates

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

#### c. Laboratory Control Samples

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

### V. Target Compound Identification

Raw data were not reviewed for this SDG.

### VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304622	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

## **VII. System Performance**

Raw data were not reviewed for this SDG.

## **VIII. Overall Assessment of Data**

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

## **IX. Field Duplicates**

No field duplicates were identified in this SDG.

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304622**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304622	FB080409-GW	Naled Merphos	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304622	FB080409-GW	Dichlorvos	J+ (all detects)	A	Continuing calibration (%D) (c)
8304622	FB080409-GW	Mevinphos	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304622	FB080409-GW	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG 8304622**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG 8304622**

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #: 21494V17

VALIDATION COMPLETENESS WORKSHEET

SDG #: 8304622

Stage 2B

Laboratory: Test America

Date: 9/11/09

Page: 1 of 1

Reviewer: JVC

2nd Reviewer: [Signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8/05/09
IIa.	Initial calibration	A	% RSD rv
IIb.	Calibration verification/ICV	SW	COV/ICV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	Client spec
IVc.	Laboratory control samples	A	LCS / B
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	FB = 1

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

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

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:

Water

1	FB080409GW	11		21		31	
2	9217511 MP	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

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



VALIDATION FINDINGS WORKSHEET

METHOD: GC HPLC

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

Notes:



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

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

**Collection Date:** August 3 through August 5, 2009

**LDC Report Date:** September 23, 2009

**Matrix:** Soil/Water

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304623

**Sample Identification**

FB080309-SO  
RSAU5-0.5B  
RSAU5-50B  
RSAU5-0.5BMS  
RSAU5-0.5BMSD

## Introduction

This data review covers 4 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8141A for Organophosphorus Pesticides.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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

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

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

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

### b. Calibration Verification

Calibration verification was performed at the required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
8/9/09	031F3101	1	Naled Merphos	21.9 23.8	FB080309-SO 9217511MB	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
8/9/09	031F3101	2	Dichlorvos	21.4	FB080309-SO 9217511MB	J+ (all detects)	A
8/14/09	055F5501	1	Naled EPN	43.9 27.1	RSAU5-0.5B RSAU5-50B RSAU5-0.5BMS RSAU5-0.5BMSD 9223449MB	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
8/14/09	055F5501	2	Naled Dimethoate Parathion-ethyl EPN	63.9 20.6 20.3 28.7	RSAU5-0.5B RSAU5-50B RSAU5-0.5BMS RSAU5-0.5BMSD 9223449MB	J- (all detects) UJ (all non-detects)	A

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
8/6/09	010F1001	1	Mevinphos	22.2	FB080309-SO 9217511MB	J- (all detects) UJ (all non-detects)	P
8/6/09	010F1001	2	Mevinphos	21.1	FB080309-SO 9217511MB	J- (all detects) UJ (all non-detects)	P

### III. Blanks

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

Sample FB080309-SO was identified as a field blank. No organophosphorus pesticide contaminants were found in this blank.

### IV. Accuracy and Precision Data

#### a. Surrogate Recovery

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

#### b. Matrix Spike/Matrix Spike Duplicates

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

#### c. Laboratory Control Samples

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

### V. Target Compound Identification

Raw data were not reviewed for this SDG.

### VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304623	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

**VII. System Performance**

Raw data were not reviewed for this SDG.

**VIII. Overall Assessment of Data**

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

**IX. Field Duplicates**

No field duplicates were identified in this SDG.



**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304623**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304623	FB080309-SO	Naled Merphos	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304623	FB080309-SO	Dichlorvos	J+ (all detects)	A	Continuing calibration (%D) (c)
8304623	RSAU5-0.5B RSAU5-50B	Naled Dimethoate Parathion-ethyl EPN	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304623	FB080309-SO	Mevinphos	J- (all detects) UJ (all non-detects)	P	Continuing calibration (ICV %D) (c)
8304623	FB080309-SO RSAU5-0.5B RSAU5-50B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG 8304623**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG 8304623**

No Sample Data Qualified in this SDG

**Tronox Northgate Henderson**

LDC #: 21494W17  
 SDG #: 8304623  
 Laboratory: Test America

**VALIDATION COMPLETENESS WORKSHEET**

Stage 2B

Date: 9/14/09  
 Page: 1 of 1  
 Reviewer: JG  
 2nd Reviewer: \_\_\_\_\_

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8/03 - 05/09
IIa.	Initial calibration	A	% RSD ≤ 20% r2
IIb.	Calibration verification/ICV	SW	ICV/COV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS / D
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	FB = 1

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

Validated Samples:

1	FB080309-SO	W	11	21	31
2	RSAU5-0.5B	S	12	22	32
3	RSAU5-50B		13	23	33
4	RSAU5-0.5BMS		14	24	34
5	RSAU5-0.5BMSD		15	25	35
6	9217511 MB		16	26	36
7	9223449 MB		17	27	37
8			18	28	38
9			19	29	39
10			20	30	40

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

VALIDATION FINDINGS WORKSHEET

METHOD: GC HPLC

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

Notes:

LDC #: 21494 W17  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Continuing Calibration**

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

METHOD: GC HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
 What type of continuing calibration calculation was performed? %D or RPD  
 Were continuing calibration standards analyzed at the required frequencies? 20  
 Did the continuing calibration standards meet the %D / RPD validation criteria of ≤15.0%?

Level IV Only  
 Y N N/A

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

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit ≤ 15.0%)	RT (limit)	Associated Samples	Qualifications
	8/6/09	010 F 1001 (100)	Col. 1	B (-)	22.2	( )	1, 9217511 MB	J-MS/P (G)
	19:10			<del>G (-)</del>	<del>21.5</del>	( )		<del>J-MS/P</del>
				R (-)	84.9	( )		<del>J-R/P</del>
			Col. 2	B (-)	21.1	( )		J-MS/P
				<del>G (+)</del>	<del>218.7</del>	( )		<del>J-R/P</del>
				D (-)	93.1	( )		<del>J-R/P</del>
	8/13/09	010 F 1001 (100)	Col. 1	C (+)	197.8	( )	2-5, 9223449 MB	J+dets/R
				D (-)	79.9	( )		J-MS/P
			Col. 2	C (+)	238.8	( )		J+dets/P
				D (-)	96.3	( )		J-R/P
	8/09/09	031 F 2101 (CON)	Col. 1	F (-)	21.9	( )	1, 9217511 MB	J-MS/A
				S (-)	29.8	( )		J+dets/A
			Col. 2	A (+)	21.4	( )		
	8/14/09	055 F 5501 (CON)	Col. 1	F (-)	43.9	( )	2-5, 9223449 MB	J-MS/A
				X (-)	27.1	( )		
			Col. 2	F (-)	63.9	( )		
				I (-)	20.6	( )		
				Q (-)	20.3	( )		
				X (-)	28.7	( )		

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

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

**Collection Date:** August 3 through August 5, 2009

**LDC Report Date:** September 19, 2009

**Matrix:** Soil

**Parameters:** Organophosphorus Pesticides

**Validation Level:** Stage 2B

**Laboratory:** TestAmerica, Inc.

**Sample Delivery Group (SDG):** 8304624

**Sample Identification**

RSAJ3-10BSPLP  
RSAJ3-10BSPLPDI  
RSAJ3-29BSPLP  
RSAJ3-29BSPLPDI  
RSAU5-0.5BSPLP  
RSAU5-0.5BSPLPDI  
RSAU5-0.5BSPLPMS  
RSAU5-0.5BSPLPMSD

## Introduction

This data review covers 8 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8141A for Organophosphorus Pesticides.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- 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

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

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

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

### b. Calibration Verification

Calibration verification was performed at the required frequencies.

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

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
8/14/09	040F4001	1	Naled	42.5	RSAJ3-10BSPLP RSAJ3-10BSPLPDI RSAJ3-29BSPLP RSAJ3-29BSPLPDI 9224150MB 9221012MB	J- (all detects) UJ (all non-detects)	A
8/14/09	040F4001	2	Naled	42.7	RSAJ3-10BSPLP RSAJ3-10BSPLPDI RSAJ3-29BSPLP RSAJ3-29BSPLPDI 9224150MB 9221012MB	J- (all detects) UJ (all non-detects)	A
8/14/09	055F5501	1	Naled  EPN	43.9  27.1	RSAU5-0.5BSPLP RSAU5-0.5BSPLPDI RSAU5-0.5BSPLPMS RSAU5-0.5BSPLPMSD 9224512MB 9224510MB	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A



Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
8/14/09	055F5501	2	Naled	47.5	RSAU5-0.5BSPLP RSAU5-0.5BSPLPDI RSAU5-0.5BSPLPMS RSAU5-0.5BSPLPMSD 9224512MB 9224510MB	J- (all detects) UJ (all non-detects)	A

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

### III. Blanks

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

No field blanks were identified in this SDG.

### IV. Accuracy and Precision Data

#### a. Surrogate Recovery

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

#### b. Matrix Spike/Matrix Spike Duplicates

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

#### c. Laboratory Control Samples

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

### V. Target Compound Identification

Raw data were not reviewed for this SDG.

### VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 8304624	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

### VII. System Performance

Raw data were not reviewed for this SDG.

### VIII. Overall Assessment of Data

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

### IX. Field Duplicates

No field duplicates were identified in this SDG.

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Data Qualification Summary - SDG 8304624**

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304624	RSAJ3-10BSPLP RSAJ3-10BSPLPDI RSAJ3-29BSPLP RSAJ3-29BSPLPDI	Naled	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304624	RSAU5-0.5BSPLP RSAU5-0.5BSPLPDI	Naled  EPN	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
8304624	RSAJ3-10BSPLP RSAJ3-10BSPLPDI RSAJ3-29BSPLP RSAJ3-29BSPLPDI RSAU5-0.5BSPLP RSAU5-0.5BSPLPDI	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Laboratory Blank Data Qualification Summary - SDG 8304624**

No Sample Data Qualified in this SDG

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Organophosphorus Pesticides - Field Blank Data Qualification Summary - SDG 8304624**

No Sample Data Qualified in this SDG

**Tronox Northgate Henderson  
VALIDATION COMPLETENESS WORKSHEET**

LDC #: 21494X17  
SDG #: 8304624  
Laboratory: Test America

Stage 2B

Date: 9/15/09  
Page: 1 of 1  
Reviewer: JVG  
2nd Reviewer: \_\_\_\_\_

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

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

Validation Area			Comments
I.	Technical holding times	A	Sampling dates: <u>8/03-05/09</u>
IIa.	Initial calibration	A	<u>2 RJD ≤ 20% r<sup>2</sup></u>
IIb.	Calibration verification/ICV	SW	<u>CCV/ICV ≤ 20%</u>
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	<u>LCS / D</u>
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	<del>NB</del>	<del>FB = FB 072109 SD</del> <u>from 8304616</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: soil

1	1	RSAJ3-10B SPLP	171	9224150 MB	21		31
2	2	RSAJ3-10BRE SPLP DI	12	9221012 MB	22		32
3	3	RSAJ3-29B SPLP	13	9224517 MB	23		33
4	4	RSAJ3-29BRE SPLP DI	14	9224510 MB	24		34
5	3	RSAU5-0.5BSPLP	15		25		35
6	4	RSAU5-0.5BSPLPRE DI	16		26		36
7	3	RSAU5-0.5BSPLPMS	17		27		37
8	3	RSAU5-0.5BSPLPMSD	18		28		38
9			19		29		39
10			20		30		40

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

VALIDATION FINDINGS WORKSHEET

METHOD: GC HPLC

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

Notes:

**VALIDATION FINDINGS WORKSHEET**  
 Continuing Calibration

METHOD: GC HPLC  
 2nd Reviewer: [Signature]

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
 What type of continuing calibration calculation was performed? %D or 2σ RPD  
 Were continuing calibration standards analyzed at the required frequencies? 2σ  
 Did the continuing calibration standards meet the %D / RPD validation criteria of 45.0%?

Level IV Only

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

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit $\leq 45.0$ )	$\leq 2\sigma$	RT (limit)	Associated Samples	Qualifications
	8/13/09	010 F1001 (ICN)	Col. 1 Col. 2	C (+) D (-) C (+) D (-)	197.8 74.9 238.0 96.3			All + BKS	J+AB/P J-/NS/P J+AB/P J-/R/P
	8/14/09	040 F4001 (CCV)	Col. 1 Col. 2	F (-) F (-)	42.5 42.7			1-4 922450 MB, 9221012 MB	J-/NS/P
	8/14/09	055 F5501 (CCV)	Col. 1 Col. 2	F (-) X (-) F (-)	43.9 27.1 47.5			5-8, 9224512 MB, 9224510 MB	J-/NS/A