

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:

<u>SDG #</u>

Fraction

8304603, 8304604, 8304606 8304610, 8304621

Organophosphorus Pesticides

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

Sincerely aute

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:

<u>SDG #</u>

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

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. Rauło Operations Manager/Senior Chemist

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EDD CHECKLIST

Tronox Northgate Henderson Worksheet

EDD Area	Yes	No	NA	Findings/Comments
I. Completeness				
Is there an EDD for the associated Tronox validation report?	x			
II. EDD Qualifier Population		¥		
Were all qualifiers from the validation report populated into the EDD?	x			
III, EDD Lab Anomalies				
Were EDD anomalies identified?	x			
If yes, were they corrected or documented for the client?	x			See EDD_discrepancy_ form_LDC21494_092409.doc
IV. EDD Delivery				
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 Report# 21494G4

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-29BMS M-29BMSD M-130BDISSMS M-130BDISSMS

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.
- 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. 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

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LDC #:___ 21494G4 SDG #: 8304607

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date Page:_ Reviewer 2nd Reviewer

Laboratory: Test America

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
١.	Technical holding times	A	Sampling dates: 6/15/09 - 6/19/,9
11.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	5~	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	melony
VII.	Duplicate Sample Analysis	Ń	, ,
VIII.	Laboratory Control Samples (LCS)	A	Lus
IX.	Internal Standard (ICP-MS)	N	pot vaniens
X .	Furnace Atomic Absorption QC	N	wit which we
XI.	ICP Serial Dilution	A	0. 7 9
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates		
xv	Field Blanks	\sim	

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	M-29B	11	M-29BMSD	21	IN K	31
2	M-130B	12	M-130BDISSMS	22		32
3	M-130BDISS	13	M-130BDISSMSD	23		33
4 1	M-78B	14		24		34
5	M-128B	15		25		35
6	M-128BDISS	16		26		36
7 1	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 #: 2149 SDG #: <u>See</u>

4



All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-9	AQ	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 ⁻ ,
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		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,
n(P, I)	m	Al, Sb, 😡, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, 😪 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 ,
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		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,
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		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, Ti, V, Zn, Mo, B, Si, CN ⁻ ,
		Analysis Method
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

		EPA SW 846 Method 6020)
LDC #: 21494G4	SDG #: See Cover	METHOD: Trace Metals (E

VALIDATION FINDINGS WORKSHEET <u>PB/ICB/CCB QUALIFIED SAMPLES</u> Soil preparation factor applied:



ng/L

Sample Concentration units, unless otherwise noted:



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LDC Report# 21494H4

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Tronox LLC Facility,	2009	Phase	В	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.
- 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. 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:

	Concentra	tion (ug/L)		D.41		
Analyte	M-13AB	M-13009AB	(Limits)	Limits)	Flags	A or P
Arsenic	120	120	-	0 (≤50)	-	-

	Concentra	tion (ug/L)					
Analyte	M-13ABDISS	M-13009ABDISS	RPD (Limits)	Difference (Limits)	Flags	A or P	
Arsenic	110	120	-	10 (≤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

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 28 4

Date:	9/14/09
Page:_	<u>(</u> of_/
Reviewer:	<u> </u>
2nd Reviewer:	and

Laboratory: Test America

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
1.	Technical holding times	A	Sampling dates: 6/23/29 - 6/25/29
<u>_ II.</u>	ICP/MS Tune	Å	, , ,
- 111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
Vİ.	Matrix Spike Analysis	4W	2 ms/mso
VII.	Duplicate Sample Analysis	N	>· // · ·>
VIII.	Laboratory Control Samples (LCS)	A	Luy
IX.	Internal Standard (ICP-MS)	A	
Х.	Furnace Atomic Absorption QC	N	ht woodrid
XI.	ICP Serial Dilution	A	đ
XII.	Sample Result Verification	XX	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(8, 10) $(9, 11)$
xv	Field Blanks	N	

Note:

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

As_

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

D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

1	M-125B	11	M-13009ABDISS	21	MB	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-125BDISSMSD	25		35
6	M-64B	16	M-17ABMS	26		36
7	M-75B	17	M-17ABMSD	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:



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

Validation Area	Yes	No	NA	Findings/Comments
All technical holding times were met.	1			
Cooler temperature criteria was met.				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?			ļ	
Were %RSD of isotopes in the tuning solution ≤5%?				
Were all instruments calibrated daily, each set-up time?	1		ļ	
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?	1		<u> </u>	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
Xale rita				
Were ICP interference check samples performed daily?	1			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
Maine description of the second s		Massala		
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.		1		
Were the MS/MSD or duplicate relative percent differences (RPD) \leq 20% for waters and \leq 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were \leq 5X the RL, including when only one of the duplicate sample values were \leq 5X the RL.	/			
			Lines	
Was an LCS anaylzed 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 m/ SDG #: 10 m ww



Validation Area	Yes	No	NA	Findings/Comments
If MSA was performed, was the correlation coefficients > 0.995?			1	
Do all applicable analysies have duplicate injections? (Level IV only)		ļ	12	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			/	
Were analytical spike recoveries within the 85-115% OC limits?	1227007			The sense of the second of the second s
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?		1		
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?	1			
Overall assessment of data was found to be acceptable.	/			
Field duplicate pairs were identified in this SDG.	1		-	
Target analytes were detected in the field duplicates.				
	1.6			
Field blanks were identified in this SDG.		\checkmark		/
Target analytes were detected in the field blanks.			V	

MET-SW_6020_tune.wpd version 1.0



VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
[-1]	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, Tl, V, Zn, Mo, B, Si, CN,
12-19	AS	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, 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, 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',
		Analysis Method
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, Tl, 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

to the	m m
	SDG #:

Matrix Spike/Matrix Spike Duplicates VALIDATION FINDINGS WORKSHEET

an A 7 đ Page: Reviewer: 2nd Reviewer:

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

Were matrix spike percent recoveries (%R) within the control limits of 75-125?) If the sample concentration exceeded the spike concentration by a factor Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". <u>Y N N/A</u> Was a matrix spike analyzed for each matrix in this SDG? <u>Y N N/A</u> Were matrix spike percent recoveries (%R) within the control limite of 75,1050 is the control of the control limite of 75,1050 is the control of the control limite of 75,1050 is the control of the contro

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

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations. <u>ON N/A</u> Wei LEVEL IV ONLY: <u>(V N N/A</u> Wei

Qualifications	13) 7/17 5												
Associated Samples	- 6Å												
RPD (Limits)													
MSD %Recovery	32												
MS %Recovery													r Are
Analyte	A7	/ /											59 4.t the
Matrîx	40												pres 1
di QSW/SW #	(8/15												omments:

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LDC#: <u>21494H4</u> SDG#: See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

METHOD: Metals (EPA Method 6020)

Y<u>N NA</u>

Were field duplicate pairs identified in this SDG?

A Were target analytes detected in the field duplicate pairs?

	Concentrat	ion (ug/L)	(≤30)	(ug/L)	(ug/L)	Qualifications
Compound	8	10	RPD	Difference	Limits	(Parent Only)
Arsenic	120	120		0	(≤50)	

	Concentrat	ion (ug/L)	(≤30)	(ug/L)	(ug/L)	Qualifications
Compound	9	11	RPD	Difference	Limits	(Parent Only)
Arsenic	110	120		10	(≤50)	

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LDC # -1 41 44

VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

Page: 0f 2nd Reviewer: Ard

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:

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 %R = Found x 100 True

					Recelculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
726	ICP (Initial calibration)	A7	39.09	40	ر ،35	くらろ	Y
	GFAA (Initial calibration)						7
	CVAA (Initial calibration)						
cul	ICP (Continuing calibration)	se	49,2	Ľ	98.4	48.4	Y
	GFAA (Continuing calibration)						
	CVAA (Continuing calibration)						
	ICP/MS (initial calibration)						
	ICP/MS (Continuing calibation)						

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

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

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

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

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

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. %R = Found x 100 True

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

Where, S = Original sample concentration D = Duplicate sample concentration RPD = <u>IS-D1</u> x 100 (S+D)/2

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

Where, I = Initial Semple Result (mg/L) SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5) %D = 1-SDRI × 100

					Racalculated	Raportad	
Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	%R / RPD / %D	%R / RPD / %D	Acceptable (Y/N)
3457T	ICP interference check	Ąړ	(~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	2	(~{0})	(~ {a]	Ý
103	Laboratory control sample	Z	38.5	2°07	96	96	
~~	Matrix spike	42	(ssr-sr) 28. 1	40.0	42	44	
12/21	Dupticate	Sr	48.2	39.8	(9	61	1
	ICP serial dilution	Ъ.	5-5	~s1.9	4-5	4.6	Λ
		ł					

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.

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LDC #: 11994Hy SDG #: ful com

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	<u>or</u>
Reviewer:	n
2nd reviewer:	mx

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

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". N N/A Have results been reported and calculated correctly? N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP? Are all detection limits below the CRDL? <u>×n n/a</u> Detected analyte results for 2 were recalculated and verified using the following equation: Concentration = (RD)(FV)(Dil) **Recalculation:** (In. Vol.)(%S) As = 6.18 y/ × 10 = 61.8 y/ RD Raw data concentration -FV -Final volume (ml) In. Vol. = Initial volume (ml) or weight (G) Dil = **Dilution factor** %S Decimal percent solids = Reported Calculated Concentration Concentration Acceptable Sample ID Analyte (VIL m/ /) (Y/N)

ļ	As	62	62	У
	4			/
2	As	5257	53	7
		, · · · · · · · · · · · · · · · · · · ·	·	
				·······
			:	

RECALC.4S2

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Tronox LLC Facility,	2009	Phase	В	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-110ABMSD M-110ABMSD M-12ABDISSMS M-12ABDISSMS

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.
- 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. 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
Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: 8304609 Laboratory: Test America

2149414

LDC #:

Date: <u>9/14/</u> Page: <u>of</u> Reviewer: <u></u> 2nd Reviewer: **And**

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
1.	Technical holding times	A	Sampling dates: $6/28/29 - \eta/01/09$
11.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	gw	2m13/m 50
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LUJ
IX.	Internal Standard (ICP-MS)	N	nt verienced
Х.	Furnace Atomic Absorption QC	N	Wit What jul
XI.	ICP Serial Dilution	A	a
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
xv	Field Blanks	r	

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	M-111AB	11	M-12ABDISSMSD	21	IMB	31	
2	M-110AB	12		22	v	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 #:_} SDG #:_S

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

ζ.

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-7	AQ	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, Tl, V, Zn, Mo, B, Si, CN,
n 8-11	Az	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, 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, 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 ⁻ ,
<i>x</i>		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, 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, 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, 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, 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, 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, Tl, V, Zn, Mo, B, Si, CN [*] ,
		Analysis Method
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

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Matrix Spike/Matrix Spike Duplicates VALIDATION FINDINGS WORKSHEET

Am Page: of Reviewer: 2nd Reviewer:

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

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". <u>X/M-N/A</u> 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. A/A K/N N/A

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

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations. <u>Y N KNA</u> Wei

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	Qualifications	T-4/4 (m)			Ą																				
	Associated Samples	1 4 4 mm		3																					
	RPD (Limits)	3																							
	MSD %Recovery	9~1			30																				
	MS %Recovery				[30																			how de	
-	Analyte	25			R																			is tot :	
	Matrix	¥			e	-																		T Smyle	1
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LDC Report# 21494K4

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-121B M-117BMS M-117BMSD 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.
- 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. 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 8304611	All analytes reported below the PQL.	J (all detects)	А

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

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: 8304611 Laboratory: Test America

21494K4

LDC #:

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: 7/6/09 _7/10/09
11.	ICP/MS Tune	A	
111.	Calibration	Å	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	Å	
VI.	Matrix Spike Analysis	Ä)ms/mcD
VII.	Duplicate Sample Analysis	Ņ	5 × / • ×
VIII.	Laboratory Control Samples (LCS)	A-	407
IX.	Internal Standard (ICP-MS)	N	kit versienel
X .	Furnace Atomic Absorption QC	2	wit uberry
XI.	ICP Serial Dilution	A	d
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	γ	
xv	Field Blanks	N	

Note:

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

M

ND = No compounds detected R = Rinsate FB = Field blank D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

1	M-117B	11	M-120BMSD	21	MB	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 #: 214 SDG #: 500

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: _ _ of _ _ Reviewer: ______ 2nd reviewer: ______

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-7	AQ	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,
ar 8-13	An-	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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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 [*] ,
		Analysis Method
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.
- 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. 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

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: 8304614 Laboratory: Test America

21494N4

LDC #:___

Date: <u>9/141</u> Page: _____of ____ Reviewer: ______ 2nd Reviewer: ______

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: 1/13/09 - 7/15/09
11.	ICP/MS Tune	A	/ / /
- 111.	Calibration	Á	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	Ą	sms/usy
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	49
IX.	Internal Standard (ICP-MS)	N	Kit veriend
Х.	Furnace Atomic Absorption QC	Ņ	het utilized
XI.	ICP Serial Dilution	A	Ø
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N N	
xv	Field Blanks	γ	

Note:

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

 Λ

ND = No compounds detected R = Rinsate FB = Field blank D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

		a second and second and					
1	H-11B	11	H-11BDISSMSD	21	MR	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	i a	28		38	
9	H-11BMSD	19		29		39	
10	H-11BDISSMS	20		30		40	

Notes:

LDC #:_> SDG #:___

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: _______ Reviewer: _______ 2nd reviewer: ______

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-7	AQ	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,
~ 8-14	M	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, 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, Ti, Ѷ, 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, 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, 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, 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',
		Analysis Method
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, 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

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Tronox LLC Facility,	2009	Phase	В	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-52B M-77BMS M-77BMSD M-77BDISSMS M-77BDISSMSD M-33BMS M-33BMS 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.
- 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. 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 Selenium	73 (75-125) -	70 (75-125) 69 (75-125)	-	J- (all detects) UJ (all non-detects) J- (all detects)	A
					00 (all hon-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	М-77В	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

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #:____8304615 Laboratory: <u>Test America</u>

2149404

LDC #:

Date: <u>9/14/</u> Page: <u>of</u> Reviewer: <u>2nd Reviewer</u>

4

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
Ι.	Technical holding times	A	Sampling dates: 1/20/09 - 1/24/09
П.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	52) MS/MMS
VII.	Duplicate Sample Analysis	N	>
VIII.	Laboratory Control Samples (LCS)	A	405
IX.	Internal Standard (ICP-MS)	N_	Not vennemed
Х.	Furnace Atomic Absorption QC	N	hit where i
XI.	ICP Serial Dilution	A	U
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	ν	
xv	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	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	L

Notes:

LDC #:_> SDG #:___

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: ________ Reviewer: ________ 2nd reviewer: _______

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-7	AQ	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, Tl, V, Zn, Mo, B, Si, CN,
~8-15	AD	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, 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, 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, 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, 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, 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, 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, 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, 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, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Analysis Method
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, 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, 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, Ti, V, Zn, Mo, B, Si, CN',

Comments: Mercury by CVAA if performed

404	eres .
749	37
-DC #:	SDG #:

Matrix Spike/Matrix Spike Duplicates VALIDATION FINDINGS WORKSHEET

an e 22 đ Page: Reviewer: 2nd Reviewer:

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

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

YN NA YN NA

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.

Were all duplicate sample relative percent differences (RPD) \leq 20% for water samples and \leq 35% for soil samples? Y N NA Wer LEVEL IV ONLY: Y N NA Wer

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

I			Ι	Γ	Τ	Τ	Т	Τ	Т	Т	Т	Т	T	Т	T	Т	T	T	Т	Т	T	T	٦
	Qualifications	J-/47/4 (m)																					
	Associated Samples																						
	RPD (Limits)																						
USN	%Recovery	10	69																				
MS	%Recovery	13																					
	Analyte	A5	کر ا																				
	Matrix	¢\$																					
	DI DSW/SW	8/9																					
L	*								_								-	┥	\neg	-+	\dashv	-	

MSD.4S2

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-11BDISSMSD 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.
- 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. 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	Flag	A or P	
All samples in SDG 8304619	All analytes reported below the PQL.	J (all detects)	А

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:

	Concentra	ition (ug/L)		D://			
Analyte	M-11B	M-11009B	(Limits)	Limits)	Flags	A or P	
Arsenic	220	220	0 (≤30)	-	-	-	

	Concentra	ation (ug/L)		Difference		A or P
Analyte	M-11BDISS	M-11009BDISS	(Limits)	(Limits)	Flags	
Arsenic	190	200	5 (≤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

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: 8304619 Laboratory: Test America

21494S4

LDC #:

Date: <u>7//4/</u> Page: of Reviewer: <u></u> 2nd Reviewer: <u></u>

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
Ι.	Technical holding times	A	Sampling dates: 71>71~ 9
11.	ICP/MS Tune	Å	/
III.	Calibration	Å	
۱V.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	2mg/msp
VII.	Duplicate Sample Analysis	N	
VIII.	Laboratory Control Samples (LCS)	A	LUY
IX.	Internal Standard (ICP-MS)	Ň	Not benievel
Х.	Furnace Atomic Absorption QC	N	but which is
XI.	ICP Serial Dilution	A	ų –
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	Sul	(1,3)(74)
xv	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	M-11B	11	MB	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 #:_> SDG #:___

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page:_	<u></u>
Reviewer:	\sim
2nd reviewer:	oma

All circled elements are applicable to each sample.

		Tornat Anglida Liat (TAL)
Sample ID		AL SE AD RO CO CO CO CO CU ES PE MO MO HO NE K SA AO NA TI V ZO MO R SI CN
1-4	No	AI, SD, (AS) Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, FD, Mg, Mill, Hg, Ni, K, Oc, Ag, Na, TI, V, Zn, Mo, B, Si, CN,
		AI, SD, AS, BA, BE, CU, CA, CI, CO, CU, FE, PD, MG, MIL, HG, KI, K, CC, HG, HG, H, H, TE, MA, D, SI, CN,
~5-8	p	AI, Sb, Asj, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Min, Hg; Ni, K, Se, Ag, Na, T, V, Zi, Mo, B, Si, CN,
		Ai, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zh, Mb, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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, 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> </u>	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 Sh 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 Sh As Ba Be Cd Ca Cr Co Cu Fe Pb Ma Mn Ha Ni K Se Ag Na Ti V Zn Mo B Si CN',
	1	Analysis Method
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 ⁻ ,
		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#: <u>21494S4</u> SDG#: <u>See Cover</u>

VALIDATION FINDINGS WORKSHEET Field Duplicates



METHOD: Metals (EPA Method 6020)

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

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

	Concentration (ug/L)		(≤30)	(ug/L)	(ug/L)	Qualifications
Compound	2	4	RPD	Difference	Limits	(Parent Only)
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	В	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

V:\LOGIN\TRONOXNG\21494V4.TR3

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.
- 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. 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:

Sample	Finding	Flag	A or P
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

SDG #: 8304622 Laboratory: Test America

21494V4

LDC #:

Date: <u>9 /14/</u> Page: <u>1</u> of <u>1</u> Reviewer: <u>7</u> 2nd Reviewer: <u>77</u>

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
Ι.	Technical holding times	A	Sampling dates: 8/3/59 - 8/4/09
II.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	A-	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A) ms/1930
VII.	Duplicate Sample Analysis	N.) /····
VIII.	Laboratory Control Samples (LCS)	A	Ly
IX.	Internal Standard (ICP-MS)	Ń	Nit variewal
Х.	Furnace Atomic Absorption QC	N	1. t utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	r	
xv	Field Blanks	ND	FB=5

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	M-31AB	11	M-21BMSD	21	31	
2	M-31ABDISS	12	MB	22	 32	
3	M-50B	13	(, ,	23	 33	
4	M-21B	14		24	34	
5	FB080409 GW	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:

LDC #: 214 SDG #: 50

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: _______ Reviewer: ______ 2nd reviewer: ______

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
15	AQ	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,
~6-11	Æ	Al, Sb, 🔄 Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, 🥱, 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, 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, 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, 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, Tl, V, Zn, Mo, B, Si, CN ⁻ ,
		Analysis Method
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

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

Organophosphorus Pesticides



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.
- 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.

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)	Ρ
6/1/09	010F1001	2	Naled	35.8	All samples in SDG 8304601	J- (all detects) UJ (all non-detects)	Ρ

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 bank. No organophosphorus pesticide contaminants were found in this blank.

Sample FB060309-SO (from SDG 8304603) 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

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)	Ρ	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

SDG #: 8304601 Laboratory: Test America

LDC #: 21494A17

Stage 2B

	Date:	9/10/09
	Page:	1 of
	Reviewer:	JVG
2nd	Reviewer:	h
		7

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
lla.	Initial calibration	Ă	r> % RSD
lib.	Calibration verification/ICV	SW	$CCN/ICN \neq 20^{2}$
111.	Blanks	A	
IVa.	Surrogate recovery	Â	
IVb.	Matrix spike/Matrix spike duplicates	Ň	Client spec
IVc.	Laboratory control samples	A	LCS/p
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	
Χ.	Field blanks	ND	$EB = 1 \overrightarrow{FB} \overrightarrow{FB} = F$

Note:

Validated Samples:

A = Acceptable N = Not provided/applicable ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

from 8304603

SW = See worksheet

Water EB052709 MC-45B M-127B 9153088 MBS

Notes:__

HPLC	
/ GC	
METHOD:	

VALIDATION FINDINGS WORKSHEET

8141(con't) 8021B	othion V. Benzene	CC. Toluene	EE. Ethyl Benzene	os-methyl SSS. O-Xylene	phos RRR. MP-Xylene	nion GG. Total Xylene	oronate	lorinate	ralın				shlorvinphos	S	Thionazin	Phosmet	0.00-Triethylphosphorothioate	Famphur	Carbo pheno thion	Carbo phenothion - methyl	
8141	chlorvos V. Fensulf	vinphos W. Bolstar	ameton-O X. EPN	imeton-S Y. Azinpho	hoprop Z. Coumar	iled AA. Parath	ulfotep BB. Trichle	orate CC. Trichi	nethoate DD. Triflur	azinon EE. Def	sulfoton FF. Prowl	arathion-methyl GG. Ethior	onnel HH. Tetrac	alathion II. Sulprofe	hlorpyrifos J.	enthion kk,	arathion-ethyl LL .	richloronate M.M.	terphos N.N.	trofos 00.	okuthion
8151	A. 2,4-D A. Dio	B. 2,4-DB B. Me	C. 2,4,5-T C. De	D. 2,4,5-TP D. De	E. Dinoseb E. Etl	F. Na	G. Dicamba G. Su	H. Dalapon H. Ph	I. MCPP	J. MCPA	K. Pentachiorophenol K. Dis	L 2,4,5-TP (silvex)	M. Silvex M. R	W.V.	0.0	P. F.	Q. P	R. T	S. M	T. St	U. To
8330	A. HMX	B. RDX	C. 1,3,5-Trinitrobenzene	D. 1,3-Dinitrobenzene	E. Tetryl	F. Nitrobenzene	G. 2.4.6-Trinitrotoluene	H. 4-Amino-2,6-dinitrotoluene	I. 2-Amino-4,6-dinitrotoluene	J. 2,4-Dinitrotolune	K. 2,6-Dinitrotoluene	L. 2-Nitrotoluene	M. 3-Nitrotoluene	N. 4-Nitrotoiuene	o.	a.	ø		:		
8310	A. Acenaphthene	B. Acenaphthylene	C. Anthracene	D. Benzo(a)anthracene	E. Benzo(a)pyrene	F. Benzo(b)fluoranthene	G. Benzo(g,h,i)perylene	H. Benzo(k)fluoranthene	l. Chrysene	J. Dibenz(a,h)anthracene	K. Fluoranthene	L. Fluorene	M. Indeno(1,2,3-cd)pyrene	N. Naphthalene	O. Phenanthrene	P. Pyrene	Ġ.	Ľ.	S.		

Notes:

7

cmpd_list.wpd

LDC #: 21494 A17 SDG #: 54 Corey

METHOD: __GC __ HPLC

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**

NG A Page: 1 of Reviewer:___

2nd Reviewer:

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

Were continuing calibration standards analyzed at the required frequencies? 20 Did the continuing calibration standards meet the %D / RPD validation criteria of 515.0%? What type of continuing calibration calculation was performed? __%D or __RPD <u>X_N_NAA</u> Were continuing calibration standards analyzed at the required frequencies?

Level IV Only Y N N/A Y N'NIA

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

	7					<u> </u>				()		F T	r	<u> </u>										
Qualifications	3+ dets/p (c)	J-145/P	3-12/2	3+ 4+5/P	J- 143/P	3-1R/P			J- /45 /A	J+ 4+1/A													-	
Associated Samples	All + Blf										<u> </u>													LIN - Are 2
	() () () () () ((() ((<u> </u>	^	 ((() () () () () (((
خ 20 کے)RT (limit)))))))))		~)	 · · ·))))))))	
%D / RPD (Limit <-15:0)	1 78.00	29.0	78, 1	2236	35. g	84.0			25.6	24,1	21.3													
Compound	- C-(1)	[(-) ∃			£	-) (-)			<-> \	Ť Đ	7 4)													
Datactor/ Column	C.A. 1	-	4	Cal. 2						2														
Standard ID	10014010	(Joy)							0 23F 250 1	(ccv)														
Date	6/01/01								66561															
*																								

CONCALNew-gc.wpd

Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: June 1 through June 4, 2009

LDC Report Date: September 19, 2009

Matrix:

Parameters: Organophosphorus Pesticides

Soil

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.
- 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.

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)	Ρ
6/1/09	010F1001	2	Naled	35.8	All samples in SDG 8304602	J- (all detects) UJ (all non-detects)	Ρ

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 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. 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)	Р	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

Tr	onox Nort	hgate Hend	erson
VALIDATIO	ON COMPL	ETENESS	WORKSHEET

Stage 2B

LDC #: 21494B17 SDG #: 8304602

Laboratory: Test America

Date: <u>9/16 /6 q</u> Page: _1of__/ Reviewer: __<u>__</u> 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: 6/01 - 04/09
Ila.	Initial calibration	Á	70 RSD & 203 r~
lib.	Calibration verification/ICV	SW	COV/ 100 = 20 2
	Blanks	A	
IVa.	Surrogate recovery	Á.	
IVb.	Matrix spike/Matrix spike duplicates	À	
IVc.	Laboratory control samples	A	lls
V.	Target compound identification	Ň	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
Х.	Field blanks	ND	FB = FB072109-50 from 8304616

Note:

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

Soil

ND = No compounds detected R = Rinsate FB = Field blank D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

* 1	RSAI2-0.58-	11	9166561 MBB	21	31	
2	RSAM3-0.5B	12	· ·	22	32	
3	RSAM2-0.5B	13		23	33	
4	RSAJ3-0.5B	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	<u> </u>	30	40	

Notes: (#1 Not Validated per list)

METHOD: CGC HPLC

VALIDATION FINDINGS WORKSHEET

8310 A. Acenaphthene B. Acenaphthylene C. Anthracene D. Benzo(a)anthracene	8330 A. HMX B. RDX C. 1,3,5-Trinitrobenzene D. 1,3-Dinitrobenzene	8151 A. 2,4-D B. 2,4-DB C. 2,4,5-T D. 2,4,5-TP	8141 A. Dichlorvos B. Mevinphos C. Demeton-O D. Demeton-S	8141(Con't) V. Fensulfothion W. Boistar X. EPN Y. Azinphos-methyl	8021B V. Benzene CC. Toluene EE. Ethyl Benzene SSS. O-Xylene
E. Benzo(a)pyrene F. Benzo(b)fluoranthene G. Benzo(g,h,l)perylene	E. Tetryl F. Nitrobenzene G. 2.4.6-Trinitrotoluene	E. Dinoseb F. Dichlorprop G. Dicamba	E. Ethoprop F. Naled G. Sulfotep	Z. Coumaphos AA. Parathion BB. Trichloronate	RRR. MP-Xylene GG. Total Xylene
H. Benzo(k)fluoranthene I. Chrysene J. Dibenz(a,h)anthracene	H. 4-Amino-2,6-dinitrotoluene I. 2-Amino-4,6-dinitrotoluene J. 2,4-Dinitrotolune	H. Dalapon I. MCPP J. MCPA	H. Phorate I. Dimethoate J. Dlazinon	CC. Trichlorinate DD. Trifturalin EE. Def	
K. Fluoranthene L. Fluorene M. Indeno(1,2,3-cd)pyrene	.K. 2,6-Dinitrotoluene L. 2-Nitrotoluene M. 3-Nitrotoluene	K. Pentachiorophenol L 2,4,5-TP (silvex) M. Silvex	K. Disulfoton L. Parathion-methyl M. Ronnel	FF. Prowl GG. Ethion HH. Tetrachlorvinphos	
N. Naphthalene O. Phenanthrene P. Pyrene	N. 4-Nitrotoluene O. P.		N. Malathion O. Chiorpyrifos P. Fenthion	ll. Sulprofos JJ. Thionazin kk. Phosmet	
0 2 0	σ		 Q. Parathion-ethyl R. Trichloronate S. Merphos 	LL. 0.0.0-Tricthylph MM. Famphur	osphorothioate
			T. Stirofos U. Tokuthion	00. Carbophenott	1001 1 en - methyl

Notes:

cmpd_list.wpd

LDC # 21494 \$ 17 SDG #: Sec Com METHOD: __GC __ HPLC

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**

2nd Reviewer:__

Reviewer: JVC Page: 1 of

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

Did the continuing calibration standards meet the %D / RPD validation criteria of <20.0%?

<u>Y N N/A</u> <u>Y N N/A</u> Level JV Only

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

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit <u>< 45.0)</u>	20 Z) RT (limit)	Associated Samp	les	Qualifications
	6 61 69	010 1 1001	 تع	(+) - - (+)	178.6	()	411 + Bik		8-4-4-4-5 /1 (C)
		(MO	-	ن بل	29,0	()			J-/43/P
				ુ વ	78.1-	()			art ar
			Ce1.2	Ce) Ce)	223.9	()			
				E) E	35.8	()			J-147 1P
			-	ې د ل	89.0	(0 27474
						(
						(
	610109	05155101	CM	(+) V	24.2				J+ dets /A
		(ccv)		4	28.2	(5-145 /A
				ج ج	26.8)			
				<u> </u>	30.9	(Jt dets 1A
			Cal. 2	F (-)	49.0	()			2- /NJ /A
				(t) X	35.3	(J+ 005 A V
						(
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)			
						(
						(

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Revision 1

LDC Report# 21494C17

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

Organophosphorus Pesticides

LDC Report Date:

October 6, 2009

Matrix:

Water

Parameters:

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-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)	Р

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 (r²) 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

Revision 1

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:

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Revision 1

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)	Ρ
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 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

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)	Ρ	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)	Ρ	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

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VALIDATION	COMPLETENESS	WORKSHEET

LDC #: 21494C17 V SDG #: 8304603 Laboratory: <u>Test America</u>

Stage 2B

Date: 9/10/09
Page:of
Reviewer: 3/6
2nd Reviewer:
y

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	
١.	Technical holding times	WZ	Sampling dates: 6/02-01-05/09	
lla.	Initial calibration	A	3 RSD 6 20 3 rr	
lib.	Calibration verification/ICV	SW	CN/1W = 20 3	
til.	Blanks	A		
IVa.	Surrogate recovery	A		
IVb.	Matrix spike/Matrix spike duplicates	N	Client spec (insufficient sample	e)
IVc.	Laboratory control samples	SW	LCS /p	
V.	Target compound identification	N		
VI.	Compound Quantitation and CRQLs	N		
VII.	System Performance	N		
VIII.	Overall assessment of data	SM		
IX.	Field duplicates	ND	$D_1 = 4, 5$ $D_2 = 6, 8$ $D_7 = 7, 0$	
Χ.	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:

valiua	teo Gamplea.	Water					
1 1	M-7BB		111	9159499	MB	21	31
27	M-5AB		12 7	9160222	MЪ	22	32
3 7	FB060309		13 3	9159433	MB	23	33
4 r	M-23B	D,	14 4	9167134	MB	24	34
5 7	M-23009B	b,	15			25	35
6 3	PC-40B	Dr	16			26	36
74	PC-40BRE	D,	17			27	37
83	PC-4009B	I _r	18			28	38
9 4	PC-4009BRE	<i>I</i> 3	19			29	39
10			20			30	40

Notes:

METHOD: CGC HPLC

VALIDATION FINDINGS WORKSHEET

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-Trinktrobenzene	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,l)perylene	G. 2.4.6-Trinitrotoluene	G. Dicemba	G. Sulfotep	BB. Trichloronate	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Trichlorinate	
l. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Triffuralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotolune	J. MCPA	J. Diazinon	EE. Def	-
K. Fluoranthene	K. 2,6-Dinitrotofuene	K. Pentachiorophenoi	K. Disulfoton	FF. Prowl	
L. Fluorene	L. 2-Nitrotoiuene	L 2,4,5-TP (silvex)	L. Parathion-methyl	GG. Ethion	
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnet	HH. Tetrachlorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	ll. Suiprofos	
O. Phenanthrene	0.		O. Chlorpyrifos	JJ. Thiongzin	
P. Pyrene	P.		P. Fenthion	kk. Phosmet	
Ġ	a		Q. Parathion-ethyl	LL. O.O.o. Triethylph	osphorothiogte
R.			R. Trichloronate	MM. Famphur	
S.			S. Merphos	NN. Carbophenot	hon
			T. Stirofos	00. Carbophenot	hlen - methyl
	× -		U. Tokuthion		

Notes:

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Sec com 21494 617 SDG #: LDC #:

VALIDATION FINDINGS WORKSHEET **Technical Holding Times**

20 Page: 1 of Reviewer: 2nd Reviewer:

All circled dates have exceeded the technical holding times.

	Qualifier	J-JR/P (h	-								
	Total # of Days	لم									
	Analysis date	6/17/09	/								
	Extraction date	6/11/09									
	Sampling Date	6/01/2									
U U	Preserved	N									
GC HPI	Matrix	M									
	Sample ID	6 2	,								

TECHNICAL HOLDING TIME CRITERIA VOLATILES:

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

Water: **EXTRACTABLES:**

Soil:

Soils:

Extracted within 7 days, analyzed within 40 days. Extracted within 14 days, analyzed within 40 days.

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SDG #: Sec Conr LDC #: 2)444

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".

Did the continuing calibration standards meet the %D / RPD validation criteria of <20.0%? Y W NIA

Level JV-Only

Were the retention times for all calibrated compounds within their respective acceptance windows? Y N(NA

r Date Summer Summer of the Summer Compound Wu RPD ($\frac{2}{4}$, 2), RT (fmi); Amonine Quantifications Quatifications Quatifications Quatifications Quatifications Quatifications Quatifications Quatididity Quatifications		5	F				—	F	 	F	—	-	<u> </u>		F								<u> </u>		-	\vdash	\rightarrow
a Data Studied ID Denetion (100) Compound (100) Compound (100) Compound (100) Compound (100) Call P (100) Associated Samples I I I F C 23,0 F C 1 Associated Samples I I Coll I E C 23,0 C 1 1 Associated Samples I C C,1 E C 23,2 C 1 <td>Qualifications</td> <td>) 4/ Jet 2</td> <td>9 / CN / - 1,</td> <td>2-7R7P</td> <td>- dy share to</td> <td>d/ 14/-5</td> <td>B-JR JP-</td> <td></td> <td></td> <td>J+ 11-1-1-4</td> <td></td> <td></td> <td></td> <td>></td> <td></td> <td>J-145 12</td> <td>J+ dits A</td> <td>J-147 18</td> <td>J+ Acts 1A</td> <td>J-MT/A</td> <td></td> <td></td> <td>3- 1451 A</td> <td><u>,</u></td> <td>I+ 414 1</td> <td>2-14 A</td> <td>7+ 414 /4</td>	Qualifications) 4/ Jet 2	9 / CN / - 1,	2-7R7P	- dy share to	d/ 14/-5	B-JR JP-			J+ 11-1-1-4				>		J-145 12	J+ dits A	J-147 18	J+ Acts 1A	J-MT/A			3- 1451 A	<u>,</u>	I+ 414 1	2-14 A	7+ 414 /4
# Date of ID Detector Control Control : 4500 ($\frac{2}{2}$ 2) RT (limit) 1 1 2 2 2 1 1 1 1 1 2 3 2 7 7 1 1 1 1 2 7 2 7 1 1 1 1 2 2 7 2 7 1	Associated Samples	All + Blks					1			-5.9159499 Mb	9160222 MB			~		. 8 9159433 MB				~			7, 9 9167134 MB			(222 20 p 3 ABA)/	
# Data Standard ID Denoteriot compound Compound (unit :=4507 f=22) RT (limit) 1 1 0.10 F 1001 CAI 1 E (-) 29.0 (-) 1 29.0 (-) 1 29.0 (-) 1 20.0 (-) 1 24.0 (-) 1 24.0 (-) 1 24.0 (-) <) () () () ()) () (((~	(5 1 (() ((([(_		
* Date Standard ID Detector/ Column Compound 'WD Reserved (Imm 5-4401 * $6/61/61$ $010F1001$ $CA1$ F $7-3$ $2-4.0$ * $6/61/61$ $010F1001$ $CA1$ F $7-3$ $2-4.0$ 78.1 * $6/62/61$ $014F1401$ $CA1$ F $7-3$ 35.8 * $6/62/61$ $014F1401$ $CA1$ F $7-3$ 36.7 * $6/62/61$ $014F1401$ $CA1$ F $7-3$ 26.2 * $6/62/601$ $CA1$ F $7-3$ 26.2 * $6/62/601$ $CA1$ F $7-3$ 26.2 * $6/1-7/64$ $603F0301$ $C-1$ A $7-3$ 26.2 * $6/1-7/64$ $603F0301$ $C-1$ A $7-3$ 26.2 * $6/1-7/64$ $603F0301$ $C-1$ A $7-3$ $27-3$ * <	🗲 20 2) RT (limit)	.))))))))))))))))))))	~)		
*DateStandard IDDetectedCompound $\zeta \land \land \land \land \land$ $\zeta \land \land \land \land \land$ $\zeta \land \land \land \land \land$ $\zeta \land	%D / RPD (Limit <u>< 45:0)</u>	178.0	29,0	78.1	p 225	35.8	- 89.0			51.2	26.2	60,9	31.0			34.2	34.0	29.3	45.1	21.6			29.1	20.2	42,3	и 44 7 ч	~~~
#DateStandard IDDatectori Column6 / 61 / 64 $010 F 1001$ CH. 16 / 64 / 64 $010 F 1001$ CH. 26 / 64 / 64 $014 F 1401$ CH. 26 / 64 / 64 $014 F 1401$ CH. 26 / 7 / 64 $014 F 1401$ CH. 26 / 7 / 64 $014 F 1401$ CH. 26 / 7 / 64 $003 F 0301$ CH. 26 / 17 / 64 $003 F 0301$ CH. 26 / 17 / 64 $003 F 0301$ CH. 26 / 17 / 64 $003 F 0301$ CH. 26 / 17 / 64 $003 F 0301$ CH. 26 / 17 / 64 $003 F 0301$ CH. 26 / 17 / 64 $003 F 0301$ CH. 26 / 17 / 64 $003 F 0301$ CH. 36 / 17 / 64 $003 F 0301$ CH. 36 / 17 / 64 $002 F 0301$ CH. 36 / 17 / 64 $002 F 0301$ CH. 36 / 17 / 64 $002 F 0301$ CH. 36 / 17 / 64 $002 F 0301$ CH. 36 / 17 / 64 $002 F 0301$ CH. 36 / 17 / 64 $002 F 0301$ CH. 36 / 17 / 64 $002 F 0301$ CH. 36 / 17 / 64 $002 F 0301$ CH. 36 / 17 / 64 $002 F 0301$ CH. 36 / 17 / 64 $002 F 0301$ CH. 36 / 17 / 64 $002 F 0301$ CH. 36 / 17 / 7 $002 F 0301$ CH. 37 $002 F 0301$ CH. 37 $002 F 0301$ CH. 3	Compound	c (+)	F (-)	 () 	6-65	F C-)	رت) (t (+).	(+) کر ا	F (+)	λ () (A G	t €J	A CĴ	F (+)́	(-) 8g			A (-)	ل ه ج	F (+)	€ E E	
#DateStandard ID \mathcal{L} \mathcal{L} \mathcal{D} \mathcal{D} \mathcal{L} \mathcal{L} \mathcal{D} \mathcal{D} \mathcal{L} \mathcal{L} \mathcal{D} \mathcal{L} \mathcal{L} \mathcal{L} \mathcal{D} \mathcal{L}	Detector/ Column	CH. 1	1	-	Col. 2		1			C.H. 1		CH. 2				Cal.1		Cel 2					crt, 1		->	(m) ~	
* Date * 6 /61 /64 6 /62 /09 6 /17 /09 6 /17 /09	Standard ID	DIO F 100]	(vol)	~						014 F 140 1	(con)					003F0301	(cen)						007 FON1				
72	Date	6 101 101								6/2/09						6/12/09							6/17 109				
المصداب والمستقد متعادي والمستقد	74																										
		072		and the second								ليعنويوني					⁴					••••••••••••••••••••••••••••••••••••••					

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Page: 1 of 1 Reviewer: JVC

2nd Reviewer:

Q

SPE CONNY LDC #: 21 494C 17 SDG #:

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

A Page: 1 of Reviewer:______2nd Reviewer:_____

METHOD: _GC __HPLC

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? Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits? ANNIA Y NNIA

Level IVID Only <u>Y N(N/A)</u> Was an LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

[، ب	; ` \	T	T				<u> </u>		T			r			.				<u> </u>	<u> </u>	r –		F
Qualifications	No ANAL IL	_		1																				
Associated Samples	6.8.9159433MB	-		7																				
RPD (Limits)	(, ,	1 82) 62	39 (36)	()	()	~	~				()	()	(_,)	() (()	(-	()	()	()	()	
LCSD %R (Limits)	(zc1-6) 25	52 (53-137)	()	(5(1-07) 25	()	()	~			()	()		(,, ,),	(): 			()	(·)	(" ") »	()	()	()	()	,
LCS %R (Limits)		()	()	()	()	(()	1 ()	()	()	()		()	()	() .		()	()	(()	{ }	()	()	
Compound	4	N	7	8.B													•							
LCS/LCSD ID	915 ad3 > LCS/D																							
=																								

LCSNew.wpd

LDC #: 21444 C17 SDG #: 5rc 6.

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

R Page: 1 of Reviewer: 2nd Reviewer:

METHOD: CGC 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.

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

J				-
#	Sample # . Gompound Name	Finding	Associated Samples	Qualifications
	7 9	But side H.T.		XXX (0)
Comr	ments:			

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Revision 1

LDC Report# 21494D17

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 6, 2009

Matrix:

Parameters: Organophosphorus Pesticides

Water

Validation Level: Stage 2B

Laboratory:

TestAmerica, Inc.

Sample Delivery Group (SDG): 8304604

Sample Identification

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

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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.
- 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

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

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

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 (r²) 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)	Ρ
6/23/09	010F1001	1	Naled	43.3	M-44BRE 9170431MB	J- (all detects) UJ (all non-detects)	Ρ

Revision 1

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)	Ρ
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)	Ρ
6/26/09	010F1001	2	Naled	47.6	M-6AB M-142B 9168145MB	J- (all detects) UJ (all non-detects)	Р

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 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 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)	Р
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

*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 8304604

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304604	M-44BRE	All TCL compounds	J- (all detects) UJ (all non-detects)	А	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)	Р	Continuing calibration (ICV %D) (c)
8304604	M-44BRE	Naled Malathion Merphos	J- (all detects) UJ (all non-detects)	Ρ	Continuing calibration (ICV %D) (c)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
8304604	M-6AB M-142B	Naled Disulfoton	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	Ρ	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

LDC #: 21494D17

SDG #: 8304604 Laboratory: Test America Stage 2B

Date:	10/09
Page:_	<u>1 of /</u>
Reviewer:	SVG
2nd Reviewer:	9
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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
<u> </u>	Technical holding times	SN)	Sampling dates: 6/08 - 12/09
lla.	Initial calibration	A	70 RSD 6 202 rx
IIb.	Calibration verification/ICV	SW	CON / ON \$ 20 Z
111.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	N	Client spec (insufficient unl.)
IVc.	Laboratory control samples	SW	us to
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	
Х.	Field blanks	ND	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: WKTer

1	M-44B	17 1 910	62333 MB	21	31	
2 7	-M-44BRE	12 7 91	70431 MB	22	32	
33	M-6AB	1339	168145 MB	23	 33	
4 4	M-6ABRE	14 4 9	181507 MB	24	 34	
5 3	M-142B	15 9	я [.]	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: CG HPLC

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		المراجع			
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. Boistar	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	С. 2,4,5-Т	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-methyi	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. Nated	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	
l. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotolune	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. Slivex	M. Ronnet	HH. Tetrachlorvinphos	
N. Naphthalene	N. 4-Nitrotoluene	•	N. Maiathion	.II. Sulprofos	
O. Phenanthrene	0.		0. Chiorpyrifos	JJ. Thionazin	
P. Pyrene	Ŀ.		P. Fenthion	kk, Phosmet	
Ġ	Ø		Q. Parathion-ethyi	LL. 0.00-Tricthylph	os phoro this ate
			R. Trichloronate	MM. Famphur	
is.			S. Merphos	NN. Carbophenot	ион
		-	T. Stirofos	00. Carbo pheno H	ien - methy/
	•		U. Tokuthion		
Notes:					-

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VALIDATION FINDINGS WORKSHEET **Technical Holding Times**

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

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

	Qualifier	5- /45 /A (h	J- /R /A						
	Total # of Days	1	50						
	Analysis date	60/ 22/9	710269						
	Extraction date	619 109	50/02/9						
	Sampling Date	6108109	6 Ko 69						
LC LC	Preserved	N -						 	
<u>GC</u> HF	Matrix	M)							
METHOD:	Sample ID	2,33	4						

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

Water: Soil: EXTRACTABLES:

Extracted within 7 days, analyzed within 40 days. Extracted within 14 days, analyzed within 40 days.

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LDC #: 21444 DI7 SDG #: Sec Conc

VALIDATION FINDINGS WORKSHEET

Continuing Calibration

METHOD: ____GC ___ HPLC

Did the continuing calibration standards meet the %D/RPD validation criteria of $\leq 20.0\%$? Y W NIA Level IV-Only Y N NIA

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

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				at along the	J-/47 /P				C+ Mar/B	3-145 10	-4×4-1	J+MAR 18-	J-/44/p	F-1810	J-/MT/D				J- /17 /A		T + Aott 2	A-747-2	J+ dr.tr. /		
Accordated Semular		1 1162222#1D							2. 9170431 MB										1. 916 2333 MB				>		(104 - Ave 720)
						((<u> </u>		 ^								(((
2) RT (limit)		, , , ,			~)	~	~		•		~	•		_))	~	,))))	
1/20 / RPD	- V	29 0	784	223.9	35.8	39.0-			124.8	43.3	85.7.	244.6	43.3	- 99:6-	25.8	24.4			1,95	20,2	42,3	24.7	50.2		e tre an Reference
Compound		, £	(<u>)</u> (C C+	∓ دَرُ	B-C3			<u>(9)</u>	(-) d	1 (-) - d	C-C+D	F G	ا رى م	N C-J N	رت ک			4 C-5 A	B (-)	F (r)	♦ €	£ 4		t segn
Detector/ Column	CH -			Col. 2		->			Cal. 1	-	>	CH.2				~			CF.]			24,2			
Standard ID	010 1001	C MOJ							0107 1001	(MU)									003F0361	(ca)	× .				
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Page: 1 of 3 Reviewer: JVC

2nd Reviewer:

LDC #: 21494 DI7 5 F SDG #: GC HPLC

METHOD:

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**

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Page: 2 of 2 Reviewer: No

4 2nd Reviewer:

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? \checkmark D or RPD V N/N Were continuing calibration standards analyzed at the required frequencies? $2 \circ$ V N/N/A Did the continuing calibration standards meet the %D / RPD validation criteria of $\le 15.0\%$?

Y N N/A Y N N/A Javel IV Only

N/N/K

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

			Detector/							
*	Date	Standard ID	Column	Compound	(Limit < 15.01 42	6ζ) RT (limit)	Associated Sa	mpies	Qualifications	
	6 24 ba	027 F2701	Cal. 1	(t >	21.7		2 9170431	AB.	0+107 V	122
	1	(ea)	Cut. 2	A (-)	24.9				J. /45 / A	-
				5 55	22.7					T
				(-) L	24.6					
				(-) (23,1					1
				(-) 0	21.3					
				P (-)	20.9					-
				U C-) M	21.5					
				(-) T	21, 2)				-
				MM E)	25,0	;				
				γ (-)	25.8)				
			J	Z F)	26.1					
										-
	6/26/09	10012 01a	c. 1	C (1)	187.8.		3-5 9168145 M	æ	OF RIK 70	÷ • •
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METHOD:

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Reviewer: JV6

2nd Reviewer:

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 $\leq 46.0\%$?

Y NNA Wer Y NNA Did Level JY Only

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

			<u> </u>			-											1	_						r
	Qualifications	3t dets/A (c	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	J-/WJ /A		J+ Acts/A	J-/NJ/A	1,	J+ Arts /A															
	Associated Samples	4 9181513 MB																						
	RT (limit)	()) () (()) () (()		()	. (()	()) (()) (()))	()) ((()	
VD / RPD	(Limit ≤ 15.0)	21.2	25.2	1.15	45.9	28.9	49.7	44.0	21.2														-	
	Compound	(+) +	(+) 4	(-) ¥	(-) E	(÷) ⊒	(-) I	(-) V	Cto X															
Datactor	Column	- 3		CH.X	_											^								
	Standard ID	00370301												{										
	Date	7/62/69																						
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VALIDATION FINDINDS WORKSHEET Surrogate Recovery

2nd Reviewer: Page: / of_ Reviewer:

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".

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*	Sample ID	92	hector/ olumn	Surrogate Compound	2	%R (Limits)				Qualif	lcations	1
E	9162333 MR	+on	specified	×		45 (60-1	1 725	レイト	٩	(s)	
				N	цу Т	9.4	49-	121)	-			
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	Surrodata Compou	pur	Sun	ogate Compound	3, 1 	Surrogate Compound		Surrogate (Sompound			H
	Chlorobenzene (CBZ	2	0	Octacosane	Σ	Benzo(e)Pyrene	s	1-Chlaro-3-h	litrobenzene	>	Tetrachloro-m- xyiene	
"	4-Bromofluorobenzene ((BFB)	Ŧ	Ortho-Terphenyl	N	Terphenyl-D14	۲	3,4-Dinitr	otaluene	N	Chlormetos	
	Triffinomholisan			uorobenzene (FBZ)	0	Decachlorobiphenyl (DCB)	D	Triper	tyttin	╉		
<u> </u>	Rimmochlarobenene			n-Triacontane	۵.	1-methvinaphthalene	>	Tri-n-pr	opytin	╉		
1"	1.4-Dichlorobutane			Hexecosane	σ	Dichlorophenyl Acetic Acid (DCAA)	3	Tributyl P	hosphate	┨		
1 u	1.4-Diffuorobenzene (D	DFB)		Bromobenzene	~	4-Nitrophenol	×	Triphenvi f	Phosphate	_		H

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LDC #: 21494 DI7 SDG #: Ju Car METHOD: __ GC __ HPLC

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

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Reviewer: Page:

Plaase 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? Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits? A N/A

>

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

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Qualifications	No SULAR CLI																							
Associated Samples	1. 9162333 MB																							
RPD (Limits)	(()	^ >	^ ,	()	~)	()	()	()	(()	(()	()	()	()	()	()	())	
LCSD %R (Limits)	(,)	~	-	~	()	())	(()) (()	()	()	()	()		()	():	()	()	()	()	()	
LCS %R (Limits)	58 (63-128)	~	(()	()	()		()		()	- (.)	()	()	()		()	()	()	().	()	(·)	()	
Compound	<u>م</u>																							
rcs/rcsp iD	9162335 4551																							
71:																								

LCSNew.wpd

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LDC # 21 494 by SDG # <u>Su</u> Curry

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

Page:

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.

(YNN/A) Was the overall quality and usability of the data acceptable?

#	Sawple 1D Compound Name	Finding	Associated Samples	Oualifications
	2, 4	Outride H.T.		X K/A (0)
	-			
Com	ments:			

OVRNew.wpd

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.
- 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.

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)	Ρ
6/1/09	010F1001	2	Naled	35.8	All samples in SDG 8304605	J- (all detects) UJ (all non-detects)	Ρ

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 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

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)	Ρ	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

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Stage 2B

SDG #: 8304605 Laboratory: Test America

LDC #: 21494E17

Date: 9/11/09 Page: 1 of] Reviewer: 3V2 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
Ι.	Technical holding times	A	Sampling dates: 6/10-11/09
lla.	Initial calibration	A	2 LSD = 202 rr
llb.	Calibration verification/ICV	SN	COV/101 = 20 }
.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	RSAM2-0.5B (from 8304607)
IVc.	Laboratory control samples	A	us
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	
Х.	Field blanks	ND	FB = FB072109-SO (from 8304616)

Note:

A = Acceptable N = Not provided/applicable ND = No compounds detected D = Duplicate

EB = Equipment blank

R = Rinsate TB = Trip blank

FB = Field blank

SW = See worksheet

Validated Samples:

vallua	Soi)					
1	SA35-0.5B	11		21	 31	
2	SA176-0.5B	12		22	32	
4 3	SA166-0.5B	13		23	33	
4	SA182-0.5B	14	2	24	34	
	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:

HPLC	
GC	
METHOD:	•

VALIDATION FINDINGS WORKSHEET

8310	0220				
01.00	8330	8151	8141	8141(con't)	8021B
. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensulfothion	V. Benzene
. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Boistar	CC Toliner
. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X. EPN	EE. Ethyl Benzene
. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	Y. Azinphos-methyl	SSS. O-Xvlene
. Benzo(a)pyrene	E. Tetryl	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. MP-Xviene
. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total Xviene
i. Benzo(g,h,i)perylene	G. 2.4.6-Trinitrotoluene	G. Dicamba	G. Sulfotep	BB. Trichloronate	
. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Trichlorinate	
Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	1. Dimethoate	DD. Trifturalin	
Dibenz(a,ħ)anthracene	J. 2,4-Dinitrotolune	J. MCPA	J. Diazinon	EE. Def	
. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowl	
. Fluorene	L. 2-Nitrotoluene	L 2,4,5-TP (silvex)	L. Parathion-methyt	GG. Ethion	
. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel	HH. Tetrachiorvinphos	
. Naphthalene	N. 4-Nitrotoluene		N. Malathion	II. Sulprofos	
. Phenanthrene	0.		O. Chlorpyrlfos	11 741ATT	
. Pyrene	à		P. Fenthion	kk Photmet	
	ø		Q. Parathion-ethyl	LL. O. O. Triethuluh	rehand this at a
			R. Trichloronate	MM. Fomehur	216 0111 0101-100
			S. Merphos	NN. Carbo phenothi	50
			T. Stirofos	00. Carbo phene th	ion - methul
			U. Tokuthion		
otes:					

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LDC #: 21494 E17 SDG #: Sec Com METHOD: __GC __HPLC

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**

Reviewer: JVC Page: 1 of

2nd Reviewer:

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

Did the continuing calibration standards meet the %D / RPD validation criteria of <20.0%? What type of continuing calibration calculation was performed? <u>%</u>D or RPD <u>X N, N/A</u> Were continuing calibration standards analyzed at the required frequencies? X/M N/X

Level JV-Only Y (N/N/A

Y N(NA

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

<u> </u>			_	-		_				r	r	r	.			_			T	-			_		1
Qualifications	TH dels /P-(C)	1 9/ EN/-1	J-XK /P	3+ april 2	J-14319	3-1×2-				Jt dets 1A	J-1451A	J- MJ/A	5+ dets A	J-/45/A	5+017/A	•									
Associated Samples	A11 + B/K	_													$\boldsymbol{\mathcal{N}}$										Contraction of the second seco
(t)	() () () () () ((((() ((() ((((<u> </u>	() () () (
<u></u> ≰202) RT (lim)))))))))))))))	~)))		
%D / RPD (Limit ≤ 15.0)	178.6-	29.0	78.1	223.9	35.8	89.0				24.2	38,2	26.8	30.9	0.64	35,03										
Compound	(+) E(+)	F (-)	() -4	(+) J	(-) 上 し)	(cj d	1 1			(+) ¥	(<) ≠	(-) K	ζ ς γ	F G	(+) /	•									
Detector/ Column	CH. 1	1	1	Col.2						Col.				Co1.2											
Standard ID	010 F1001	CND								051 F5101	(ccn)														
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Revision 1

LDC Report# 21494F17

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

Organophosphorus Pesticides

LDC Report Date:

Matrix:

Parameters:

Validation Level:

Stage 2B

October 6, 2009

Soil

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 SA86-0.5BMSD

1

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.
- 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

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

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

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)	Ρ
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)	Ρ

Revision 1

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)	Ρ
6/26/09	010F1001	2	Naled	47.6	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)	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 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 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)	А

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)	Ρ

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)	Α

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	*Fiag	A or P
SA86-0.5B SA129-0.5B	Dimethoate	x	A
SA86-0.5BRE SA129-0.5BRE	All TCL compounds except Dimethoate	×	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 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)	Ρ	Continuing calibration (ICV %D) (c)
8304606	SA86-0.5B SA86-0.5BRE SA129-0.5B SA129-0.5BRE	Naled Disulfoton	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	Ρ	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)	Р	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)

Revision 1

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

Iron	ox Nortngate	Henderson
VALIDATION	COMPLETEN	VESS WORKSHEE

LDC #: 21494F17 SDG #: 8304606 Laboratory: Test America

Stage 2B

Date:	4/15/09
Page:	lof)
Reviewer:	JVY
2nd Reviewer:	P
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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
١.	Technical holding times	SW	Sampling dates: 6/16 - 19 /69
lla.	Initial calibration	A	2 kcp = 20 2 r2
llb.	Calibration verification/ICV	SW	contra = 20 D
111.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	SW	
IVc.	Laboratory control samples	SN	KS /þ
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	s₩	
IX.	Field duplicates	N	
<u>X.</u>	Field blanks	ND	FB = FB072109.50 from 8304616

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:

valida	Soj'	۰		
11	SA85-0.5B	11 9170419 MB	21	31
ž	SA92-0.5B	12 9175172 MB	22	32
37	SA86-0.5B	13 3 9189494 MB	23	33
+ 4 3	SA86-0.5BRE	14	24	34
4 7	SA129-0.5B	15	25	35
+ 6 3	SA129-0.5BRE	16	26	36
7	SA85-0.5BMS	17	27	37
8 1	SA85-0.5BMSD	18	28	38
97	SA86-0.5BMS	19	29	39
10	SA86-0.5BMSD	20	30	40

Notes:

HPLC ∕ gc METHOD:

VALIDATION FINDINGS WORKSHEET

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8310	8330	8151	(8141	8141(con't)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fanailfathion	
B. Acenaphthylene	B. RDX	B. 2.4-DB	B Maid-tra		V. Benzene
C. Anthracene	C. 1.3.5-Trinitrobenzene	C. 245.T	D. Mevinpnos	W. Bolstar	CC. Toluene
D. Benzo(a)anthracene		1-01-1-0-0	G. Demeton-O	X. EPN	EE. Ethyl Benzene
	u. 1,J-Dinirobenzene	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,l)perylene	G. 2.4.6-Trinitrotoluene	G. Dicamba	G. Sulfotep	BB. Trichloronate	
H. Benzo(k)fluoranthene	H. 4-Amino-2,8-dinitrotoluene	H. Dalapon	H. Phorate	CC. Trichiorinate	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	1. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene .	J. 2,4-Dinitrotoiune	J. MCPA	J. Diazinon	EE. Def	-
K. Fluoranthene	K. 2,8-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. Tetrachlorvinnhoe	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	I. Subrofoe	
O. Phenanthrene	ö		O. Chiorpyrifos	•	
P. Pyrene	ď		P. Fenthion	LL PLIONGZIN	
Ġ	a		G. Parathion-ethvi	12WSoul	-
.Ж			R. Trichloronate	0.0.0 - IM ETHUINH	se phoro this ate
S.			S. Merphos	WIN. TAMPANT	
			T. Stirofos	NN. LARBO PHEND TH	1 71
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LDC #: 21 494 F17 SDG # Su Ch

VALIDATION FINDINGS WORKSHEET Technical Holding Times

び Page: 1 of 2nd Reviewer: Reviewer:

All circled dates have exceeded the technical holding times.

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	Qualifier	や ちや-5		\									
	Total # of Days	00		6	•								
	Analysis date	7/2/2	-	1 1/2/69					•				
	(Extraction date)	7 68/09											
	Sampling Date	6 /18 /09		6 ha log									
PLC	Preserved	1 */	-	-19			-						
GC H	Matrix	S				•				 	 		
METHOD :	Sample ID	4		و							•		

TECHNICAL HOLDING TIME CRITERIA VOLATILES: Water unpreserved: Aromatic w Water preserved: Both within Soils: Both within EXTRACTABLES: Water: Extracted v Soil: Extracted v

Aromatic within 7 days, non-aromatic within 14 days of sample collection. Both within 14 days of sample collection. Both within 14 days of sample collection. Extracted within 7 days analyzed within 40 days

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Extracted within 7 days, analyzed within 40 days. Extracted within 14 days, analyzed within 40 days.

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LDC #: 31494 F17 Su lar SDG #:

METHOD: __GC __HPLC

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**

Page: of Y Reviewer: JVL Y 2nd Reviewer:

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 where continuing calibration standards analyzed at the required frequencies? -%D or _____RPD where continuing calibration standards analyzed at the required frequencies? -%D or _____RPD where continuing calibration standards meet the %D / RPD validation criteria of $\leq 15.0\%7$

Y N NIA Y N NIA Level W Only Y N NIA

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

		K.	1	T	T	I	T	T	l in the second s	Ī	T	T	1	1			I						
Qualifications	Island (C	5-14510	4/8/44	Errorato-	5-650	(ARA	4/21/-I				-tartate	J-/W/P		J-/4J/P	JANG 15/10	5-14512	-B-XA-B-		J- 15 ASA		->	J+ duts/A.	
Associated Samples	1 2,78. 9170419MB										3-69 10. 9175172MB.	9189494 MD					Ţ		3r5,910 9175172 MB	, , , + ⁻	3,5)	7	
2ω λ.) RT (limit)		()	())	(()))	()	()	()	()	()		(()	()	((
ompound (Limit ≤ 45.0) €	C (+) 174.8	≠ (~) _ 43.3	<u>h c) šs.7</u>	244.6	F(-) 43.3	<u>- 4. p - 1 (-) (t</u>	N(-) 25.8	S(-) 24.4			C (+) 1878	F(-) 40,)	$\mathcal{D}(\cdot) = \mathbb{S}^{2}$	K(-) 20.6	6-8) 215.0	- Ft - 1 - 47.6	- D () 85.2		 B (-) 22. 3	V (-) 22.9	Y (-) 25.4	<u>(, 72 (+)</u>	
Detector/ Column	C-P. 1	-		crt. 2							Cort.]			->	64.2	10			CH.	-			
Standard ID	10012010	(1er)									010F1001	(ml)							019F1901	(cor)			
# Date	6/42/2	~ /								•	60/95/3	-							 40/40/2	 , ,			

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LDC #: 21494 F17 La Cr SDG #: METHOD: CGC HPLC

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**

 $M(n) = \int_{-\infty}^{\infty} dx \, dx$ į,

Reviewer: JV Page: ~~

2nd Reviewer:

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 <45.0%? Y(N/N/A

Level IV Only

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

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Qualifications	J-Mr/4 6.	J+ dth.A	J-M5 A						3+ Acts A															
Associated Samples	3, 5, 9 10 7175172 MB					A			4.6. 9189494 MB															
- 2a レノ RT (limit)	()	()	(()	((()	()	()	(()	()	((()	(()	()	()	()	((()	(
%D / RPD (Limit ≤ 15.07 €	22'8	122°6	57.8	59,4	29.)	20.8			1,55.	24.7	X	¢.												
Compound	B 5-	É G	I I	رت ۲	(-) k	۲ ۲			(+) ₽	First First								•						
Detector/ Column	C1. Y]			cal.)	Carl. Y														
Standard ID	019 = 1901	(con)							00370301	(cm)														
# Date	1/2/60/2								13/61/4	1 1														

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LDC #: 21494 F17 SDG #: La love

VALIDATION FINDINDS WORKSHEET Surrogate Recovery

Page: 1 of 1 Reviewer:

METHOD: GC HPLC Are surrogates required by the method? Yes or No. Rease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

																					xylene					
	fications	A (Tetrachloro-m-					
	Qual	- /u]																			7					
		Ы																		Compound	-Nitrobenzene	trotoluene	entyttin	propyttin	Phosphate	Phosphate
		16))		()	(((((((((^	^	Surrogate	1-Chioro-3	3,4-Dini	Tripe	-Tri-n-	Tributy	Tripheny
		47 1																			s	F	Э	>	3	X
	%R (Limits)	> 82)								~)				Surrogate Compound	Benzo(e)Pyrene	Terphenyl-D14	Decachlorobiphenyl (DCB)	1-methvinephthalene	Dichlorophenyl Acetic Acid (DCAA)	4-Nitrophenol
؟ \$؟			- 1995 1997	an an An Antara Martina a				 	- 3 : 												x	z	0	۵	σ	В
Imples and blanks meet the QC limit	Surrogate Compound	×	,																	gate Compound	Octacosane	rtho-Terphenyl	robenzene (FBZ)	n-Triacontane	Hexacosane	Iromobenzene
o all sa s (%R)		6.J												1 SAA B TANKS I STREAM IN THE 2 ST						Surro		0	Fluo			-
iked int overie:	betector/ Column	Ska																			ں ن	н		/ /	¥	
lates sp gate rec		1 Not																		P P		SFB)				jej
Were surrog Did all surrog	Sample 1D	LS LS																		Surrogate Compour	Chlorobenzene (CBZ)	4-Bromofluorobenzene (B	a.a.a-Trifluorotoiuene	Bromochlorobenene	1,4-Dichiorobutane	1.4-Diffuorobenzene (Dř
Y N N/A	 #																				<	6	0	٥	w	

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LDC #	SDG #:

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

1. 19 Sec. 2

٩ Page: 1 of 2nd Reviewer: Reviewer:

METHOD: GC HPLC Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? <u>V N NA</u> Was an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed? AN NA VN NA

	U) USW/SW	Compound	%R	MS . (Limits)	M M U	SD Jimits)	RPD (Limi	(8)	Associated Samples	Qualifications
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-				^ ~		^	-	1		
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		t	ہ	(251-01)	9	(p-)5()		 ^		
		ŧ	£3	(21- 114)	50	(51-1)9)	~	<u> </u>		No mar o.
		MM	pe	(33-144)	•	~	- 62	31 1		
		>	9,3	(47-123)	-	(42-123)				
		d	٥	(\$1-25)	0	(52-115)	~	^		
		\$	0	(15-143)	٥	(15-143)	>	^		
		55	\$	(50-124)	48	(+0-05))	~	~	<u> </u>	<u>_</u>
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LDC #: 21464 F17 (Les SDG #: 24 METHOD: __GC __HPLC

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

Za Page: ____of___ 2nd Reviewer: Reviewer:

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

Level IVID Only Y <u>N Nろ</u> Was an LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

		<u>ب</u>					>		 3	٤															
	Uualifications	N. mul (2)				J-12/0 11			Nonico. CLA																[] · · · · · · · · · · · · · · · · · · ·
		1, 2, 71/049 MB				3.5 9175172 Mb			4 6. 9189494 MR																
RPD (mit=)	104 De	1 2 1 2 1 2 1	97 (to)	()	~	()	(-	(-	((()	()	()	(1	()	(()	()	()	()		
LCSD %R (LImits)		7	(()		()	(()	9.01	()	()	()	()	()			()	() () () () () () () () () ()	()	()	()		(j) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c	A Star Star Star	<u>此</u> "此作之派
LCS %R (Limits)			~ ~	()	()	(10-156)	()	()	^ }		() .		()	()	() .		()	()	<pre></pre>	()	()	()	()		
Compound	+ +		Y			ч			 I								· .								
TCS/TCSD ID	917041015A					917972 US			9189494 UCS/D																
*																									

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LDC #: 21 494 F17 とう SDG #:

VALIDATION FINDINGS WORKSHEET **Overall Assessment of Data**

ð Reviewer: Page:

METHOD: CC 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. Was the overall quality and usability of the data acceptable? XNNIA

Associated Samples Qualifications	3 $X X A (0)$	7					
PNS Aven 1 ne manual 1	inter a supression with the supression of the su	LCS artside limit					
# Compound Name T	All excent I					Comments:	

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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 June 19, 2009

LDC Report Date: September 18, 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.
- 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.

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 Disulfoton	40.1 20.6	All samples in SDG 8304607	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	Ρ
6/26/09	010F1001	2	Naled	47.6	All samples in SDG 8304607	J- (all detects) UJ (all non-detects)	Ρ

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 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

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	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	Ρ	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

SDG #: 8304607 Laboratory: Test America

LDC #: 21494G17

Date: <u>9/15/0</u>9 Page: <u>1</u>of <u>1</u> Reviewer: <u>9/15/0</u>9 2nd Reviewer: <u>9/15/0</u>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: 6/16 - 19/09
lla.	Initial calibration	A	2 RSD 5202 r2
lib.	Calibration verification/ICV	SW	cw/iw = 202
111.	Blanks	А	,
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	client spec (insufficient vol)
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	ND	p = 2, 3
Х.	Field blanks	ND	FB = FB060309 from \$304603

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 30B	11	9173103 MR	21	31	
	M-39D	10		22	32	
2	IVI-123B	12	······································	22	22	
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	
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Notes:___

METHOD: CG HPLC

VALIDATION FINDINGS WORKSHEET

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cmpd_list.wpd

LDC #: 2494 17 SDG #: 566 Gury METHOD: GC HPLC

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Reviewer: _______2nd Reviewer: _______

Page: lof

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

Did the continuing calibration standards meet the %D / RPD validation criteria of <360%? Were continuing calibration standards analyzed at the required frequencies?

<u>X N/NA</u> Wer <u>X N/N/A</u> Did 1 Level I<u>V Only</u>

X N NA

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

			<u> </u>		1				_	r	1	<u>, </u>		F	<u> </u>	T	r	1	1		.	<u> </u>	1	
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7																								
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CONCALNew-gc.wpd

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: September 19, 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.
- 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.

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)	Ρ
6/26/09	010F1001	2	Naled	47.6	All samples in SDG 8304608	J- (all detects) UJ (all non-detects)	Р

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:

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.

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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	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	Ρ	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

LDC #:_	21494H17	VALIDA
SDG #:	8304608	
Laborato	ny: Test America	

Tronox Northgate Henderson TION COMPLETENESS WORKSHEET

Stage 2B- 4

	Date:	9/11/09
	Page:_	<u></u>
	Reviewer:	26
2nd	Reviewer:	0~
		Ĭ

Laboratory: Test America

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
1.	Technical holding times	Á	Sampling dates: 6/23/09
lla.	Initial calibration	A	2 RSD = 262 r2
IIb.	Calibration verification/ICV	ŚW	$CCV/ICV \leq 20$ %
- 111.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	Á	
IVc.	Laboratory control samples	A	LCS to
V.	Target compound identification	NА	
VI.	Compound Quantitation and CRQLs	NА	
VII.	System Performance	NA	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
Х.	Field blanks	NØ	FB = FB060309 from 8307603

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:

valiua	Water			
1	M-125B	11	21	31
2	M-125BMS	12	22	32
3	M-125BMSD	13	23	33
4	9177142-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:

2

Method:GCHPLC				١
Validation Area	Yes	No	NA	Findings/Comments
1. Technical holding times.				
All technical holding times were met.	$\left \right $			
Cooler temperature criteria was met.	1	ł		
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Were all percent relative standard deviations (%RSD) \leq 20%?		ļ		
Was a curve fit used for evaluation?	\leq			
Did the initial calibration meet the curve fit acceptance criteria of $\geq 0.990?$				
Were the RT windows properly established?				
W.Continuing calibration				
Was a continuing calibration analyzed daily?				
Were all percent differences (%D) $\leq 15\%$.0 or percent recoveries 86-126%?	\leq			
Were all the retention times within the acceptance windows?	-			
V-Blanks				
Was a method blank associated with every sample in this SDG?				
Was a method blank analyzed for each matrix and concentration?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/	٢	
VI. Surrogate spikes				
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?				-
VII Maurx solke/Matrix-spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated			ε. <u>γ</u>	
Mis/MSD, Soli / Water.				
Was a MS/MSD analyzed every 20 samples of each matrix?				
(RPD) within the QC limits?			989-969-873-96	
VIII Laboratory control samples				
Was an LCS analyzed for this SDG?				
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
IX Regional Quality Assurance and Quality Control	<u>тарала</u> 1			
Were performance evaluation (PE) samples performed?				/
Were the performance evaluation (PE) samples within the acceptance limits?				

VALIDATION FINDINGS CHECKLIST

Page:_	2 of 2
Reviewer:	<u> </u>
2nd Reviewer:	$- \swarrow$

Validation Area	Yes	No	NA	Findings/Comments
X Target compound identification			9 7.	
Were the retention times of reported detects within the RT windows?	\square			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XII System performance				
System performance was found to be acceptable.		1		
XIII, Overall assessment or data				
Overall assessment of data was found to be acceptable.		· .		
XIV. Field dupicates				
Field duplicate pairs were identified in this SDG.		/		
Target compounds were detected in the field duplicates.		_		
XV Field blanks				
Field blanks were identified in this SDG.		/		
Target compounds were detected in the field blanks.				

VALIDATION FINDINGS WORKSHEET

METHOD: /GC HPLC

8310	8330	8151	(8141	8141(con't)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V Ennerification	
B. Acenaphthylene	B. RDX				V. Benzene
C. Anthracene		0. z,4=00	B. Mevinphos	W. Boistar	CC. Toluene
	 U. 1,3,5-1 rinitrobenzene 	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. Tetryi	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. MP-Xylene
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathlon	GG. Total Xviene
G. Benzo(g,h,!)perylene	G. 2.4.6-Trinitrotoluene	G. Dicamba	G. Sulfotep	BB. Trichioronate	
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-Dinitrotolune	J. MCPA	J. Diazinon	EE. Def	· ·
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowi	
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-Nitrotoiuene	M. Silvex	M. Ronnel	HH. Tetrachiorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	ll. Sulprofos	
O. Phenanthrene	°.		0. Chlorpyrlfos	J.T Thissein	
P. Pyrene	ġ		P. Fenthion	kk Phosmet	
ö	٥		Q. Parathion-ethyl	LL. 000-Triethulah	se share this at a
R.			R. Trichloronate	MM. Famehur	216211.200
S.			S. Merphos	NN. Carba shows th	
			T. Stirofos	00. Carbonhene the	in mother!
			U. Tokuthlon		6-11-114
Notes:					

cmpd_list.wpd

SDG #: SCE Gury LDC #: 2494 H17

METHOD: ____GC ___ HPLC

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**

25 Page: of Reviewer:

2nd Reviewer:

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 step0%? Y N N/A Y N/N/A Level IV Only

Y N N/A

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

	-	-	_							 _			 _		 	_		
Qualifications	JET RATE (C)	1 0 - 1 - 1 - 1	a a a	5-/4T /P		4-145	1 The second											
Associated Samples	AII + BIK																	
ے 20 ک) RT (limit)))	(()	())	()			((((()
%D / RPD (Limit ≤ 15:0 7 (8:28	40.1	82.1	20.6	-9-215-0-	47.0	-2'2g											
Compound	6-(+)-	(-) 且	- (-) - C I	(-) Y		F (-)	per											
Detector/ Column	CH.]			4	Col.2													
Standard ID	010 = 1001	Cian,																
# Date	50/2/1	. /																

CONCALNew-gc.wpd

LDC #: 21494 H17 See Care SDG #:

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

1 of 2 Page: 2nd Reviewer: Reviewer:

HPLC METHOD: GC

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

average CF = sum of the CF/number of standards %RSD = 100 * (S/X) CF = A/C

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

5,60922 536 3.6050 **Recalculated** 72566.2 7.323 XS %RSD 5.53 7.32345 9 9554 5,53546 3-60449 10609.5 Reported %RSD 2 Recalculated 2,01745 Average CF (initial) 1.76315 1.20369 181476 1-74977 Average CF (initial) 1.76915 1.20369 2.01915 1-81974 Reported - 74977 20 17724 **Recalculated** 1.69691 1.82370 2,17503 Ч std) 1.76369 2 _ 1.76366 06668.1 2.17503 1,17724 25 -69691 CF 2 std) Reported 81422) 8141-1 Compound Mathim Malathin Di chlorugs Dichlorvas Phorate Phone 60/2c/ 3 Calibration Date Standard ID 1541 # 2 ო 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.

P C P ¥

LDC # 21 499 417 En lar SDG#

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

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

GC EPA SW 846 Method 8141A **METHOD:**

Malathion Parameter:

X^2									
×	Conc ratio	0.100	0.250	0.500	1.000	1.500	2.000	2.500	
٨	Area ratio	0.14584	0.29331	0.55883	0.89027	1.76202	2.36769	2.77727	
	Compound	Malathion							
	Column	(8141A-1)							
	Date	06/26/2009							

Regression Output:			Reported	
Constant		-0.02062	П С	-0.02066
Std Err of Y Est		0.12319		
R Squared		0.99000	r2 =	0.99783
No. of Observations		7.00000		
Degrees of Freedom		5.00000		
X Coefficient(s)	1.1388	-0.002208	ŋ	1.14436E+000
Std Err of Coef.	0.054985	00.00		

IS = TOCP = 2.0ug/mL LAb used weighted linear regression

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LDC # 21 494 HI7 See Cover SDG #:

Continuing Calibration Results Verification VALIDATION FINDINGS WORKSHEET

Page: 1 of 1 Reviewer: 2nd Reviewer:

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

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

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

A = Area of compound C = Concentration of compound

					Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	CF/Conc. CCV	CF/Conc. CCV	. 0%	Q%
+	016 F1601	6/20/00	Dichlar vors (8141-1)	3,00	2.6730	2,6730	10,9	10,9
			phorate		2.9703	2, 9700	- 0 -	0 1
			Malatui an 4		3.0648	3.0648	۲	2. X
ы			Dichturues (8191-2)		2.6533	2-6533	11.6	11, 6
			Phyrate		3.1758	3.1758	5,9	5, 9
			marethim &		3.0056	3.0056	r.e	o, V
ო								
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 # 21494 HI7 Ser Coner SDG #:

VALIDATION FINDINGS WORKSHEET **Surrogate Results Verification**

Page: 1 of 1 Reviewer:

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

Percent Difference

Percent Recovery

I

0

Recalculated

2 して

					ļ
	Percent Recovery	Reported	× 77	لا لاح	
	Surrogate Found		0.55488	Q (22 92. Q	4
	Surrogate Spiked		1.00		
	ColumniDetector		Carl. 1		
Sample ID: 🕌 📔	Surrogate		TPP	Ch Wrmerbys	

Sample ID:

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

Sample ID:

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

LDC #: 21994 HIJ SDG #: See Cover

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

Page: of Reviewer: 2nd Reviewer:

METHOD: C. 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

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

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

'n 3 MS/MSD samples:___

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

MSD = Matrix spike duplicate SC = Sample concentration

	Spil	e.	Sample	Spike S	ample	Matrix	spike	Matrix Spike	e Duplicate	W/SW	sD
Compound	рру 1 си 1) D	Cone. (いうん)	Concen (L/S /	tration	Percent I	Recovery	Percent R	tecovery	RPI	
	WS	MSD	I.	SM	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)											
Dichlmung (8141)	386	3.93	6	2.87	2.92	74	74	*	74	1, 8	1.7
Malaris m 1	_ >		≁	ځ۲.۶	2.99	7	77	76	76	J. D	9.1
											-
										-	
Comments: <u>Refer to Matrix Sr</u> of the recalculated results.	oike/Matrix (Spike Dup	licates finding	<u>as worksheet (</u>	for list of quali	fications and a	associated sar	nples when re	ported result	s do not agree	within 10.0

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214	ž
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БС	SDG

Page: lof <u>I</u> Reviewer: <u>JVC</u> 2nd Reviewer: <u>C</u>

2.008

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 1 * 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

Z	
くトレレトト	
CS/LCSD samples:	

	S	pike	Spiked	Sample	FC	S	ΓC	sD	LCS/I	CSD
Compound	8 9 4	Ided	Concei (MS	ntration /し)	Percent	Recovery	Percent I	Recovery	RF	Q
	rcs	LCSD	۲CS ر	LCSD	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)										
Dich Lorver & 8141)	4.0)	M	2-70	¥¥ Y	. 82	68				
Marthim &	-10		クリーマ		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 #	+ <u>See curer</u>	VALIDATIC Sample	DN FINDINGS WORKSH Calculation Verificatio	leet D	Page: 1 of 1 Reviewer: 3Vb 2nd Reviewer:
METH	tod: Gc HPLC	•			,
NN XX	Were all reported re NA Were all recalculate	ssults recalculated and verified for od results for detected target comp	all level IV samples? bounds within 10% of the rep	orted results?	
Conce	entration= (A)(Fv)(Df) (RF)(Vs or Ws)(%S/100	D) Example: Sample ID.	Comp	ound Name	
A= A Fv= F V= C Cf= C VS= I VS= I SS= I	rea or height of the compound to be me inal Volume of extract Dilution Factor verage response factor of the compound it the initial calibration it the initial volume of the sample initial volume of the sample Percent Solid	asured Concentration =			
			· ·		
#	Sample ID	Compound	Reported Concentrations	Recalculated Results Concentrations	Qualifications
Com	nents:				

SAMPCALew.wpd

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: September 18, 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.
- 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.

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)	Р
			Disulfoton	20.6		J- (all detects) UJ (all non-detects)	

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/26/09	010F1001	2	Naled	47.6	All samples in SDG 8304609	J- (all detects) UJ (all non-detects)	Ρ

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 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

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

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.

5

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	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	Ρ	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

Tronox Northgate Henderson

LDC #: 21494I17

SDG #: 8304609

Laboratory: Test America

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Reviewer: <u>JV6</u> 2nd Reviewer: <u></u>

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
1.	Technical holding times	A	Sampling dates: 6/29/09
lla.	Initial calibration	A	2 RSD ≤= 20 2 Vr
llb.	Calibration verification/ICV	SW	cav/1av = 202
111.	Blanks	Ă	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	Ń	Client spec (insufficient sample)
IVc.	Laboratory control samples	A	us /p
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	
Х.	Field blanks	ND	EB = 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:

valiua	Wate	ed			
1	M-111AB	11	21	31	
2	EB062909-GW	12	22	32	
3	9182412 MB	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: CC 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. 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(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,l)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	
l. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotolune	J. MCPA	J. Diazinon	EE. Def	
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowt	
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. Tetrachiorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	ll. Sulprofos	
O. Phenanthrene	Ö		O. Chlorpyrlfos	JJ. Thiongzin	
P. Pyrene	P.		P. Fenthion	kk, Phosmet	
ö	۵		Q. Parathion-ethyl	LL. O.O.O. Triethylph	osphorothioate
Ŕ			R. Trichloronate	MM. Famphur	
S.			S. Merphos	NN. Carbophenot	on
			T. Stirofos	00. Carbo pheno th	ien - methy/
			U. Tokuthion		
Notes:					

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LDC #: 2494 11 SDG #: 500 6000

METHOD: ____GC ___ HPLC

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**

ď 25 Page: Lof Reviewer:

2nd Reviewer:

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 <360%?

Y NNA Y NNA Level IV Only

Y N NA

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

		্					Т	T	T	T		2		1				Τ			Ī	Ι	T	T	
3	Qualifications	C at she	J-LAT NP	J-96-5	5-/WJ/P	Turates	V-14510	Lo reactor			J+ A15/A	~													
	Associated Samples	4.11 + -B.K						->					5												
			(^	(~			(~	(. (() ((`		(~
	아 🌒 🛛 RT (limit))))))))	,))	~	-))))))))))	}
ND / RPD	(Limit ≤ 15.07(42	187.8	1.012	4.48	20.6	-9'512	47.0	- 16'38 -			44.4	24.0													
	Compound	C (4)	1 1 1	د- <u>1</u> ط	k (-)	C U U	F (-)	p c >			Ð H	É L	-												
Detector/	Column	C.F.)				Col.2		-			- - Ce	Car 2													
	Standard ID	016 1 1001									004 70401	(α)													
	Date	1. 121.105									7/07/69														
	#																								

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Revision 1

LDC Report# 21494J17

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 6, 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

1

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.
- 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
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 SA82-0.5BMSD 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 SA82-0.5BMSD 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)	Ρ
6/26/09	010F1001	2	Naled	47.6	All samples in SDG 8304610	J- (all detects) UJ (all non-detects)	Ρ

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 banks. No organophosphorus pesticide contaminants were found in these blanks.

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 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)	Р

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	А

*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 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	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	Ρ	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

Т	ronox No	rthgate Henc	derson
VALIDAT	ION COM	PLETENESS	WORKSHEET

LDC #: <u>21494J17</u> SDG #: <u>8304610</u> Laboratory: <u>Test America</u>

Stage 2B

Date:	9/15/00
Page:	1 of
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
١.	Technical holding times	SM	Sampling dates: 6/26 - 7/61/89
IIa.	Initial calibration	A	2 RSD = 20 2 + 2
IIb.	Calibration verification/ICV	SW	CW/ICN = 202
111.	Blanks	A	
lVa.	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, ~ FB = FB072109-50 from 8304

Note:

A = AcceptableND = No ccN = Not provided/applicableR = RinsattSW = See worksheetFB = Field

ND = No compounds detected R = Rinsate FB = Field blank D = Duplicate TB = Trip blank EB ≑ Equipment blank

Validated Samples:

Water + Soil

ī1	EB062609-SO	W	11	9180507 MB	21	 31	
2 7	EB062609-SORE	1	F12 Y	9189451 MD	22	32	
3 2	SA106-0.5B	S	13 ≯	91 88427 MB	23	 33	
4 3	SA82-0.5B		14		24	 34	
53	SA82-10B		15		25	 35	
6 3	SA82-29B		16		26	36	
7 3	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

2

METHOD: ____GC ___HPLC

8310	8330	8151	8141	8141(con't)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlarvos	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)peryiene	G. 2.4.6-Trinitrotoluene	G. Dicamba	G. Sulfatep	BB. Trichloronate	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoiuene	H. Dalapon	H. Phorate	CC. Trichlorinate	
l. Chrysene	1. 2-Amino-4,6-dinitrotoluene	I. MCPP	1. Dimethoate	DD. Triffuralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotolune	J. MCPA	J. Diazinon	EE. Def	
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disuifoton	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. Malathlon	II. Sulprofos	
O. Phenanthrene	°.		O. Chlorpyrifos	JJ. Thiongrin	
P. Pyrene	P.	•	P. Fenthion	kk. Phosmet	
Q.	۵		Q. Parathion-ethyi	LL. 0.0.0-Triethylph	os phoro this ate
Ŗ			R. Trichloronate	MM. Famphur	
S,		<i>Б</i> .,	S. Merphos	NN. Carbo pheno th	on .
			T. Stirofos	00. Carbophene H	ion - methy/
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LDC #: 21 494 Jr 50 SDG #: 22

VALIDATION FINDINGS WORKSHEET **Technical Holding Times**

R Page: 1 of 2nd Reviewer: Reviewer:

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

		Cr)									
	Qualifier	J-/NJ/A	`								
	Total # of Days	7									
	Analysis date	7 10 69	/						•		
	Extraction date	7/18/00					1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	an Santa			
	Sampling Date	6/20/2									
orc	Preserved	- N									
CC H	Matrix	M									
METHOD:	Sample ID	R									

Aromatic within 7 days, non-aromatic within 14 days of sample collection. Both within 14 days of sample collection. Both within 14 days of sample collection. TECHNICAL HOLDING TIME CRITERIA VOLATILES: Water unpreserved: A Water preserved:

Soils:

Water: Soil: **EXTRACTABLES:**

Extracted within 7 days, analyzed within 40 days. Extracted within 14 days, analyzed within 40 days.

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LDC # 2494 17 SDG # 566 Gury

METHOD: ____GC ___ HPLC

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**

35 Page: Lof Reviewer:

2nd Reviewer:_

Y N/N/A Y N/N/A Level IV.Only

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

1		-	Detector/		VD/RPD	202.) RT (limit)		Associated Sa	npies	Qualifications	
11	Date	Standard IU			1 2 2 0			<u>Au</u> + B.hr		JAN HISTOR	~
4	150/02/	010 = 1001								4-14T 10	
							-			-722P-	-
										5-145 19	
			Col.2		215.0)				Jon Althon	-
				1 1 1 1 1 1	47.0)	- ~			V-1451	
					A B	~		~		Je the Las	
						~	-				
1.5	1 hales	09270301	(75)	A ED	>1.1			1. 9180567	MB	J-145A	
			-	8 Co	45.9	~					1
				E-1	28.9		7			C+ dets/A	T
				I C-)	49.7)	(J-/45/A	Ť
				(~) />	44.0	~					-
				(t) X	21.2					J+detsA	
			2.2	BC)	22,3)				J-/WIA	-
-				(-)Y	22.9)	~				-
+				3	52.9)	~				T
				(+)5	27.1)	(7		0+4.tx	T
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	7/0 100	DIO F1001	ert.)	F (+)	43.Y		7	3-10 9188	<u>चेल त्य</u>	J+ ArtsA	T
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LDC # 21414 J17 SDG #: Lu Carry

VALIDATION FINDINDS WORKSHEET Surrogate Recovery

シア Page: 1of 2nd Reviewer. Reviewer:____

METHOD: CC 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".

V N X												
ŧ	Sampie ID		setor/	Surrogate Compound		%R (Limits)				Quali	fications	
		Abt C	BeckBer	×		46 (60-1	् र	3-/	15	رى م	
				И		37 (49-	(121	`	4		
)						
	GIR NCAT AND			>		مراجع		(ラノーケ	1/10		
	Gin / Aca all			^N) 26 -			~	-	~	Ţ
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	Sumorata Compoun	- P	Surrog	ate Compound		Surrogate Compound		Surrogate	Compound			
	Chiorobenzene (CBZ)		ŏ	tacosane	×	Benzo(e)Pyrene	s	1-Chloro-3-	Nitrobenzene	7	Tetrachloro-m- xylene	
(a	4-Bromofluorobenzene (B	FB) H	Po	ho-Terphenyl	z	Terphenyl-D14	+	3,4-Dinit	rotoluene	N	Chlormetes	
	a a a-Trifluorotoluene	-	Fluore	vbenzene (FBZ)	0	Decachlorobiphenyl (DCB)	5	Tripe	intyltin			
, c	Bromochlorobenene		ć	Triacontane	٩	1-methvinaphthalene	×	Tri-n-c	roovttin	+		
- u	1.4-Dichlorobutane	×	Ĩ	lexacosane	σ	Dichlorophenyi Acetic Acid (DCAA)	3	Tributy	Phosphate			
L	1.4-Diffuorobenzene (DF	B)	BG	omobenzene	8	4-Nitrophenol	X	Liphend	Phosphate	-		

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Matrix Spike/Matrix Spike Duplicates VALIDATION FINDINGS WORKSHEET

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	Qualifications	None	Certher LCS	or MS of MS of MSD 5.										No quel	Ceither MSD	(mr rrz m)										
n was performed? limits?	Associated Samples	3												4												
ver a sample extraction inces (RPD) within QC	RPD (Limits)	(12 (.49)	92 (78)	64) 00		()		(44 (31)	36 (37)	()) ((()	107 (98)	(,) /	()	79 (78)	-	()	(()		(
each matrix or whene relative percent differe	MSD %R (Limits)	(151-a) o	16 (221-24) 21	8.8 (IC-142)	()	22 (ST-115)	48 (49-1221)	40 (40-124)	40 (45,115)	()	()	()	()	(.)	۲ (الم	()	()	()		44 (1)2)	(() <u>,</u>	(.) _{(2,1,2}	(()	
id every 20 samples for nt recoveries (%R) and	MS %R (Limits)	0 (10-156)	35 (47-123)	(epi-si) 01	()	()		() .	()	()	()	()		54 (57-)U)	48 (49-1m)	7.7 (10-156)	44 (47-123	48 1 44-124	12 (15-14)	1511-281 96	4-2 1 20-1 xt	49 (D-1K)	()	()	()	
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VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

200 ð Page: Reviewer: 2nd Reviewer:

METHOD: CGC HPLC

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

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

Was the overall quality and usability of the data acceptable?

N N/A

#	Sample 1D Component Name	Finding	Associated Samples	Qualifications
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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 9 through July 10, 2009

LDC Report Date: September 18, 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.
- 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.

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:

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)	Ρ
6/26/09	010F1001	2	Naled	47.6	All samples in SDG 8304612	J- (all detects) UJ (all non-detects)	Р

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.

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 SA35-32B SA35009-32B SA85-33B EB071009-SO	Naled Disulfoton	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	Ρ	Continuing calibration (ICV %D) (c)
8304612	RSAM2-10B RSAM2-35B SA35-10B SA35-32B SA35-32B 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

Tronox Northgate Henderson	
VALIDATION COMPLETENESS WORKSHEI	ЕΤ

Stage 2B

SDG #: 8304612 Laboratory: Test America

LDC #: 21494L17

Reviewer: 2nd Reviewer:

Date: 9/11 /09

SV

Page: _ lof_

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
١.	Technical holding times	A	Sampling dates: 7/09_10/09
IIa.	Initial calibration	A	2 RSD = 202 r2
IIb.	Calibration verification/ICV	sW	CON/100 = 20 2
111.	Blanks	A	, , , , , , , , , , , , , , , , , , ,
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	D9 C020173-061D
IVc.	Laboratory control samples	SW	LCS /3
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 = FB 072109-SO (from 8304614)

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:

vanua	ted oumples.	50%	+ 1	Nate	1			
<u>-</u> 1	RSAM2-10B	<u> </u>	S	11	9203338-MB	21	31	
- 7 2	RSAM2-35B			12 7	9194431-MB	22	32	
37	SA35-10B			13 3	919 8202 MB	23	33	
4 2	SA35-32B	Þ		14	-	24	34	
$\frac{1}{5}$ γ	SA35009-32B	Ь		15		25	35	
6 7	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: CG 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. 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(a)pyrene	E. Tetryi	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. Trifiuralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotolune	J. MCPA	J. Dlazinon	EE. Def	
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachiorophenol	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-Nitrotoiuene	M. Silvex	M. Ronnel	HH. Tetrachiorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Maiathion	II. Sulprofos	
O. Phenanthrene	ö		O. Chlorpyrifos	JJ. Thiongzin	
P. Pyrene	ď		P. Fenthion	kk, Phosmet	
ö	۵		Q. Parathion-ethyl	LL. O.O.O. Triethylph	osphorothioate
R.			R. Trichloronate	MM. Famphur	
s.			S. Merphos	NN. Carbophenoth	non
			T. Stirofos	00. Carbophenot	ion - methy/
			U. Tokuthion		
Notes:					

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LDC #: 2494 17 SDG #: 500 Gury

METHOD: ____GC ___ HPLC

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**

ろ Page: 1 of Reviewer:

2nd Reviewer:___

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 $\leq 360\%$?

Y NNA Y NNA Level IV Only

Y N N/A

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

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$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$				->	k (-)	20.6)		5-/WJ/P	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		-		Cot.2	6430	-9-312)		Jan 40.4	
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$\frac{1}{64} \begin{array}{cccc} 0.03 \ \text{FO} 201 \\ \hline (CeN) $)			
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	1	4/69	003 FN 201	Cal	A (-)	3.02)	1 1 9203338-MB	J-145/A	
$(\sqrt{6}) (Let, 2) \neq (4, 5) 34, 7 (,)) $	1		(Len)		(+) +	32.6)	· · · · · · · · · · · · · · · · · · ·	THUDA	
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LDC # 21494 LI7 SDG #: 11 CM-1

METHOD: _____GC ___ HPLC

VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

N Page: 1of 1 2nd Reviewer: Reviewer:

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

A/N N/A

Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG? Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

Level 144D Only Y N N/A) Was an LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

	rcs/rcsp id	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (LImits)	Associated Samples	Qualifications
\neg	9203338-UCS	Y	()		(05-01) 28 (1 920238-MB	No que I CUER
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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: September 18, 2009

Matrix:

Parameters: Organophosphorus Pesticides

Soil

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.
- 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

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)	Ρ

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/26/09	010F1001	2	Naled	47.6	All samples in SDG 8304613	J- (all detects) UJ (all non-detects)	Ρ

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 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. 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 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	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	Ρ	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

Trone	ox Northgate	Henderson
VALIDATION	COMPLETEN	IESS WORKSHEE

Stage 2B

SDG #: 8304613 Laboratory: Test America

LDC #: 21494M17

Date:<u>9/11/09</u> Page:<u>lof</u> Reviewer:<u>JVC</u> 2nd Reviewer:<u>f</u>

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	
١.	Technical holding times	A	Sampling dates: 7/13/69	
lla.	Initial calibration	A	% RSD = 20	
llb.	Calibration verification/ICV	SW	CON/ICN = 20 Z	
111.	Blanks	A	, .	
IVa.	Surrogate recovery	A		
IVb.	Matrix spike/Matrix spike duplicates	A	bgco20173-066	
IVc.	Laboratory control samples	A	us	
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	
Х.	Field blanks	ND	FB = TB072109-50	(from 8304616)

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:

valiua	Soil				
1	SA176-10B	11	21	1	31
2	SA176009-37B Ø	12	22	2	32
1 3	SA176-37B	13	23	3	33
4	RSAM3-30B	14	24	4	34
5	92 04174 - MB	15	25	5	35
6		16	26	5	36
7		17	27	7	37
8		18	28	3	38
9		19	29	9	39
10		20	30	0	40

Notes:

METHOD: / GC HPLC

VALIDATION FINDINGS WORKSHEET

	Τ	Т	T	Τ			T	1	T	T	T	T	Τ	Т	Τ	Τ	Т	Τ	Τ	Τ	Τ	T	٦
 8021B	V. Rentere		CC. Toluene	EE. Ethyl Benzene	SSS. O-Xylene	RRR. MP-Xylene	GG. Total Xylene												25 PHOTO 1410 476		1 . AL	161-11 40	
8141(con't)	V. Fensulfothion		W. Boistar	A. EFN	Y. Azinphos-methyl	Z. Coumaphos	AA. Parathion	BB. Trichloronate	CC. Trichlorinate	DD. Trifluralin	EE. Def	FF. Prowl	GG Ethion	HH. Tetrachlorvinnhoe	I. Sulorofos	J.T. 76.	kk Photemet	L 0 0 Tristerlet	Non Fombur		on Carbo chen 21	ut award a reason was	
8141	A. Dichlorvos	B Mavinnhoe	C. Demeton.O		D. Demeton-S	E. Ethoprop	F. Naled	G. Sulfotep	H. Phorate	l. Dimethoate	J. Diazinon	K. Disultoton	L. Parathion-methyl	M. Ronnel	N. Malathion	0. Chlorpyrifos	P. Fenthion	Q. Parathion-ethyl	R. Trichloronate	S. Merphos	T. Stirofos	U. Tokuthion	
8151	A. 2,4-D	B. 2,4-DB	С. 2,4,5-Т	C olerb	U. 2,4,3-1,7	E. Dinoseb	F. Dichlorprop	G. Dicamba	H. Dalapon	I. MCPP	J. MCPA	K. Pentachlorophenol	L 2,4,5-TP (silvex)	M. Silvex									
8330	A. HMX	B. RDX	C. 1,3,5-Trinitrobenzene	D. 1.3-Dinitrohenzene		E. Tetryl	F. Nitrobenzene	G. 2.4.6-Trinitrotoluene	H. 4-Amino-2,6-dinitrotoluene	I. 2-Amino-4,6-dinitrotoluene	J. 2,4-Dinitrotolune	K. 2,6-Dinitrotoluene	L. 2-Nitrotoluene	M. 3-Nitrotoiuene	N. 4-Nitrotoluene	o.		٥					
8310	A. Acenaphthene	B. Acenaphthylene	C. Anthracene	D. Benzo(a)anthracene		c. benzo(a)pyrene	F. Benzo(b)fluoranthene	G. Benzo(g,h,l)perylene	H. Benzo(k)fluoranthene	I. Chrysene	J. Dibenz(a,h)anthracene	K. Fluoranthene	L. Fluorene	M. Indeno(1,2,3-cd)pyrene	N. Naphthalene	O. Phenanthrene	P. Pyrene	ö	R.	S.			

Notes:

cmpd_list.wpd

LDC #: 2494 17 SDG #: 566 Gv-Y

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**

25

Reviewer:

Ø

2nd Reviewer:___

Page: Lof

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? _____MD or _____RPD

Were continuing calibration standards analyzed at the required frequencies?

Did the continuing calibration standards meet the %D / RPD validation criteria of <360%? Y NNA Y NNA Level IV Only

X N NA

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

													Ź								1	1	1	
Qualifications	JANES C	J-LAT NP	in Refe	5-/WJ/P	to the total	V-1451	Jegg for			J-/MJ/A														
Associated Samples	.411 + Blr																							
よう RT (limit)	(()	()	()	()	()	()	()	()	()	(()	()	()	()	()	()	()	()	()	()	()	()	()
%D / RPD (Limit < 45:01 = 20	187.8	40.1	1-28-	20.6	-0'5 lz	42.6	-2'2g			23.Y	70.4	21.1	4.69											
Compound	6	(-) 4	- (- जु- दी	(-) k	t t J	F C-)	per			[-] ₹	E (-)	n (-)	() ユ											
Detector/ Column	<u>ح: ا</u>			1	Col.2					Cerl.)	l		Col.Y											
Standard ID	016 = 1001	100								00370301	(GCM)													
Date	126/05									7/25/09														
#																								

CONCALNew-gc.wpd

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Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: July 14, 2009

LDC Report Date: September 19, 2009

Matrix: Water

Parameters: Organophosphorus Pesticides

Validation Level: Stage 2B

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 8304614

Sample Identification

TR-8B

V:\LOGIN\TRONOXNG\21494N17.TR3

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.

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)	Ρ
6/26/09	010F1001	2	Naled	47.6	All samples in SDG 8304614	J- (all detects) UJ (all non-detects)	Ρ

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.

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	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	Ρ	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

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET

LDC #: 21494N17 SDG #: 8304614

Stage 2B

Date: 9/11/09 Page: 1 of Reviewer: D 2nd Reviewer:

Laboratory: Test America

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
Ila.	Initial calibration	A	2 RSD = 202 r~
IIb.	Calibration verification/ICV	SW	ccu/1a) 6 20 Z
111.	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	
Х.	Field blanks	N	

Note:

A = Acceptable

R = Rinsate

N = Not provided/applicable SW = See worksheet

ND = No compounds detected 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: CG 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. 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(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,l)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	
l. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotolune	J. MCPA	J. Dlazinon	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. Tetrachiorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	ll. Sulprofos	
O. Phenanthrene	Ö		O. Chlorpyrlfos	JJ. Thionezin	
P. Pyrene	-		P. Fenthion	kk, Phosmet	
o.	۵		Q. Parathion-ethyl	LL. 0.0.0-Triethylph	os phoro thio ate
ъ			R. Trichloronate	MM. Famphur	
ċ.			S. Merphos	NN. Carbo pheno th	ио
			T. Stirofos	00. Carbophenoth	en - methy/
			U. Tokuthion		

Notes:

cmpd_list.wpd

LDC #: 2494 17 SDG #: 500 Guran

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

Did the continuing calibration standards meet the %D / RPD validation criteria of <360%? Were continuing calibration standards analyzed at the required frequencies?

Y NNA Y NNA Level IV Only

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

	K	4				_]		4	.					1	1				Τ	T	Ī		T		
Oualifications	144.1	- There a	J-TAT P	J. J.R. P	5-/WT/P		V-/NTA	- Jakes																	· ·
Accordiated Samples		All + BIK						~																	
		7		<u> </u>	(((() (((((((()	
)))))))	~	~	~	~		~	-))))))))
VD / RPD		187.8	40.1	83.4	20.6	2212	47.0	85.9																	
	Compound	くきし	[-] =↓	4	k (-)	6450	F C-)	4																	
Detector/	Column	CH.)			->	Coliz																			
	Standard ID	010 = 1001									- 18+1-0++	(60)													
	Date	6/26/05									7 6. 60	1 ar tor													
	*																								

ろ Q Page: of Reviewer:

2nd Reviewer:

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 (r²) (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
VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Laboratory: Test America

LDC #: 21494017

SDG #: 8304615

	Date:	1/11/09
	Page:_	<u></u>
	Reviewer:	SVC
2nd	Reviewer:	à-
		/

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
lla.	Initial calibration	SM	2 RSD = 20 2 1~
IIb.	Calibration verification/ICV	SUTA	- Cav/100 = 20 2
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	client she (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	
Х.	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	М-97В	11	21		31	
2	9 205274 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(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. Tetryi	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. MP-Xylene
F. Benzo(b)fiuoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total Xylene
G. Benzo(g,h,l)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	
l. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotolune	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. Tetrachiorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	ll. Sulprofos	
O. Phenanthrene	ö		O. Chlorpyrifos	JJ. Thionazin	
P. Pyrene	ď		P. Fenthion	kk, Phosmet	
Ġ	۵		Q. Parathion-ethyl	LL. 0.0.0-Triethylph	os phoro this ate
Ŀ,			R. Trichioronate	MM. Famphur	
ġ.			S. Merphos	NN. Carbophenot	ИОИ
			T. Stirofos	00. Carbophenot	niom - methy/
			U. Tokuthion		
Notes:					

cmpd_list.wpd

SDG #: Set lanes LDC # 21494 017

METHOD: GC HPLC

VALIDATION FINDINGS WORKSHEET **Initial Calibration**

Page: 1 of F 2nd Reviewer: Reviewer:

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

- Was a 5 point calibration curve performed?
- Was a linear fit used for evaluation? If yes, the acceptance criteria for each compound is %RSD less than or equal to 20.0%. Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? $r^2 Z_0$, q_1 Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? AN NA N N/A
 - Did the initial calibration meet the acceptance criteria? N/N/N Y'N N/Y
- Was initial calibration performed at the required frequency?

Level-HV Only

Y N NA

- Were the retention time windows properly established for all compounds?
- Were compounds run at the required concentrations in the initial calibrations?

#	Date	Standard ID	Colump) Detector	Compound	Finding	Associated Samples	Qualifications	
	8/06/09	ICAL	cal, 2	X	0.08927 [20]	96) AII + BIK	T/AT A (C)	
	12:56-15:41							
<u>.</u>								
_								
Com	ments							

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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 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.
- 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	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 SA166-31B SA182-10B SA182-38B RSAH3-0.5B RSAH3-0.5B RSAH3-32B SA131-0.5B SA131-0.5B SA131-0B SA131-27B RSAH3-0.5BMS RSAH3-0.5BMSD 9216459MB 9210468MB	J- (all detects) UJ (all non-detects)	Ρ

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
8/6/09 01 0F1 001 (19:10)		2	Mevinphos	21.1	SA166-10B SA166-31B SA182-10B SA182-38B RSAH3-0.5B RSAH3-0.5B RSAH3-32B SA131-0.5B SA131-0.5B SA131-0.5B SA131-10B SA131-27B RSAH3-0.5BMS RSAH3-0.5BMSD 9216459MB 9210468MB	J- (all detects) UJ (all non-detects)	Ρ
8/6/09	010F1001 (19:10)	1	Mevinphos	23.8	EB072209-SO EB072309-SO EB072409-SO 9206112MB	J- (all detects) UJ (all non-detects)	Ρ
8/6/09	010F1001 (19:10)	2	Mevinphos	21.4	EB072209-SO EB072309-SO EB072409-SO 9206112MB	J- (all detects) UJ (all non-detects)	Ρ

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 banks. No organophosphorus pesticide contaminants were found in these blanks.

Sample FB072109-SO 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. 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)	А

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:

	Concentrat	ion (ug/Kg)	PPD	Difference			
Compound	SA131-0.5B SA131009-0.5B		(Limits)	(Limits)	Flags	A or P	
Azinphos-methyl	20	14U	-	6 (≤14)	-	-	
Coumaphos	6.1	14U	-	7.9 (≤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 (r²) (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 RSAH3-0.5B RSAH3-0.5B RSAH3-32B EB072309-SO SA131-0.5B SA131-0.5B SA131-0B SA131-27B EB072409-SO	Mevinphos	J- (all detects) UJ (all non-detects)	Ρ	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 RSAH3-0.5B RSAH3-32B EB072309-SO SA131-0.5B SA131009-0.5B SA131-05B 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	
VALIDATION COMPLETENESS WORKSHEE	ΞT

Stage 2B- 4

SDG #:	8304616	
Laborat	ory: Test America	

LDC #: 21494P17

Date: <u>9 /14 /0</u> 9 Page: _____ of ___ Reviewer: ______ 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: 7/21 - 24 /09
lla.	Initial calibration	sµ	% RSD 4202 rx
IIb.	Calibration verification/ICV	SW	COV/IW EZOZ
III.	Blanks	Å	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	Las /b
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	SIN	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	<u></u>
IX.	Field duplicates	SW	$^{7}D_{1} = 8,9$ $D_{2} = 12,13$
X .	Field blanks	ND	FB = 1, 5, 11, 16 $FB = 2$

Note:

A = Acceptable N = Not provided/applicable SW = See worksheet D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

valiu	a	ed Gamples.	Soil		+	Water					
1	l	EB072109-SO	v	Ń	- 11 3	EB072309-SO	W	21 1	9205274 - MB	31	
$\overline{2}$	1	FB072109-SO		U	12 4	SA131-0.5B	D~ S	22 7	- 9216459_MB	32	
3	7	SA166-10B	<	;		SA131009-0.5B	Dr	23 3	9206112- MB	33	
-4	7	SA166-31B		IJ	14 Y	SA131-10B		24 4	9210468- MB	34	
5	3	EB072209-SO	ν	$\overline{\mathbf{v}}$	15 4	SA131-27B		25		35	
6	¥	SA182-10B	\$		16 3	EB072409-SO	W	26		36	
7	ų	SA182-38B			17 4	RSAH3-0.5BMS	5	27		37	
8	Ч	RSAH3-0.5B	p,		18 Y	RSAH3-0.5BMSD		28		38	
9	4	RSAH3009-0.5B	b,	Π	19			29		39	
10	4	RSAH3-32B		V	/ 20			30		40	

Notes:

Method:GCHPLC				,
Validation Area	Yes	No	NA	Findings/Comments
R Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.			a an an an an an an an an an an an an an	
Il Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	<			
Were all percent relative standard deviations (%RSD) \leq 20%?				
Was a curve fit used for evaluation?				
Did the initial calibration meet the curve fit acceptance criteria of \geq 0.990?				
Were the RT windows properly established?				
V. Continuing calibration/				
Was a continuing calibration analyzed daily?				
Were all percent differences (%D) \leq 15%.0 or percent recoveries 85-115%?				
Were all the retention times within the acceptance windows?			S. 1997.	
VeBlanks				
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.		/		
VI. Surrogate spikes		190		
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?				
VII Matrix spike/Matrix-spike dublicates				
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. Soli / Water.	-			
Was a WS/MSD analyzed every 20 samples of each matrix:				
VIII - L'aboratory control samples re				
Nas an LCS analyzed for this SDG?				
Was an LCS analyzed per extraction batch?	1			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
X Regional Quality Assurance and Quality Control				Г
Were performance evaluation (PE) samples performed?	<u> </u>		[
Were the performance evaluation (PE) samples within the acceptance limits?	<u> </u>			

VALIDATION FINDINGS CHECKLIST

Validation Area				
	Yes	<u>No</u>		Findings/Comments
X Target compound identification				
Were the retention times of reported detects within the RT windows?				
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?		1		
XII System performance				4 1
System performance was found to be acceptable.		-		
XIII. Overall assessment of data			- 66 - 2	
Overall assessment of data was found to be acceptable.		-		
XIV Pield ouplicates		100 A		-147 -
Field duplicate pairs were identified in this SDG.				
Target compounds were detected in the field duplicates.	/			
XV-Field blanks	A.			
Field blanks were identified in this SDG.	\triangleleft			
Target compounds were detected in the field blanks.			\leq	

METHOD: / GC HPLC

VALIDATION FINDINGS WORKSHEET

8310	8330	8151	(8141	8141(con't)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A Dichlonuse	V P	
B. Acenaphthylene	B PDX			V. Fensuirothion	V. Benzene
		B. 2,4-UB	B. Mevinphos	W. Bolstar	CC. Toluene
C. Anuntacene	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-Xvlana
E. Benzo(a)pyrene	E. Tetryi	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. MP.Xvlana
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total Xviene
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	-
l. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifturatin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotolune	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. Tetrachiorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Maiathion	II. Subrofos	
O. Phenanthrene	o.		O. Chlorpyrlfos	Тт 7	
P. Pyrene	a		P. Fenthion	kk phormet	
Ċ	۵		Q. Parathion-ethyl	LL 0 0 Triathulat	
R.			R. Trichloronate	MM. Fambhur	25 PAORO 1 110 972
is			S. Merphos	NN. Carbabhenoth	S
			T. Stirofos	00. Carbo pheno th	im - mithul
			U. Tokuthion		16
Notes:					

cmpd_list.wpd

LDC # 21 494 P17 SDG #: Sec Com METHOD: __ GC __ HPLC

VALIDATION FINDINGS WORKSHEET **Initial Calibration**

Page: \ of 2nd Reviewer: Reviewer:

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

Was a 5 point calibration curve performed? YN NA

Was a linear fit used for evaluation? If yes, the acceptance criteria for each compound is %RSD less than or equal to 20.0%. 12 20,99 Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? Did the initial calibration meet the acceptance criteria?

Was initial calibration performed at the required frequency?

bevel IV Only

Were the retention time windows properly established for all compounds? Y)N N/A V/N N/A

Were compounds run at the required concentrations in the initial calibrations?

#	Date	Standard ID	Column Detector	Compound	Finding イン R SD Limit <u>- 20%</u>	Associated Samples	Qualification	
	8/06/09	1cal	en, 2	X	0.98937 (Zt	2026 21 (94)	T AM MY	
	12:28-13	.i4y						(2) (2)
							•	
Comr	nents							

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LDC #: 21494 \$17 SDG #: Su long GC HPLC

METHOD:

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**

Page: / of] Reviewer: JVC

2nd Reviewer:

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

Did the continuing calibration standards meet the %D / RPD validation criteria of <45.0%? 2

Y N N/A Y N N/A Level IV Only Y)N N/A

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

		<u> </u>											<u> </u>		 				 			
Qualifications	J+112/A (C)		J- MJ /A	3+ drb 12		0-/WJ/A		->				3+ dets /4										
Associated Samples	3.4.9216459 MB							~				12-,15										
ものと) RT (limit)	()	()	()	()	()	()	()	()	()	()	()	()	()	(()	()	()		(()	
%D / RPD (Limit < 15.0)	<u>کلو، ک</u>	しるの	44,1	81.4	6'58	38.1	42,8	25.4				23.9	5.12									
Compound	(+) Y	(+) F	F F)	A (f)	(+) ¥	E E	ه ج	W (-)	~			\$ (+)	(+) ¥									
Detector/	CH. 1		ſ	cu.r				1.	A			Cal. 1	Cr1.2									
Standard ID	003 F0301	(cen)										000 40 601	(cen)									
Date	8/10/09	17:55										8/08/09							 			
#																						

CONCALNew-gc.wpd

LDC #: 21494 P17 SDG #: Su Crre

METHOD: __GC __HPLC

VALIDATION FINDINGS WORKSHEET $\overline{\mathcal{I}}$ Continuing Calibration

Page: <u>1 of</u> Reviewer: <u>W</u>

2nd Reviewer:

Please see gualifications 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 <u>Y_N_N/A</u> Were continuing calibration standards analyzed at the required frequencies?

Did the continuing calibration standards meet the %D / RPD validation criteria of <15.0%? 20

<u>Y N N/A</u> <u>Y N N/A</u> Y N N/A

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

	A	\geq	_									_	_								 		_
Qualifications	J+ deta/P (c	J-1R 2P-1	to the set of	J-/R/P			J-145 14	L'hokethy P	- grante	J-/45 /P	- the test of the	- A MACH			J-/NJ /P	3 Marte 13	J-/R/16	J+ drts/P	× 1818	J-/4J/P			
Associated Samples	1, 2 9205274 - MB			~~>			3.4 9216459 MB	6-10 12-15, 17, 18	92 10 468-MB			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			5, 11. 16. 9266112 MA				~				
€ 20 L) RT (limit)	()			()	()	()	()	()	()	()	()	()	(()	()	()	()	()	()	()	(()	
%D / RPD (Limit ≤ 45:0)	230.0	\$8.8	1787	126			22.2	211.6-	6.48	21.1	1:817	43.4	-		23.8	201.3-	65.0-	221.3-		21.4			
Compound	(t)	6	CE O	С С С			È A	C (F)		(-) 'A	C C C C C C C C C C C C C C C C C C C	1			(-) q	(v)	لرب م	(v) ~~	1 5 6)	B (-)			
Detector/ Column	C2	4	5				c.t.1		1	CM. 2					Col.		ſ	GU.2					
Standard ID	Q10 F108 1	CNOX					010 F 1001	(M)							01051001	(ICN)							
Date	8/66/09	16.:09					8/06/09	19.01							8/06/09	19:10							
#																							
							6	50	. 45						(Jost)								

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:#: 5)	#	
БО	SDC	

Compound Quantitation and Reported CRQLs VALIDATION FINDINGS WORKSHEET

125 d Page: 1 of 2nd Reviewer: Reviewer:

_____GC ___ HPLC METHOD:

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

ĺ

	Qualifications	J drb/A (di								
10.0% of the recalculated results? umns./detectors <40%?	%RPDI%D Between Two Columns/Detectors Limit (≤ 40%)	23								
or sample dilutions, dry weight factors, etc. for detected target compounds agree within the of detected compounds between two coll s bellow.	Sample ID	12								
Were CRQLs adjusted fo Did the reported results fi Did the percent differenc If no, please see findings	Compound Name	Я								
N NA N NA N NA						 			 	

Comments: <u>See sample calculation verification worksheet for recalculations</u>

SDG #: - Srr Cover	Fie	eld Duplicates		Reviewer. JVC
METHOD: CC HPLC YN N/A Were field duplicate pairs ide	entified in this SDG?			2nd reviewer.
Y/N N/A Were target compounds dete	ected in the field duplicate pai	rs?		
	Concentration ((halke)	%RPD	Qualification
Compound	- 1	E	Limit	Rarent only / All Samples
X	20	14 U	(17 Pitt)	
N	(,)		7.9	
	Concentration	()	%RPD	Qualification
bunodwoo				Parent only / All Samples
			-	

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Page: Lof

LDC #: 21494 P17

VALIDATION FINDINGS WORKSHEET

LDC #: 21444 P17 SDG #: See Cover

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

26 1 of **X** Reviewer: Page: 2nd Reviewer:

HPLC METHOD: GC_

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

$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$					Reported	Recalculated	Reported	Recalculated	Renorted	Recalculated
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	#	Standard ID	Calibration Date	Compound	CF (2 , to std)	CF (2,00std)	Average CF (initial)	Average CF (initial)	%RSD	%RSD
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	- - -	1691	810660	Dichlorupy (814A.2)	See	rr call				
$\frac{2}{2}$ $\frac{2}{1(AL - B^{-1})}$ $\frac{1}{AL - B^{-1}}$ $\frac{1}{AL - B$				Phorate	2.03409	2,03409	1-292-1	1. 99571	01159:1	10.65165
$\frac{2}{12}$ $\frac{1}{12} \frac{1}{12}			11:01-0-	Malestrim V	Σαε	rr calc	•			
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	7			Dichlarva (8141A-1)						
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	L			Phorate	0- 84084		0-84507		5-59-00	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				Malathi en		V				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	~ ~	ICAL	8 106 109	(1-414-1) (8141A-1)	0. 86 756	0.86756	0,84 16S	0.84168	3.52069	3 52061
Melatice J: 0.8477 J: 0.8477 J: 0.0124 B 6180 B. 61 4 Dichlunto $(21414-2)$ 0.86014 0.86014 0.83357 4.86412 5.84 4 Dhutte 0.84014 0.86014 0.86014 0.83357 4.86412 5.84 1 Dhutte 0.84084 0.64084 0.84507 0.84507 13.2920 1 Delatrite 5.667 0.84507 0.84507 0.84507 13.2920		:+/	26-13:34	Phrate	1.07117	1. 07117	1.07104	1.63104	8.29536	9 2954 8
4 Dichlano (81414-2) 0.86014 0.86014 0.83367 4.86412 4.86502 4				malation J	1.08977	1.08977	1.00124	1. 00124	8 61200	8.6120
Dhurate 0.84084 0.84507 0.84507 13.29300 13.20 malazzion 500 13.20	4			Dichluno (81414-2)	0, 86014	0.86014	633367	6. 83357	4.86+12	F. 84277
malatrian See r' calo	l	r		phyrate 6	0.84084	6. 54084	0,84507	0.84507	13.29200	13. 29294
				malarrian]	200 r	r calc	\ 			

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

2.0 11 OCP 11 2 *

= 2,0 (Phonede & Dichlorus) = 2.0 (Malatin) 15 = Tributy prosphate toep 15 ıl * *

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21444 217 La Cure LDC #:___ SDG #:

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: 2 of 8 Reviewer: JVC 2nd Reviewer:

HPLC METHOD: GC_

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

average CF = sum of the CF/number of standards %RSD = 100 * (S/X) CF = AC

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

				Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date	Compound	CF (2.0 std)	CF (2:0 std)	Average CF (initial)	Average CF (initial)	%RSD	%RSD
-	(cyr	3/06 109	pich lor vos	1.25265	1,25265	1.21037	1.21637	3. 2737S	3. 27372
	(1	Phorate	69975.1	1. 54663	748247	1. 48247	7.97041	7.970495
	(lack)	41.01-95.4	Malathian	1.08977	1.0 8977	1.00/24	42100.1	8.618	8.618
7			Dichuruss	1. 16 144	1. 16144	1-11 44	1.11441	4.50356	4.50360
			phyrate	1.13537	1.13537	1. 12645	1.12465	16.03095	10. (3096
			Madathi un	рŢ	6 - 2	cule. (sa	me as at	er me)	
 m									
, 									
4									

Comments: Refer to Initial Calibration findings worksheet for list of gualifications and associated samples when reported results do not agree within 10.0% of the recalculated 123 the other Same row data as for all cyde. TOCP ٤ Madathin IS wed They = ICAL results.

INICLC.1SB

LDC # 21 444 P17 SDG# Ju Corred

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: J of Z

GC EPA SW 846 Method 8141A **METHOD:**

Dichlorvos Parameter:

X^2								
X Conc ratio	0.100	0.250	0.500	1.000	1.500	2.000	2.500	
Y Area ratio	0.16666	0.14234	1.14300	1.86832	2.84139	3.91604	4.54365	
Compound	Dichlorvos							
Column	(8141A-2)							
Date	08/06/2009	12:58-15:4V						

Regression Output:			Reported	
Constant		-0.04459		0.00661
Std Err of Y Est		0.19659		
R Squared		0.9900	-27	0.99400
No. of Observations		7.00000		
Degrees of Freedom		5.00000		
X Coefficient(s)	1.9024	-0.002208	a	1.91742E+000
Std Err of Coef.	0.087748	0.00		

LDC # 21 494 P17 SDG# 216 Cm-1

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page: 24 of 2 Reviewer: 3VC Ø

METHOD: GC EPA SW 846 Method 8141A

Parameter: Malathion

X^2								
X Conc ratio	0.100	0.250	0.500	1.000	1.500	2.000	2.500	
Y Area ratio	0.08761	0.08110	0.66683	1.12291	1.66312	2.22001	2.69919	
Compound	Malathion			I.				
Column	(8141A-2)							
Date	08/06/2009	12:51-15:42						

Regression Output:			Potronol	
Constant			nai indavi	
CUISICALI		-0.02887	11	0.01372
Std Err of Y Est		0.10316		
R Squared		0.99153	= 61	0 99453
No. of Observations		7.00000		
Degrees of Freedom		5.0000		
X Coefficient(s)	1.1137	-0.002208	α	1 126305+000
Std Err of Coef.	0.046046	0.00	5	1. 150001 - 000

LDC # 21 494 P17 SDG# Sre Corred

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Q Page: 🕁 of 🕭 Reviewer: JVC 2nd Reviewer:

METHOD: GC EPA SW 846 Method 8141A

Parameter: Dichlorvos

			~	×	X^2
Date	Column	Compound	Area ratio	Conc ratio	
08/06/2009	(8141A-1)	Dichlorvos	0.17514	0.100	
14:51-23:21			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	
tant		0.02613	II 0	0.01094
irr of Y Est		0.09498		
uared		0.99782	r2 =	0.99581
f Observations		7.00000		
ses of Freedom		5.00000		
efficient(s)	2.0301	-0.002208	a	2.07952E+000
rr of Coef.	0.042397	0.00		

21464 P17 Lucin LDC # SDG#

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: 5 of 8 Reviewer: JVC 2nd Reviewer: _____

GC EPA SW 846 Method 8141A **METHOD:**

Malathion Parameter:

X^2									
×	Conc ratio	0.100	0.250	0.500	1.000	1.500	2.000	2.500	
7	Area ratio	0.10725	0.27812	0.73013	1.19616	1.74866	2.23552	2.89440	
	Compound	Malathion			I				
	Column	(8141A-1)							
	Date	08/06/2009	12:54-15:42	•					

Regression Outpr	ıt		Reportec	
Constant		0.04712		-0.00342
Std Err of Y Est		0.07124		
R Squared		0.99605	r2 =	0.99300
No. of Observations		7.00000		
Degrees of Freedom		5.0000		
X Coefficient(s)	1.1287	-0.002208	σ	1.17261E+000
Std Err of Coef.	0.031800	0.00		

LDC # 21 454 P17 SDG# 24 Cm~

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page: 🔏 of 🕱 Ë

METHOD: GC EPA SW 846 Method 8141A

Parameter: Phorate

J

Date	Column	Compound	Y Area ratio	X Conc ratio	X^2
08/06/2009	(8141A-1)	Phorate	0.18690	0.100	
12:58-15:42		,	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 Outpu	ıt		Reported	_
Constant		0.11374	ШO	-0.05994
Std Err of Y Est		0.10106		
R Squared		0.99682	r2 =	0.99682
No. of Observations		7.00000		
Degrees of Freedom		5.00000		
X Coefficient(s)	1.7854	-0.002208	ŋ	1.79112E+000
Std Err of Coef.	0.045109	00.0		

LDC # <u>21 4 94</u> P1) SDG# <u>14 Crrr</u>

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page: 7 of 2 25 Reviewer: <u>30</u> 2nd Reviewer:

METHOD: GC EPA SW 846 Method 8141A

Parameter: Malathion

X^2									
×	Conc ratio	0.100	0.250	0.500	1.000	1.500	2.000	2.500	
≻	Area ratio	0.06172	0.16064	0.35869	0.71697	1.02499	1.35430	1.61327	
	Compound	Malathion							
	Column	(8141A-2)							
	Date	08/06/2009	16: 81-25:31						

Regression Output:			Reported	
Constant		0.02098	= 0	0.01814
Std Err of Y Est		0.03472		
R Squared		0.99721	12 11	0.99782
No. of Observations		7.00000		
Degrees of Freedom		5.00000		
X Coefficient(s)	0.6553	-0.002208	σ	9.45490E-001
Std Err of Coef.	0.015497	0.00		

IS = Tributylphosphate = 2.0ug/mL LAb used weighted linear regression

LDC # 21494 P17 See Cover SDG #:

Continuing Calibration Results Verification VALIDATION FINDINGS WORKSHEET

1 of 2 24 F 2nd Reviewer: Reviewer:__ Page:

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

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

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

Where:

Recalculated 0 M 81.4 と N n 81.4 6 3.6 ſ Reported ð S 0 5 5 2.2638 Recalculated 2.1678 4.5358 2.4096 .0320 A 206 CF/Conc. CCV n 'n 2,0320 2.26 3X 2,4046 2.1678 4.5358 CF/Conc. CCV 3. 9054 Reported しとう arter Average CF(Ical)/ CCV Conc. 500 fut 3 Ĺ 8141-2 andly zed (8141 Compound malathin Ş Pich Iw WS Dich lor vors Melath Phoreta Phyrade ł 11,16 Ц Calibration 8/10/09 Date Standard ID 003 F0301 3 Ċ 4 ¥t 2.6

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

LDC #: 21494 P17 SDG #: 54 61-1

VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification

Page: Zof Z Reviewer: JVC 2nd Reviewer:

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 * (ave. CF -CF)/ave.CF

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

A = Area or compound C = Concentration of compound Recalculated ŝ 21. 2 o,y じん A して \$ 3.3 2,6 13.9 2.2 ŝ , v 4 0 Reported 13.9 r V 2.15 3,3 4 2,2 2,6 o. » 2, 6 m n a ŝ . 0 'n 2.8464 2.4180 2.4347 2.4649 2.4084 2.5067 3.0385 Recalculated 2.4924 2.53 36 CF/ Conc. CCV 2.8136 2 5653 2.4186 150 2 2.4084 3.0385 2.5047 2. 4347 2.4180 2,4924 2,8464 CF/ Conc. CCV 2.4649 2.4186 2.8136 Reported 2.5053 2. Average CF(Ical)/ CCV Conc. 2.500 (8141-2) (2-1618) **(**8141-1) Pichlorvos (8141-1 Dichlorups Med athim Malathim <u>Malathi m</u> Compound Malathin Smulled Dichlung Phinate phonate phorate pherate 60/80/8 Calibration Date 8/07/09 Standard ID 1 052 = 520 3 00 6 F6 601 # 4 1/21-21 0-70

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.

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METHOD: CC HPLC

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page: 1 of Reviewer:______2nd reviewer:_____

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found SS = Surrogate Spiked

Sample ID: #]

Surrogate	Columninetector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Triphenyl phisphali	C.J. ×	1. 0	0. 86945	87	87	0
Children ha		-*	0.52199	۶	х ц	<u>ــــــــــــــــــــــــــــــــــــ</u>
-						
		•				

Sample ID:

Sample ID:

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

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LDC #: 21999 p17 SDG #: Sre Cover

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

2nd Reviewer: Page: 1 of 1 Reviewer: JV6

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

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

18/18

MS/MSD samples:

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

MSD = Matrix spike duplicate SC = Sample concentration

	Spike		Sample	Spike S	ample	Matrix	spike	Matrix Spike	Duplicate	W/SM	SD
Compound	(NO AC		Vonc. MS/Ec)	Concen (he /	tration	Percent I	Recovery	Percent R	ecovery	RPI	
	SM SM		0 1	WS	0SM	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)											
Dichlurvas (8141)	<i>حا اا</i>	0	٥	119	107	6	٩١	×8	87	0	=
malathin V				87.6	85	67	67	65	وح	3.0	m
Comments: <u>Refer to Matrix Sp</u> of the recalculated results	ike/Matrix Spike	Duplic	ates finding	s worksheet f	or list of quali	fications and a	issociated sar	nples when re	ported result	s do not agree	within 10.0%

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# #	#
LDC	SDG



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:

SC)/SA	(ICS + LCSU)
% Recovery = 100* (SSC-SC)/SA	Nr u = 1 Luo - Luou - 21(LUO +

Where: SSC = Spiked sample concentration SA = Spike added LCS = Laboratory control sample percent recovery

SC = Concentration

LCSD = Laboratory control sample duplicate percent recovery

2
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samples:
LCS/LCSD

	S S	pike	Spiked	Sample	ר	cs	ΓĊ	sp	LCS/	LCSD
Compound	23	9/L)	Conce (Mo	ntration (1)	Percent	Recovery	Percent F	Recovery	2	a
	rcs	LCSD	rcs	LCSD	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)										
Dichloruns (8141)	4.00	4.00	3.47	3.29	. 98	86	82	8	0.4	4
malathim /			3,09	3.01	77	77	52	SL	2,5	54

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.

0 2nd Reviewer: Qualifications 6.1 wg / Kg COUMAPHOS = 0.08107 1[ani) (Ime (0,88) Recalculated Results く Concentrations 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? Compound Name - 0. 03646 (Blene (LOI 80.0 0.89074 Reported Concentrations (15 E b l b) (1682) /ı 4 CNC. # Concentration/= | Sample ID. Example: find Compound Area or height of the compound to be measured Final Volume of extract (RF)(Vs or Ws)(%S/100) RF= Average response factor of the compound In the initial calibration (A)(Fv)(Df)HPLC GC Vs= Initial volume of the sample Ws= Initial weight of the sample %S= Percent Solid Sample ID SDG #: See Curr A= Area or height of f Fv= Final Volume of e Df= Dilution Factor Concentration= **METHOD:** Comments: N N/A AN #

SAMPCALew.wpd

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

21494 917

LDC #:

Page: / of / Reviewer: 1/2

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.
- 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.

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:

Sample	Finding	Flag	A or P
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

LDC #: <u>21494Q17</u> SDG #: 8304617

Laboratory: Test America

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage_2B 4

	Date:	9/15/0g
	Page:_	<u>lof /</u>
	Reviewer:	JVC'
2nd	Reviewer:	A
		•

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
<u> </u>	Technical holding times	A	Sampling dates: 7/21 - 22/09
lla.	Initial calibration	A	2 RSD = 202 rr
IIb.	Calibration verification/ICV	NEWA	Car/1W = 202
	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	Las
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	JUEAT 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				
11	SA166-10BSPLP	- 11	9211412 MB	21	31
2 >	SA166-10BSPLPRE DI	12 7	9211418 MB	22	32
3 1	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 7	SA166-10BSPLPREMS	17		27	37
8 7	SA166-10BSPLPREMSD	18		28	38
9		19		29	39
10		20		30	40

Notes:

GCHPLC				
Validation Area	Yes	No	NA	Findings/Comments
Is Technical holding times as				
All technical holding times were met.	/	ł		
Cooler temperature criteria was met.	/	ł		
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	/	ľ		
Were all percent relative standard deviations (%RSD) \leq 20%?				
Was a curve fit used for evaluation?	\leq		 	
Did the initial calibration meet the curve fit acceptance criteria of $\geq 0.990?$	/			
Were the RT windows properly established?				
W.Continuing/calibration/				
Was a continuing calibration analyzed daily?				
Were all percent differences (%D) \leq 15%.0 or percent recoveries 85-115%?				
Were all the retention times within the acceptance windows?			ſ	
V/Blanks	i si			
Was a method blank associated with every sample in this SDG?	\mid			
Was a method blank analyzed for each matrix and concentration?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
MI-Surrogate spikes				
Were all surrogate %R within the QC limits?	\backslash	-		
If the percent recovery (%R) for one or more surrogates was out of QC limits, was				
I a reanalysis performed to confirm samples with %R outside of criteria?				
matrix in this SDG? If no, indicate which matrix does not have an associated	/			
MS/MSD. Soll / Water.	~			
Was a wishing analyzed every 20 samples or each matrix?		/		
(RPD) within the QC limits?		akto skranstv		
VIIIs Eaboratory control samples in the				
Was an LCS analyzed for this SDG?				
Was an LCS analyzed per extraction batch?	\square			·····
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the OC limits?		/		
X Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?	NAME AND A DESCRIPTION OF A DESCRIPTIONO			n en
Were the performance evaluation (PE) samples within the acceptance limits?				

VALIDATION FINDINGS CHECKLIST

	Page:_	2 of 2
	Reviewer:	<u> </u>
2nd	Reviewer:	0-
		7

Validation Area	Yes	No	NA	Findings/Comments
X starget compound identification				
Were the retention times of reported detects within the RT windows?		-		
XI. Compound quantilation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIII System performance				
System performance was found to be acceptable.				
XIII: Overall assessment of data				
Overall assessment of data was found to be acceptable.				
XIV-Field duplicates		А. С.		
Field duplicate pairs were identified in this SDG.	•	7	/	
Target compounds were detected in the field duplicates.			7	
XV Field blanks				
Field blanks were identified in this SDG.			-	
Target compounds were detected in the field blanks.				

21444 @17 See Cover LDC #: SDG #:

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

-0 -0 -Page: 2nd Reviewer: Reviewer:

HPLC METHOD: GC

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

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

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

5.6478Y Recalculated 7.61934 5-21245 6.26780 %RSD 5,21237 5.64768 6.26779 7.61929 Reported %RSD Recalculated Average CF (initial) 1.55 884 1.07563 1.28601 1. 8 2706 Average CF (initial) 1.28601 Reported. 1.55884 1.07563 1.82706 celo. Recalculated 1.16461 1. 36616 1.68126 CF کہی std) 10575.1 <u>s</u> ٢ Ś 1.68620 1.36616 1.16461 CF 2.0 std) Reported 1.965301 See See (2141-2) C 8141-1-Phorate / Ethoprop Compound Malathian Dichloruss Melsthien Dichlorves Phorate Calibration 8/03/09 Date Standard ID ICAL # ო 4 -2

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

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LDC # 21 494 Q17 Ste Correl SDG#

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Page: 2 of 3245 2nd Reviewer: Reviewer: _

GC EPA SW 846 Method 8141A **METHOD:**

Phorate Parameter:

			~	×	X^2
Date	Column	Compound	Area ratio	Conc ratio	
08/03/2009	(8141A-1)	Phorate	0.18145	0.100	
			0.53110	0.250	
			1.04001	0.500	
			2.13734	1.000	
		I.	3.09373	1.500	
			3.53449	2.000	
		·	4.98370	2.500	

Regression Output:			Reported	_
Constant		0.07126	- II O	-0.02464
Std Err of Y Est		0.20117		
R Squared		0.99000	r2 =	0.99500
No. of Observations		7.00000		
Degrees of Freedom		5.00000		
X Coefficient(s)	1.9112	-0.002208	в	1.93230E+000
Std Err of Coef.	0.089791	0.00		

IS = TOCP = 2.0ug/mL LAb used weighted linear regression

LDC # 21494 (2)7 SDG# 24 Cures

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page: <u>3</u> of <u>3</u> Reviewer: JVC 2nd Reviewer: _

:

METHOD: GC EPA SW 846 Method 8141A

Parameter: Phorate/Ethoprop

X Conc ratio	0.200	0.500	1.000	2.000	3.000	4.000
Y Area ratio	0.29174	0.73456	1.50219	3.33981	4.68224	5.72258
Compound	Phorate/Ethoprop			1		
Column	(8141A-2)					
Date	08/03/2009					

5.000

7.80615

X^2

Regression Output:		Reported	
Constant	0.02499	11	0.01406
Std Err of Y Est	0.23214		
R Squared	0.99424	r2 =	0.99671
No. of Observations	7.00000		
Degrees of Freedom	5.00000		
X Coefficient(s)	5226 -0.002208	g	1.55380E+000
Std Err of Coef. 0.0	1808 0.00		

IS = TOCP = 2.0ug/mL LAb used weighted linear regression

LDC #: 21494 Q 17 See Cover SDG #:

Continuing Calibration Results Verification VALIDATION FINDINGS WORKSHEET

) of Page: Reviewer: 2nd Reviewer:

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

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

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

					Reported	Recalculated	Reported	Recalculated
Standard ID		Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	CF/Conc. CCV	CF/Conc. CCV	D%	Q%
			All sampled and	werd n'sh	t ofter	CAL		
	and the second se				-			
	_							
	1							

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

METHOD: _____GC ___ HPLC LDC #: 21494 & 17 SDG #: Ser Cover

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

l of Reviewer:______2nd reviewer:______ Page:

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	ColumnDetector	Surrogate Spiked	Surrogat e Found	Percent Recovery	Percent Recovery	Percent Difference
))			Reported	Recalculated	
Tripheny phisphate	Col. 1	1.00	0.78998	79	79	۵.
chlormetos	G. Y	1	0. 58552	<u>ر الم</u>	25	
		-				

Sample ID:

Sample ID:

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

SURRCALCNew.wpd

LDC #: 21494 & 17 SDG #: Ste Curel

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

Page: -01 2nd Reviewer:____ Reviewer:

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

RPD =(((SSCMS - SSCMSD) * 2) / (SSCMS + SSCMSD))*100 ٩ 5

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

MSD = Matrix spike duplicate SC = Sample concentration

	Sp.	ike tad	Sample	Spike S	sample	Matrix	k spike	Matrix Spik	e Duplicate	W/SW	sp
Compound	1 49	(- 7)	Conc. 1 1	Voncer V VV /	L)	Percent	Recovery	Percent F	Recovery	RPI	
	WS	MSD	. 1,	WS	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)											
Dichlor UZS (8141)	4.00	£, 4	Ó	3.07	3.36	77	77	*	44	6.6	6
malani m	}	+		2.7~	2,97	68	27	٤٢	73	52	- ~
							 		-		-
Comments: Refer to Matrix Sp of the recalculated results.	oike/Matrix	Spike Dup	licates finding	s worksheet f	or list of quali	fications and a	associated sar	nples when re	ported result	s do not agree	within 10.09

MSDCLCNew.wpd

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4	ÿ
LDC #	SDG #:



CC HPLC METHOD:

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 = I LCS - LCSD I * 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:	211418	SN						-		
	d S C	like	Spiked	Sample	FC	ş	LC	SD	LCS/I	csD
Compound	лч УМ)	14)	Conce (V/S	$\frac{1}{L}$)	Percent F	Recovery	Percent	Recovery	RP	Q
	LCS 1	LCSD	rcs	rcsD	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)										
Dichlarvas (8141)	es 17	KA V	3.27	NA	. ~ 8	81			-	
Malatuin 4		>	27. G		69	69				
Comments: <u>Refer to Labors</u> results do not agree within 1	atory Control	Sample/Labo	oratory Control	Sample Dupli	cate findings wo	rksheet for lis	t of qualifications	s and associate	d samples w	nen reported
V:\Validation Worksheet	S/GC/LCSDCLC_	GC.wpd							$\langle \cdot \rangle$	

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SDG SDG	1	VALIDATI Sampl	ION FINDINGS WORKS e Calculation Verificati	HEET <u>on</u>	Page: <u>of</u> d Reviewer: <u>JV</u> 6 2nd Reviewer:
MET	CHOD:GC HPLC				
ZZ XX	N/A Were all reported re N/A Were all recalculate	esults recalculated and verified fo ed results for detected target com	or all level IV samples? pounds within 10% of the rep	ported results?	
Conc	centration= (A)(Fv)(Df) (RF)(Vs or Ws)(%S/100	D) Example:		Ş	
A= Fv= f=	Area or height of the compound to be me: Final Volume of extract Dilution Factor	asured			
RF= VS= Ws=	Average response factor of the compound In the initial calibration Initial volume of the sample Initial weight of the sample Percent Solid	Concentration -	50		
			· ·		
*	Sample ID	Compound	Reported Concentrations	Recalculated Results Concentrations	Qualifications
		·			
Com	nents:				
····>					

SAMPCALew.wpd

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.
- 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.

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)	Ρ
8/6/09	010F1001	2	Mevinphos	21.1	All samples in SDG 8304620	J- (all detects) UJ (all non-detects)	Ρ

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 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. 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)	Ρ	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

Stage 2B

LDC #: 21494T17 SDG #: 8304620

Laboratory: Test America

Date: <u>9/15/69</u> Page: <u>lof /</u> Reviewer: <u>JVC</u> 2nd Reviewer: <u>_</u>

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: 7/29/69
Ila.	Initial calibration	A	2 KSD 620 2 rr
IIb.	Calibration verification/ICV	SW	CON/101 = 20 3
111.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	us /p
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	
Х.	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	RSAU4-20 S	11)	9215329 MB	21	31	
21	RSAU4-50	12	9215363 MB	22	 32	
3-1	FB072909-SO W	13		23	33	
4	SA73-0.5B S	14		24	 34	
51	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:

HPLC / CC METHOD:

VALIDATION FINDINGS WORKSHEET

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 Tolitono
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	
ł. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotolune	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. Slivex	M. Ronnel	HH. Tetrachlorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	ll. Sulprofas	
O. Phenanthrene	o.		O. Chlorpyrifos	JJ. Thionazin	
P. Pyrene	Р.		P. Fenthion	kk, Phosmet	
ö	ø		Q. Parathion-ethyi	LL. 0.00-Triethulah	scohara this ato
R.			R. Trichloronate	MM. Famphur	
S.			S. Merphos	NN. Carbo Dheno th	01
			T. Stirofos	00. Carbo phene th	ion - methy/
			U. Tokuthion		

Notes:

cmpd_list.wpd

LDC #: 21 49 4 717 SDG #: Ly Conn

METHOD: _____GC ___ HPLC

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**

Page: 1 of 1 Reviewer: JC

2nd Reviewer:

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

Did the continuing calibration standards meet the %D / RPD validation criteria of <45.0%? R Y N N/A

Level JA-Quly

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

		_										_		_			_	_						
Qualifications	5-/WT/P (c)	Et Mets P	5-12 /2	5- /WJ /P	4524 +1	arat a		3-145 A	It Arts A					-										
Associated Samples	AN + BIKS							1,2, 4-7, 9215329 MB	, L			3-9215362 MB												
	((((((((((((((-	((((((((<u> </u>
RT (limit))	<i>、</i>)))))))))))))))))	
202																								
%D / RPD (Limit ≤ 45.0)	22.2	211.6	84.9	21.1	4.812	93.1		34.2	340															
Compound	¢-)	(1) J	() A	ر.) هم		p er		F C	À GÌ															
Detector/ Column	5-9,1		>	G1.2				ch ,	cr1:12															
Standard ID	010 F/001	Clear						048 F4801	(cev)			01451401	رومها											
Date	8/06/09							2 109/09				<u>8/1.0/00</u>												
#																								

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Revision 1

LDC Report# 21494U17

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:

Matrix:

Soil

Parameters:

Validation Level:

Stage 2B

Organophosphorus Pesticides

October 6, 2009

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 8304621

Sample Identification

RSAU4-20BSPLP RSAU4-20BSPLPRE RSAU4-20BSPLPDI RSAU4-50BSPLP RSAU4-50BSPLPDI RSAU4-20BSPLPREMS RSAU4-20BSPLPREMSD

Revision 1

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.

V:\LOGIN\TRONOXNG\21494U17.RV1

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
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)	š) A icts)	
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)	Ρ
8/6/09	010F1001	2	Mevinphos	21.1	RSAU4-20BSPLPRE RSAU4-20BSPLPREMS RSAU4-20BSPLPREMSD 9232166MB	J- (all detects) UJ (all non-detects)	Р

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)	Å

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	А

*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)	А	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)	Ρ	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	*Х	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

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VALIDATION	COMPLETEN	IESS WORKSHEET

LDC #: 21494U17

Stage 2B

	Date:	9/14/09
	Page:	l of)
	Reviewer:	JYG
2nd	Reviewer:	16
		۲`

SDG #: 8304621 Laboratory: Test America

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
1.	Technical holding times	SW	Sampling dates: 7/31/69
lla.	Initial calibration	A	3 KSD 4202 +2
lib.	Calibration verification/ICV	SW	CONTON 6203
	Blanks	A	
IVa.	Surrogate recovery	SW	· · · · · · · · · · · · · · · · · · ·
IVb.	Matrix spike/Matrix spike duplicates	Å	
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.	
Х.	Field blanks	N	

Note:

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

D = Duplicate TB = Trip blank EB = Equipment blank

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Validated Samples:

A = Acceptable

SW = See worksheet

N = Not provided/applicable

	validat	Soi					
	11	RSAU4-20BSPLP	111	9224150 MB	21		31
8/21	27	RSAU4-20BSPLPRE1	127	9232166 MB	22		32
	33	RSAU4-20BSPLPRE2 DI	- 13 3	92210/200 MB	23		33
- 1	4 1	RSAU4-50BSPLP	14		24		34
	5 3	RSAU4-50BSPLPRE DI	15		25		35
	62	RSAU4- 20 BSPLPRE M	516		26	·	36
	7 7	/ Ms	717		27		37
	8		18		28		38
	9		19		29		39
	10		20		30		40

Notes:

SDG #: _____ LDC # 21 494 MI7

VALIDATION FINDINGS WORKSHEET Technical Holding Times

バ Page: ____of__ 2nd Reviewer:__ Reviewer:

All circled dates have exceeded the technical holding times.

METHOD :	CGC HF	or c					
Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
2, 6, 7	Soil	N	7/30/169	8/21/00	8/25/09	5	3-/45/A CH)
/	~						
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TECHNICAL HOLDING TIME CRITERIA

Extracted within 7 days, analyzed within 40 days. Extracted within 14 days, analyzed within 40 days.

Water: Soil: . इ. स्ट्र

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LDC # 21 494 M17 SDG #: Suc Curry METHOD: ____GC ___ HPLC

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**

2nd Reviewer:

Page: Nof #

Reviewer: 372

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

Level IV Only Y N NVA

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

<u> </u>		1	1	T			1															\leq		
Qualifications	- 3+ new/p (C	JANA	34 det 19	3-/R/P			J-156	5+ Act 0	July	5-145/9	J+dute D	Jyghte		J-141A	~			J+ Acts A		J-/NJ /A	3+ 1.3/A			
Associated Samples	1, 3-5 9224100 MB	922 1012 MB					Z, 6,7, 9232166 MB							1. 3-5. 9224 ISOMB	Qm <101226			2.67 9232166MB				~		
20 2 RT (limit)		(()		()	(()	(((()	()	()	()	((()	(()	((
%D / RPD (Limit ≤ 45:00	197. 0	74.9	238.0	ation		ara - 1845. 18-19 - 18-19 19-19 - 19-19	22.2	211.6	84.9	21, 1	218.7	42.1		42.5	42.7			22.7	52°57	21.8	\$! \$	29.3		a tanan arawa Arawa Arawa arawa
Compound	C (+)	Z A	(1) 0	U E)			B (-)	6-67		B E-J	C-ter	450		E E	E E			(+) 4	(+) 8	£	(t) ₹	(+) 8		
Detector(Column	64 -	- - - - -	C24. 2				CH. 1	-		543				Ca1,1	1.40			- ins		->	5.2			
Standard ID	1001 + 1001						01071001							040 F4001	(00)	<u> </u>		003 70301	(دھ)					
¥ Date	\$ 12 60	1 3121/2					8/06/60	+ 2:22/2						8/14/00				8 /20/09						
											1			1			1	<u>L_</u>	1		L		<u> </u>	

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LDC # 21 494 417 SDG # 24 64-4

VALIDATION FINDINDS WORKSHEET Surrogate Recovery

SVC d Page: 1 of Reviewer:

METHOD: GC HPLC Are surrogates required by the method? Yes or No. Phase see qualifications below for all questions answared "N". Not applicable questions are identified as "N/A". Y.M. N/A Were surrogates spiked into all samples and blanks?

X (N)	N/A Did all surro	ogate re	COVENES (7		201						
*	Sample ID		Detector/ Column	Surrogate Compound		%R (Limits)			Qui	lifications	
		Nat	3 220	X) 86	- 07	154)	ライーク	I ZA	5
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	Surrogate Compoui	Pu		urrogate Compound		Surrogate Compound		Surrogate Compound			
<	Chlorobenzene (CBZ)		0	Octacosane	¥	Benzo(e)Pyrene	s	1-Chloro-3-Nitrobenzene	7	Tetrachloro-m- xylene	
ß	4-Bromofluorobenzene (E	BFB)	н	Ortho-Terphenyl	z	Terphenyl-D14	+	3,4-Dinitrotoluene	N	Chlorm+ tos	
υ	a,a,a-Trifluorotoluene			Fluorobenzene (FBZ)	0	Decechlorobiphenyl (DCB)	2	Tripentyltin			
۵	Bromochiorobenene			n-Triacontane	٩	1-methylnaphthalene	>	Tri-n-propyllin			
ш	1,4-Dichlorobutane		×	Hexacosane	a	Dichlorophenyl Acetic Acid (DCAA)	3	Tributy Phosphate			
"	1.4-Difluorobenzene (D)	FB) L		Bromobenzene	L R L	4-Nitrophenol	L X L	Triphenvi Phosphate	_		

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LDC #: 21 494 117 SDG #: 54 Cr

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

SUC 2nd Reviewer: Page: lof 1 Reviewer:

METHOD: CC 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. (

il quality and usability of the data acceptable?	
Was the overal	
Y/N N/A	¥

*	Sample # compound Name	Finding	Associated Samples	Qualifications
	а	outside H.T.		XX/A (o)
<u> </u>		a a construction of the second second second second second second second second second second second second se		
			4	
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Con	nments:			

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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: August 5, 2009

LDC Report Date: September 24, 2009

Matrix: Water

Parameters: Organophosphorus Pesticides

Validation Level: Stage 2B

Laboratory:

TestAmerica, Inc.

1

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.
- 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.

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)	Ρ

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)	Р

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 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

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)	Ρ	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	
VALIDATION COMPLETENESS WORKSHEET	Г

Stage 2B

SDG #: 8304622 Laboratory: Test America

LDC #: 21494V17

/ Date: <u>۹/۱۱</u> | Page: _ of Reviewer: _ عکر 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
1.	Technical holding times	A	Sampling dates: 8/05/09
lla.	Initial calibration	A	70 RSD rr
IIb.	Calibration verification/ICV	SW	CON/100 = 202
<u>III.</u>	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	client spec
IVc.	Laboratory control samples	A	4CS 16
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 =

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:

vanaa	Water		·····	
1	FB080409GW	11	21	31
2	9217511 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(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	GC. Tolitena
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-methył	SSS. O-Xylene
E. Benzo(a)pyrene	E. Tetryi	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. Trifluratin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotolune	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. Tetrachiorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	II. Sulprofos	
O. Phenanthrene	o.		0. Chlorpyrlfas	JJ. Thionazin	
P. Pyrene	ď		P. Fenthion	kk, Phosmet	
Ġ.	۵		Q. Parathion-ethyl	LL. O.O.OTriethulph	oc phoro this at +
R.			R. Trichloronate	MM. Famphur	
S.			S. Merphos	NN. Carbophenoth	04
			T. Stirofos	00. Carbophenoth	ion - methul
			U. Tokuthion		

Notes:

cmpd_list.wpd

LDC #: 21 494 V17 See cones SDG #: METHOD: CG HPLC

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**

Page: 1 of 1 Reviewer: 3V6

2nd Reviewer:

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? _____6D or ____RPD What type of continuing calibration calculation was performed? <u>%</u>D or <u>RPD</u> <u>X N NA</u> Were continuing calibration standards analyzed at the required frequencies?

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

Level JV-Only Y N N/A

Y N/N/A

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

· · · · ·	7	\mathbf{x}	-		r	-			-	\rightarrow					 -			-		_			_
Qualifications	5-145 10 (C)		3-1210	3+ dets 10	K-18-18	J-/45 /P		5- N5/A		Jolets/A .													
Associated Samples	rii + Bik										-												
t)		(()) () (((()	(((() () ((() () () (
RT (limi)))))))))))	-))))))))
%D / RPD (Limit ≤ 15.0)	22.2	3112	24.6	2-9-2-	42.1	21.1		21.9	23.8	21.4													
Compound	ر ح			C C	(J) d	(-) 8		F (-)	() ح-)	A (+)													
Detector/ Column	CN. 1	-		Cel. X	\	~>		Col. 1		CA 2													
Standard ID	010+1001	(M)						051F3101	رتحم														
# Date	8/06/09	•						8/09/09	-														

CONCALNew-gc.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 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.
- 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.

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)	Ρ
8/6/09	010F1001	2	Mevinphos	21.1	FB080309-SO 9217511MB	J- (all detects) UJ (all non-detects)	Р

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 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. 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)	Ρ	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	
VALIDATION COMPLETENESS WORKSHEET	Γ

Stage 2B

8304623 Laboratory: Test America

LDC #: 21494W17

SDG #:

Date: 9/14/09 Page: 1 of Reviewer: 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: 8/63 - 05/09
lla.	Initial calibration	A	70 KID ≤ 202 rr
IIb.	Calibration verification/ICV	SW	ICV/CON = 20 2
- 111.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	45/0
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	Á	
IX.	Field duplicates	Ń	
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
61	9217511 MB	16	26	36
- 7 2	9223449 MB	17	27	37
8		18	28	38
9		19	29	39
10		20	30	40

Notes:

VALIDATION FINDINGS WORKSHEET

METHOD: CGC HPLC

8310	8330	8151	(8141	8141(con't)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensulfothion	V Borroo
B. Acenaphthylene	B. RDX	B. 2.4-DB	R Mevinnhoe		
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X FPN	CC. Ioluene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2.4.5.TP	D Dameton_S	V Arlandra at 1	tter turiyi beliterite
				r. Azinpnos-memyi	SSS. U-Xylene
t. Benzo(a)pyrene	E. Tetryi	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,l)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-Dinttrotolune	J. MCPA	J. Diazinon	EE. Def	
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachiorophenol	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. Tetrachiorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	li. Sulprofos	
O. Phenanthrene	0.		0. Chlorpyrifos	JJ. Thionezin	
P. Pyrene	٩ċ		P. Fenthion	kk, Phosmet	
ġ	۵		Q. Parathion-ethyl	LL. 0.00-Triethulph	scohara this ato
R.			R. Trichloronate	MM. Famphur	
S.			S. Merphos	NN. Carbophenoth	00
			T. Stirofos	00. Carbophenoth	ion - methul
			U. Tokuthion		
Notae:					

cmpd_list.wpd

LDC #: 21494 W17 SDG #: 54 Cored GC HPLC

METHOD:

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Reviewer: JV6 Page: lof

2nd Reviewer:

Υ,

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". At type of continuing calibration calculation was performed? __%D or __RPD

Were continuing calibration standards analyzed at the required frequencies? 2 Θ Did the continuing calibration standards meet the %D / RPD validation criteria of $\leq 18.0\%$?

 Y N
 N/A
 Were continues

 Y N
 V/A
 Did the continues

 Y
 N N/A
 Were the respective

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

	(<u>`</u>												_			_			-		_			~
Qualifications	J-143/P (G	34 marts	14/1	J-MJ/P	21 Acres of	- a - a - a			J+ dets/R	J-/WS/2	It detap	J-/R/P			J-14 A		J+deb/A			J-/NJ/A	~				
Associated Samples	1, 921751 MB								2-5 9223449 MB	<u> </u>					(1, 921751) MB					2-5 9223449 MB	-				1
	(((((()	(((Ź						^	(
20 と) RT (limit))))))))))))	_	<u> </u>		<u> </u>	~	~)	<u>`</u>	, , , , , , , , , , , , , , , , , , ,	<u> </u>)	
%D / RPD (Limit < 15.0)	22.2	3-11-2	84.9	21.1	-218.1	1.69			197.8	74.9	2 38.8	96.3			21,9	23.8	21.4			43.9	ا ,7 ح	63,9	20,6	20,3	18.7
Compound	€ E	1000		B (-)	50	PC-			(+) C	the second	E J	(-) A			F (-)	5	A (+)			() 4	X (-)	F F)	Т С	() ()	(-) X
Detector/		-	~	Col. 2					(af.)		C21.2				G.I.	Ţ	Carl. Y			Cal.		cui. X	-		
Standard ID	1001 \$ 1001								01 F 1001	CMU					031 F3101	(200)				055 7501	(col)				
Date	8/06/66	19:10							8/12/00	1 2721/2					2 109 60					8/4 60					
#																									

CONCALNew-gc.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 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.
- 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.

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 Hend	erson
VALIDATION COMPLETENESS	WORKSHEET

Stage 2B

SDG #: 8304624

Laboratory: Test America

LDC #: 21494X17

Date:	9/15/09
Page:_	l_of
Reviewer:	JVG_
2nd Reviewer:	h

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
	Technical holding times	Å	Sampling dates: 8/03-05/09
lla.	Initial calibration	A	7_{1} RJD ≤ 202 r ²
IIb.	Calibration verification/ICV	SW	Cav/10 = 202
111.	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	
Х.	Field blanks	V 🎝	#B= EB072109 - 50 Frm 8304616

Note:

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

Soil

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

D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

1	RSAJ3-10B SPLP	171 9224150 MB	21	31
2 7	RSAJ3-10BRE SPLP DI	12 × 9221012 MB	22	32
3	RSAJ3-29B SPLP	13 3 9224517 MB	23	33
4 >	RSAJ3-29BRE SPLP DI	144 9224510 MB	24	34
5 3	RSAU5-0.5BSPLP	15	25	35
6 Y	RSAU5-0.5BSPLPRE DI	16	26	36
7	RSAU5-0.5BSPLPMS	17	27	37
8	RSAU5-0.5BSPLPMSD	18	28	38
9		19	29	39
10		20	30	40

Notes:

VALIDATION FINDINGS WORKSHEET

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METHOD: CG HPLC

8310	8330	8151	(8141	8141(Con't)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Faneulfothion	
B. Acenaphthylene	B. RDX	B. 2.4-DB	R Marinehee		V. Benzene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	W. Bolstar Y Edn	CC. Toluene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2.4.5-TP	D Demetron-6		EC. EUNI Benzene
E. Benzo(a)pyrene	F Tetrul			1. Azinpnos-metnyi	SSS. O-Xylene
	L: Teuyi	E. Uinosed	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)peryiene	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-Dinitrotolune	J. MCPA	J. Diazinon	EE. Def	
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachiorophenol	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. Tetrachiorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	II. Sulprofos	
O. Phenanthrene	ö		O. Chiorpyrifos	J.T Thisserin	
P. Pyrene	ġ		P. Fenthion	kk Phocmet	
Ġ.	ø		Q. Parathion-ethyl	LL. 000-Twiethulish	and the set of the set
R.			R. Trichloronate	MM. Famphur	21000000
S.			S. Merphos	NN. Carbo chencth	22
			T. Stirofos	00. Carbo pheno the	cm - m+41.1
			U. Tokuthion		
Notes:					
					· · ·

cmpd_list.wpd
LDC #: 21 494 X17 SDG #: 54 Corey METHOD:

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Reviewer: NC Page: 1 of 1

2nd Reviewer:

9

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?

Did the continuing calibration standards meet the %D / RPD validation criteria of 45.0%? Ľ

(Y N N/A Y N N/A Level IV Only Y N N/A

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

	G	\square												N	-									
Qualifications	JIACASA (7-2-143/P	J+deg/p	J-/R/P			2- AN M	->				J-/MA		~										
Associated Samples	All & BIKS			1			1-4 9224150 MB ,	9 221012 MPS				5-8 922 4512 MB	Grr4510 MB	-	•									
έ2ο λ RT (limit)	()			()	()	(()	()	()	()	()	()	()	(((()	()	(()	(((()	()
%D / RPD (Limit ≤ -43:0) 	197.8	74.9	238.0	96.3			42.5	42.7				43.9	27, 1	チプグ										
Compound	C (+)	(-) Q	(+) (+)	er a			ۍ ۳	F (-)	/ /			≢ (-)	ХÚ	F (-)										
Detector/ Column	247		LTY \	4			cal. 1	Col, Y				CA, 1	1	CN.Y										
Standard ID	010 = 1001						040 74001	(con)				OS5 FESOI	(ccv)											
# Date	8/13/08	Z					R/4/09					8/14/0-1												