

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 Newport Beach, CA 92660 ATTN: Ms. Cindy Arnold December 4, 2009

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

Dear Ms. Arnold,

Enclosed is the revised data validation report for the fraction listed below. The data validation was performed under Stage 4 guidelines. Please replace the previously submitted report with the enclosed revised report.

LDC Project # 21423:

Fraction

TRX09072041

SDG #

**Organic Acids** 

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

Sincerely,

Erlinda T. Rauto Operations Manager/Senior Chemist



### LABORATORY DATA CONSULTANTS, INC.

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

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

September 14, 2009

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

Dear Ms. Arnold,

Enclosed are the final validation reports for the fraction listed below. These SDGs were received on August 20, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

### LDC Project # 21423:

### <u>SDG #</u>

### **Fraction**

**Organic Acids** 

TRX09052940, TRX09060140, TRX09060141, TRX09072852, TRX09060256, TRX09060456, TRX09060457, TRX09060566, TRX09060567, TRX09060840, TRX09061850, TRX09061951, TRX09070755, TRX09071051, TRX09071450, TRX09072041, TRX09072352, TRX09072741, TRX09073051, TRX09080450

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

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

Sincerely,

Erlinda T. Rauto Operations Manager/Senior Chemist

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#### EDD CHECKLIST

LDC #:<u>21423</u>

#### SDG #: <u>TRX09052940</u>, <u>TRX09060140</u>, <u>TRX09060141</u>, <u>TRX09072852</u>, <u>TRX09060256</u> <u>TRX09060456</u>, <u>TRX09060457</u>, <u>TRX09060566</u>, <u>TRX09060567</u>, <u>TRX09060840</u>, <u>TRX09061850</u>, <u>TRX09061951</u>, <u>TRX09070755</u>, <u>TRX09071051</u>, <u>TRX09071450</u> <u>TRX09072041</u>, <u>TRX09072352</u>, <u>TRX09072741</u>, <u>TRX09073051</u>, <u>TRX09080450</u>

# Tronox Northgate Henderson Worksheet

EDD Area	Yes	No	NA	Findings/Comments
1. Completeness				
Is there an EDD for the associated Tronox validation report?	x			
LI-RDD QualifiedRopfilston			-74 C	
Were all qualifiers from the validation report populated into the EDD?	x			
ID.BBDDLabanomalics				
Were EDD anomalies identified?	x			
If yes, were they corrected or documented for the client?	x			See EDD_discrepancy_ form_LDC21423_091409.doc
IV. EDDIDaliverya				
Was the final EDD sent to the client?	x			

## Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Data Validation Reports LDC# 21423

**Organic Acids** 

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Tronox LL(	C Facility,	2009	Phase	В	Investigation,
	Henderson,	Nevada				

Collection Date: May 27, 2009

LDC Report Date: September 1, 2009

Matrix: Water

Parameters: Organic Acids

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): TRX09052940

## Sample Identification

EB052709 EB052709MS EB052709MSD

### Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

Sample EB052709 was identified as an equipment blank. No organic acid contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB052709	5/27/09	Benzenesulfonic acid Diethyl phosphorodithioic acid 4-Chlorobenzenesulfonic acid	3.8 mg/L 17 mg/L 4.1 mg/L	No associated samples in this SDG

## **IV. Accuracy and Precision Data**

### a. Surrogate Recovery

Surrogates were not required by the method.

## 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) were not within QC limits. Since the sample concentration was greater than the spiked concentration, no data were qualified.

## 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 TRX09052940	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 Organic Acids - Data Qualification Summary - SDG TRX09052940

SDG	Sample	Compound	Flag	A or P	Reason
TRX09052940	EB052709	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09052940

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09052940

No Sample Data Qualified in this SDG

# 

VALIDATION COMPLETENESS WORKSHEET

SDG #:\_\_\_\_\_TRX09052940

Laboratory: Alpha Analytical, Inc.

## Date: <u>8/31/09</u> Page: <u>1of</u> Reviewer: <u>v</u>( 2nd Reviewer: \_\_\_\_

### METHOD: HPLC Organic Acids (HPLC Method)

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

**Tronox Northgate Henderson** 

Stage 2B

	Validation Area		Comments
<u> </u>	Technical holding times	A	Sampling dates: 5/27/09
IIa.	Initial calibration	A	r >
llb.	Calibration verification/ICV	A	CCN = 20 2 ICN = 30 2
- 111.	Blanks	A	
IVa.	Surrogate recovery	N	Nat reid.
IVb.	Matrix spike/Matrix spike duplicates	SW	U
IVc.	Laboratory control samples	A	ICS
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	SW	EB = 1

Note:

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

Water

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

EB = Equipment blank

Validated Samples:

1	EB052709	11	21	31
2	EB052709MS	12	22	32
3	EB052709MSD	13	23	33
4	MBLK- 22129	14	24	34
5		15	25	35
6		16	26	36
7		17	27	37
8		18	28	38
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Notes:

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METHOD: GC /HPLC

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A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensulfothion	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Bolstar	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X. EPN	EE. Ethyl Benzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	Y. Azinphos-methyl	SSS. O-Xylene
E. Benzo(a)pyrene	E. Tetryl	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. MP-Xylene
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total Xylene
G. Benzo(g,h,l)perylene	G. 2.4.6-Trinitrotoiuene	G. Dicamba	G. Sulfatep	BB. Trichloronate	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Trichlorinate	
I. Chrysene	1. 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-Nitrotoiuene	M. Silvex	M. Ronnei	HH. Tetrachlorvinphos	
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	II. Supprofos	
O. Phenanthrene	0.		O. Chlorpyrifos	Organic Acid	4
P. Pyrene	ġ		P. Fenthlon	A Dimethul phosphon	odithioic acid
Ċ.	۵		Q. Parathion-ethyl	B. Benzene sulfonic	aid
R.			R. Trichloronate	c. Phthalic acid	
S.			S. Merphos	D. Dictuyl Phospho	rodithioic acid
			T. Stirofos	E. 4- chlorobenzen	esulfonic acid
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LDC #: 21423 447 SDG #: Su Com

VALIDATION FINDINGS WORKSHEET <u>Matrix Spike/Matrix Spike Duplicates</u>



METHOD: GC / HPLC Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A" CAN N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? AN NA V NIA V NIA

Was an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

			No pure		LARANT CINC.	. Dur Hids VIL																		
imits?	Associated Samples																							
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	Compound	•	٥																					
	# MS/MSD ID	2/3	~																					

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Tronox LLC Facility, Henderson, Nevada	2009	Phase	В	Investigation,
Collection Date:	May 28, 2009				
LDC Report Date:	September 1, 2009				
Matrix:	Water				
Parameters:	Organic Acids				
Validation Level:	Stage 2B				
Laboratory:	Alpha Analytical, Inc.				
Sample Delivery Group (SDG):	TRX09060140				
Sample Identification					
M-127B					

### Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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- 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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

No field blanks were identified in this SDG.

## **IV. Accuracy and Precision Data**

### a. Surrogate Recovery

Surrogates were not required by the method.

## 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 not within QC limits. Since there were no associated samples, no data were qualified.

## 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 TRX09060140	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 Organic Acids - Data Qualification Summary - SDG TRX09060140

SDG	Sample	Compound	Flag	A or P	Reason
TRX09060140	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 Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09060140

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09060140

No Sample Data Qualified in this SDG

### Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #:<u>TRX09060140</u> Laboratory: <u>Alpha Analytical, Inc.</u>

LDC #: 21423B47

## Date: <u>8/31/09</u> Page: <u>1of /</u> Reviewer: <u>SV6</u> 2nd Reviewer: <u>/</u>

### METHOD: HPLC Organic Acids (HPLC Method)

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>I.</u>	Technical holding times	A	Sampling dates: 5/28/	109	
lla.	Initial calibration	A	rr		
IIb.	Calibration verification/ICV	A	CCV E 203	101 = 303	
Ш.	Blanks	A			
IVa.	Surrogate recovery	N	Not regid.		
IVb.	Matrix spike/Matrix spike duplicates	SW)	09052940-01	( No associated sample, No g	rol
IVc.	Laboratory control samples	A	KCS		
<u>v</u> .	Target compound identification	N			
VI.	Compound Quantitation and CRQLs	N			
VII.	System Performance	N			
VIII.	Overall assessment of data	A			
IX.	Field duplicates	N			
<b>X</b> .	Field blanks	N			

Note:

A = Acceptable N = Not provided/applicable

SW = See worksheet

Mater

ND = No compounds detected R = Rinsate

FB = Field blank

D = Duplicate TB = Trip blank

EB = Equipment blank

Validated Samples:

<del> </del>   1	M-127B	11	21	31
2	M 127BMS-	12	22	32
3	-M-127BMSD-	13	23	33
4	MB1K - 22124	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:

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Tronox LLC Facility, Henderson, Nevada	2009	Phase	В	Investigation,
Collection Date:	May 29, 2009				
LDC Report Date:	September 1, 2009				
Matrix:	Water				
Parameters:	Organic Acids				
Validation Level:	Stage 2B				
Laboratory:	Alpha Analytical, Inc.				
Sample Delivery Group (SDG):	TRX09060141				
Comple Identification					

Sample Identification

MC-45B

### Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

## III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

No field blanks were identified in this SDG.

## **IV. Accuracy and Precision Data**

## a. Surrogate Recovery

Surrogates were not required by the method.

### 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 not within QC limits. Since there were no associated samples, no data were qualified.

## 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 TRX09060141	All compounds reported below the PQL.	J (all detects)	А

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 Organic Acids - Data Qualification Summary - SDG TRX09060141

SDG	Sample	Compound	Flag	A or P	Reason
TRX09060141	MC-45B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09060141

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09060141

No Sample Data Qualified in this SDG

### Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: TRX09060141

LDC #: 21423C47

Laboratory: Alpha Analytical, Inc.

## Date: 8/31/69 Page:\_\_lof\_\_/ Reviewer:\_\_\_\_V 2nd Reviewer:\_\_\_\_

### METHOD: HPLC Organic Acids (HPLC Method)

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: 5/29/09
lla.	Initial calibration	A	r <sup>°</sup>
IIb.	Calibration verification/ICV	A	CCV = 20 2 101 = 30 3
111.	Blanks	A	
IVa.	Surrogate recovery	N	Not regid.
IVb.	Matrix spike/Matrix spike duplicates	SW	09052940-01 (No associated sample No qual)
IVc.	Laboratory control samples	A	lcs
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
<b>X</b> .	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:

	Water				
1	MC-45B	11	21	31	
2	MB16 - 22124	12	22	32	
3		13	23	33	
4		14	24	34	
5		15	25		
6		16	26	36	
7		17	27	37	
8		18	28	38	
9		19	29	39	
10		20	30	40	

Notes:

21423C47W.wpd

# 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 10, 2009
Matrix:	Soil
Parameters:	Organic Acids
Validation Level:	Stage 4
Laboratory:	Alpha Analytical, Inc.
Sample Delivery Group (SDG):	TRX09072852

## Sample Identification

SA166-10BSSPLP SA166-10BSSPLPpH(SPLP) SA166-10BSSPLP(DI SPLP) SA182-10BSPLP SA182-10BSPLPpH(SPLP) SA182-10BSPLP(DI SPLP)

### Introduction

This data review covers 6 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

## III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

No field blanks were identified in this SDG.

## **IV. Accuracy and Precision Data**

## a. Surrogate Recovery

Surrogates were not required by the method.

## 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 were within validation criteria.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG TRX09072852	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 Organic Acids - Data Qualification Summary - SDG TRX09072852

SDG	Sample	Compound	Flag	A or P	Reason
TRX09072852	SA166-10BSSPLP SA166-10BSSPLPpH(SPLP) SA166-10BSSPLP(DI SPLP) SA182-10BSPLP SA182-10BSPLPpH(SPLP) SA182-10BSPLP(DI SPLP)	All compounds reported below the PQL	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09072852

## No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09072852

No Sample Data Qualified in this SDG

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

Stage 4

SDG #: TRX09072852 Laboratory: Alpha Analytical, Inc.

LDC #: 21423D47

### METHOD: HPLC Organic Acids (HPLC Method)

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>I.</u>	Technical holding times	A	Sampling dates: $7/21 - 22/09$
lla.	Initial calibration	A	+ ~
llb.	Calibration verification/ICV	A	CCN = 203 ICN = 303
111.	Blanks	A	
IVa.	Surrogate recovery	N	Not regid.
IVb.	Matrix spike/Matrix spike duplicates	Á	09073050-01 09073051-02
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	A	
VI.	Compound Quantitation and CRQLs	A	
VII.	System Performance	A	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
<u>x</u> .	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:

vanua	Soil				
1	SA166-10BSSPLP	11 /	MB1K-22436	21	31
2	SA166-10BSSPLP(SPLP)	12 -	MB1K- 22444	22	32
3	SA166-10BSSPLP(DISPLP)	13		23	33
4	SA182-10BSPLP	14		24	34
5	SA182-10BSPLP(SPLP)	15		25	35
6	SA182-10BSPLP(DISPLP)	16		26	36
7		17		27	37
8		18		28	38
9		19		29	39
10		20		30	40

Notes:

Date: 9/10/09 Page: \_\_\_\_of\_\_/ Reviewer: SNC 2nd Reviewer:
Method:GCHPLC				
Validation Area	Yes	No	NA	Findings/Comments
Ik rechnicell földingsumelsen at 12 av 12 av		No.		
All technical holding times were met.				
Cooler temperature criteria was met.				
II. Infual Calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	$\left \right $			
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?	$\square$			
Were the RT windows properly established?			N. C. LOW AN	
Was a continuing calibration analyzed daily?				
Were all percent differences (%D) < 26%.0 or percent recoveries 86-126%?	$\leq$			
Were all the retention times within the acceptance windows?		a dha meratan	elan <b>te</b> n g	
V:Blanks				
Was a method blank associated with every sample in this SDG?				
Was a method blank analyzed for each matrix and concentration?	$\leq$			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		-		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?			~	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?				
<u>พีเราน้อยเหล่าได้เสี้ยวอี่มีเหลยนมีโดกกร</u>				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD_Soil / Water		-		
Was a MS/MSD analyzed every 20 samples of each matrix?	~			
Were the MS/MSD percent recoveries (%R) and the relative percent differences		/		
Was an LCS analyzed for this SDG?				
Was an LCS analyzed per extraction batch?	/			· · · · · · · · · · · · · · · · · · ·
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?			1	

Validation Area	Yes	No	NA	Findings/Comments
X it ingencompounds continication	es is	in de la compañía de La compañía de la comp	И <u>ф</u>	的基本的新闻会会
Were the retention times of reported detects within the RT windows?				
XI. Sompound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
				No. 19 Maria
System performance was found to be acceptable.		-		
XIII, Overall assessment of data		s x i i		
Overall assessment of data was found to be acceptable.		-		
XIV. Field duplicates and a	2.3	ner Vien		
Field duplicate pairs were identified in this SDG.			-	
Target compounds were detected in the field duplicates.			/	
XV-Field blanks			) ** ) Verso	a lang sa
Field blanks were identified in this SDG.		<	-	
Target compounds were detected in the field blanks.			$\langle$	

LDC # 21 423 947 Jee Curry SDG#

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

3/5 Page: 1 of 

HPLC METHOD: 4-Chlorobenzenesulfonic acid Parameter:

			×	٢	Y^2
ate	Detector	Compound	Conc	Area	
			(ppm)		
6/03/09	Ś	4-Chlorobenzenesulfonic acid	0.025	105332	
	HPLC 3		0.050	201649	
			0.100	464100	
			0.250	1152183	
			0.500	2262016	
			1.000	4485504	
			1.500	6696299	
			2.000	8851547	

4641000 4608732

RF 4213280 4032980 4485504 4464199

4425774 Ave 4424438

4524032

Regression Output:			Repor	ted
Constant		-4.19374E-003	II O	-0.004194
Std Err of Y Est		0.00735		
R Squared		0.999917	r2	0.999917
No. of Observations		8.00000		
Degrees of Freedom		6.00000		
X Coefficient(s)	2.254E-007	-9.41E-015	= q	2.254E-007

21 423 047 See Cover SDG #: LDC #:

**Continuing Calibration Results Verification** VALIDATION FINDINGS WORKSHEET

the Page: 1 of 1 2nd Reviewer: Reviewer:

> HPLC METHOD: GC

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

Recalculated Q ふ 0 Å 100, 101. 47 00 100.3 101.6 Reported б ď. 100. 67, **Recalculated** des CF/Conc. CCV 1,008 0.979 0. SOR 0 CF/Conc. CCV 202.0 0.979 208 1.003 Reported 0 Average CF(Ical)/ CCV Conc. 000 500 095.0 000 . 1 °. Compound P-CBSA Calibration Date 8/01 /09 p0/0K/2 19/12/2 540:100 2087 81 7 /30/69 \$ 4819001. Dy B4783001.00 194793001, DI Standard ID ო \* 2 4

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.

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



GC / HPLC **METHOD:** 

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using Where the following calculation: %Recovery = 100 \* (SSC - SC)/SA

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

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

SC = Sample concentration

amy sw 10-050% Lobo MS/MSD samples:

	Spi	tke ter	Sample	Spike S	ample	Matrix	spike	Matrix Spike	• Duplicate	N/SW	SD
Compound	( Gru )		( 10 K )	Concen ( たの /	ration て)	Percent	Recovery	Percent R	ecovery	RP	
	SW	MSD	ł	WS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recelc
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)											
PCDSA (HPLC)	00.1	00.1	0	1.008	1.030	101	101	40/	705	2,4	۲, ۲
Comments: <u>Refer to Matrix Spi</u> of the recalculated results.	ke/Matrix:	Spike Dupl	licates finding	s worksheet fo	or list of qualit	fications and a	ssociated san	iples when rei	ported results	s do not agree	within 10.0%

73 247	Curr
4 IC	ž
LDC #:	SDG #:

# Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification VALIDATION FINDINGS WORKSHEET



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

LCS/LCSD samples: L(S- 22 4 4 d

L

		spike	Spiked	Sample	L.	cs	ГС	SD	rcs	/rcsD
Compound	ιĘ	0 Kc)	20100 2010	Acc.)	Percent	Recovery	Percent	Recovery		D
	rcs		LCS		Reported	Recalc.	Reported	Recalc	Reported	Racalc
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)										
P CBSA (HPLC)	0.0	K-Y	1. 29	AA	45	95				
Comments: Refer to Labora	Itory Control	Sample/Labo	pratory Control	Sample Dupli	cate findings wo	orksheet for lis	t of qualifications	and associated	d samples w	then reported
results do not agree within 1	0.0% of the	recalculated i	results.							

V:\Validation Worksheets\GC\LCSDCLC\_GC.wpd

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VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Reviewer: <u>N(6</u> 2nd Reviewer: <u>6</u> Page: / of 1

HPLC
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METHOD:

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ss? of the reported results?		Compound Name	
ilculated and verified for all level IV sample for detected target compounds within 10%	Example:		Concentration =
Were all reported results reca	htration= (A)(Fv)(Df) (RF)(Vs or Ws)(%S/100)	a or height of the compound to be measured al Volume of extract ution Factor	rage response factor of the compound he initial calibration ial volume of the sample ial weight of the sample rcent Solid
N N N	Concei	A= Ar Fv= Fir Df= Dil	RF= Avi In 1 Vs= Init Ws= Init SS= Pe

#	Sample ID	Compound	Reported Concentrations	Recalculated Results Concentrations	Qualifications	
						Τ
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Comme	ints:					

SAMPCALew.wpd

# Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: June 1, 2009

LDC Report Date: September 1, 2009

Matrix: Water

Parameters: Organic Acids

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): TRX09060256

### Sample Identification

PC-40B PC-4009B

### Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

No field blanks were identified in this SDG.

### **IV. Accuracy and Precision Data**

### a. Surrogate Recovery

Surrogates were not required by the method.

### 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 not within QC limits. Since there were no associated samples, no data were qualified.

### 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 TRX09060256	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 PC-40B and PC-4009B were identified as field duplicates. No organic acids were detected in any of the samples with the following exceptions:

	Concentral	ncentration (mg/L)					
Compound	PC-40B	PC-4009B (Limits) (		Limits)	Flags	A or P	
Benzenesulfonic acid	0.053	0.053	-	0 (≤0.050)	-	-	

### Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Data Qualification Summary - SDG TRX09060256

SDG	Sample	Compound	Flag	A or P	Reason
TRX09060256	PC-40B PC-4009B	Ail compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09060256

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09060256

No Sample Data Qualified in this SDG

**Tronox Northgate Henderson** VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: TRX09060256 Laboratory: Alpha Analytical, Inc.

LDC #: 21423E47

### METHOD: HPLC Organic Acids (HPLC Method)

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: 6/01/09
Ila.	Initial calibration	K	rr
llb.	Calibration verification/ICV	A	$COV \leq 202$ $ICV \leq 302$
- 111.	Blanks	A_	
IVa.	Surrogate recovery	N	Not regid
IVb.	Matrix spike/Matrix spike duplicates	SN	09052940-01 (No associated sample- No qual
IVc.	Laboratory control samples	#	rs
V.	Target compound identification	Ň	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D = 1, 2
Χ.	Field blanks	N	

A = Acceptable Note:

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	PC-40B	11	21	3	31
ŧ	PC-4009B	12	22		32
3	MBLK - 22124	13	23		33
4		14	24		34
5		15	25		35
6		16	26		36
7		17	27	3	37
8		18	28	3	38
9		19	29		39
10		20	30	4	40

Notes:\_

Date: 8/31/69 Page:\_\_\_of\_ SVG Reviewer: 2nd Reviewer: 0

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METHOD: GC /HPLC

A compatibulationA (MAC)A (Ad)A (Ad) </th <th>8310</th> <th>8330</th> <th>8151</th> <th>8141</th> <th>8141(con't)</th> <th>8021B</th>	8310	8330	8151	8141	8141(con't)	8021B
B. ROXB. ActoBB. MokinghosK. BolderC. TalueeC. AnthraceneC. (3,57 frittribohenzeneC. 24,517C. DemetonOX. ENE. Etyl BenaneC. AnthraceneC. (3,57 frittribohenzeneC. 24,517C. DemetonOX. ENE. Etyl BenaneD. BenzofoluminenesD. (3,01tribohenzeneD. 24,517C. DemetonOX. ENE. Etyl BenaneD. BenzofoluminenesE. 1 etylD. (3,01tribohenzeneD. (3,01tribohenzeneC. TalueeS. S. OxforeD. BenzofolumineneE. TenylE. DinobenzeneC. 24,517X. EmorpoX. EmorpoS. S. OxforeD. BenzofolumineneE. NitobenzeneD. 24,517K. BelzenoC. TalueeO. TokiNgeneD. BenzofolumineneU. 24,617D. OxforeC. TribulonzaneO. TokiNgeneL. BenzofolumineneL. 24,617J. MCAJ. DiarinoD. TribulonzaneO. TribulonzaneL. BenzofolumineneK. PatenbiorenelyL. 24,617DiarinoD. TribulonzaneO. TribulonzaneL. BenzofolumineneK. PatenbiorenelyL. 24,617DiarinoD. TribulonzaneD. TribulonzaneL. BenzofolumineneK. BenzofolumineneL. 24,617DiarinoD. TribulonzaneD. TribulonzaneL. BenzofolumineneK. BenzofolumineneL. 24,617DiarinoD. TribulonzaneD. TribulonzaneL. BenzofolumineneK. BenzofolumineneL. 24,617DiarinoD. TribulonzaneD. DiarinoL. DemetoluzioL. 24,617L. 24,617DiarinoD. TribulonzaneD.	A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensulfothion	V. Benzene
C. AnthreeneC. C. AnthreeneC. C. AnthreeneK. E. Eivy BenaeneD. AnthreeneD. 1;3:DintrobenzeneD. 24,5:TK. Demetor, K. Y. Almpho-metrylSS. OxyeneD. BenzelojhymoE. TaroyE. TaroyE. Ethop:opZ. CoumapiceBR. Mr. XyoneE. BenzelojhymoF. NitobenzeneD. 1;3:DintrobenzeneD. 24,5:TE. Ethop:opS. OxyeneE. BenzelojhymoE. TaroyE. TaroyE. Ethop:opZ. CoumapiceBR. Mr. XyoneF. BenzelojhymoG. BenzelojhymoG. DeneseneC. SullospoBB. TachhoenaetyD. Caral XyoneF. BenzelojhymoU. BenzelojhymoG. DeneseneC. SullospoBB. TachhoenaetyD. Caral XyoneJ. BenzelojhymoU. BenzelojhomH. Panino. Z-AlmitrobueneH. Panino. Z-AlmitrobueneL. DeneseneD. TarihomD. TachhoenaeteJ. AutorobueneU. DeneselohhouJ. DeneselohhouJ. DeneselohhouJ. DeneselohhouD. TachhoenaeteD. TachhounaeteL. DobenzelohhouL. ZAGNItrobueneJ. DeneselohhouJ. DeneselohhouD. TachhounaeteD. TachhounaeteJ. DeneselohhouL. ZAGNItrobueneJ. DeneselohhouL. PathonounaeteD. TachhounaeteD. TachhounaeteJ. DeneselohhumeK. FlouenteeJ. DeneselohhouJ. DeneselohhouD. TachhounaeteD. TachhounaeteJ. DeneselohhumeK. Panino-chenaeteJ. DeneselohhouJ. DeneselohhouD. TachhounaeteJ. DeneselohhumeK. ZeolintrobueneJ. DeneselohhouL. Panino-chenaeteD. TachhounaeteJ. De	B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Bolstar	CC. Toluene
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F. ParachoffmorantheneF. NutoberzeneF. DichlopropeF. MadetA. ParathionG. Cotal XyleneG. Sutscip.G. 2.45-TrinitrotolueneG. SuttereB. TrichloronateB. TrichloronateG. Cotal XyleneH. Perzecij.L. 4Arnito-2.6-dinitrotolueneH. DelaponH. PhorateC. TrichlorinateD. TrifuncionateH. Parzecij.L. 2Arnico-4.6-dinitrotolueneH. DelaponL. Dimento-activiticonateD. TrifuncionateC. TrichlorinateL. ChryseneL. 2Arnico-4.6-dinitrotolueneH. DelaponL. Dimento-activiticonateC. TrichlorinateD. TrifuncionateL. ChryseneL. 2.42-DinitrotolueneH. DelaponL. Dimento-activiticonateD. TrifuncionateD. TrifuncionateL. ChryseneL. 2.24-DinitrotolueneH. NorthereL. Parathior. NorthereD. TrifuncionateD. TrifuncionateL. FluorenteL. 2.24-DinitrotolueneH. ShirotolueneL. Parathior. NorthereD. TrifuncionateD. TrifuncionateM. Indeno(L.2.3-cdipyreneM. SchlueneL. Parathion. NorthereH. RenetD. TrifuncionateD. TrifuncionateM. Indeno(L.2.3-cdipyreneM. AltrotolueneM. ShirotolueneM. SuboraD. ContentroneD. TrifuncionateM. Indeno(L.2.3-cdipyreneM. AltrotolueneM. SchluenoM. RenetD. TrifuncionateD. TrifuncionateM. Indeno(L.2.3-cdipyreneM. AltrotolueneM. ShirotolueneM. SchluenoD. ContentroneD. ContentroneM. Indeno(L.2.3-cdipyreneM. AltrotolueneM. AltrotolueneM. AltrotolueneD. Co	E. Benzo(a)pyrene	E. Tetryt	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. MP-Xylene
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K. FluorantheaeK. 24.DintrotoluoneK. PentactiorophanolK. DisultotonFr. ProviL. FluorantheaeL. 2.NitrotolueneL. 2.A.5.TP (silvex)L. Parathion-methyiG.G. EthionM. Indeno(1,2.3-cd)pyreneM. 3.NitrotolueneM. SilvexM. S. AntorotolueneM. SilvexM. Indeno(1,2.3-cd)pyreneM. 3.NitrotolueneM. SilvexM. RonnelH. TerachtorvinphosM. NaphthaleneN. 4.NitrotolueneM. SilvexM. Subroto-H. TerachtorvinphosN. NaphthaleneO.O.NathtionH. Subroto-O. PhenanthreneO.O.O. CholorpyritosA. DinorchaO. PhenanthreneP.P.P.P.O. PhenanthreneP.P.B. Barzene Sul fonicacidO. PhenanthreneM.B. Brazene Sul fonicacidS. MorthonP.P.P.P.P.R.M.B.B. Brazene Sul fonicacidS.B.D.DictrigitacidS.B.Dictrigitprostorele Sul fonicacidS.MerbiosE.P.P.DirectereM.M.B.DirectereB.P.DirectereR.M.B.DirectereC.DirectereDirectereR.M.B.DirectereC.DirectereDirectereR.M.B.DirectereC.DirectereDirectereR.M.B.DirectereDirectereDirectere	J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotolune	J. MCPA	J. Dlazinon	EE. Def	
L. FutoreteeL. 2.45-TP (silvex)L. Parathon-methylGG. EthlonM. Indeno(1,23-ci)pyreneM. 3-NitrotolueneM. SilvexM. RonnelHH. TerachlorvinphosN. NaphthaleneN. 4. NitrotolueneN. 4. NitrotolueneO. ChlorpyritosE. FenthlonO. PhenanthreneO.O. ChlorpyritosM. MalathlonHH. TerachlorvinphosO. PhenanthreneO.O. ChlorpyritosC. ChlorpyritosH. TerachlorvinphosO. PhenanthreneO.O. ChlorpyritosM. MalathlonH. TerachlorvinphosO. PhenanthreneO.O. ChlorpyritosA. DimothylPhiloicO. PhenanthreneP.P.P.P.PhiloinO. PhenanthreneO. ChlorpyritosA. DimothylPhiloicA didD. PictonB. Benzene Sul fonicA didMiloicA didR.ND.P.P.PhiloicA didS. MerphosS. MerphosC. Philoine acidC. PhiloineA didS. MerphosD.D. Dic Huly Phospholodi ThiloicA didS. MerphosD.D.Dic Huly Phospholodi ThiloicA didD.Dic HulyD.Dic Huly Phospholodi ThiloicA didD.Dic HulyDic HulyDic HulyDic HulyA didD.Dic HulyDic HulyDic HulyDic HulyDicD.Dic HulyDic HulyDic HulyDic HulyDic	K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowl	
M. Indeno(1,2,3-cd)pyreneM. SilvexM. RonnelHH. TetrachlorvinphosN. NaphthaleneN. 4.NitrotolueneN. 4.NitrotolueneN. MalathlonN. NaphthaleneO.O.C. ChlorpyritosH. B. LuprofosO. PhenanthreneO.O.C. ChlorpyritosH. SulprofosP. PyreneP.P.P.P.O. PhenanthreneO.O.C. ChlorpyritosA Pimethal Phosphop of thio is a cidP. PyreneP.P.D.Pimethal Phosphop of thio is a cidR. YandowM.R. TichhononateC. Ph thal is a cidS. MerphosS. MerphosD. Dic Hnyl Phosphop of thio is a cidS. MerphosD. Dic Hnyl Phosphop of thio is a cidJ. TokuthonD. Dic Hnyl Phosphop of thio is a cidJ. TokuthonD. Dic Hnyl Phosphop of thio is a cidJ. TokuthonD. Dic Hnyl Phosphop of thio is a cid	L. Fluorene	L. 2-Nitrotoluene	L 2,4,5-TP (silvex)	L. Parathion-methyl	GG. Ethion	
N. Naphthalene N. A.Nitrotoluene N. Malathion II. Sulproton   O. Phenanthrene O. O. C. Chlorpyritos A pimot Acid   P. Pyrene P. P. P. A pimot Anit   P. Pyrene P. R. A pimot Anit A pinot Acid   O. A Dimot Anit Dimot Acid A pimot Acid   O. A Dimot Anit Dimot Acid A pinot Acid   O. A Dimot Anit Dimot Acid A pinot Acid   O. A Dimot Acid B. B. B.   A. Dimot Acid C. Phratic A pionot Acid   A. Dimot Acid C. Phratic A pionot Acid   B. B. B. B. B. B.   A. Dimot Acid C. Phratic A cid   B. B. Dimot Acid Dimot Acid Dimot Acid   B. Dimot Acid Dimot Acid Dimot Acid Dimot Acid   B. Dimot Acid Dimot Acid Dimot Acid Dimot Acid	M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoiuene	M. Silvex	M. Ronnel	HH. Tetrachlorvinphos	
O. Phenanttrene O.   P. Puttene P.   P. Puttene acid P.   S. Merphos P.   P. Ditethyll Phospholodithioic acid	N. Naphthalene	N. 4-Nitrotoluene		N. Malathion	II. Sulprofoe	
P. Pyrane P.   P. Pyrane P.   P. Pyrane A   Dimethylic phosphologic acid   Dimethylic acid   Dimethylic acid   R.   R.   R.   R.   S.   Merphos   C.   Phylatic acid   S.   Merphos   D.   Dic Hayl phospho radithioic acid   S.   U. Tokuthion   U. Tokuthion	O. Phenanthrene	Ö		O. Chlorpyrlfos	(vorganic Aci	re l
a. a. b. b. b. b. b.   R. R. R. R. R. R. R.   R. R. R. R. R. R. R.   S. Merphos S. Rephos D. Dic thyl phospho rod ithioic acid   S. 1. Stirolos E. A- Charbo rod ithioic acid	P. Pyrene	ď		P. Fenthion	A Pimethyl Phospho	pdithioic acid
R. Trichloronate C. Phthalie acid   S. Merphos S. Merphos D. Dic thyl phospho rodithiolic acid   S. T. Stirolos D. Dic thyl phospho rodithiolic acid   No U. T. Stirolos E. 4-	Ö	٥		Q. Parathion-ethyl	B. Benzene sulfonic	aud
s. Merphos D. Dic thyl phospholodithiolic acid T. Stirofos E. 4- chloro benzene sul farie acid U. Tokuthlon U. Tokuthlon	Ŕ			R. Trichioronate	c. Phthalie acid	
T. Stirofos E. 4- chimo benzene sul foric acid U. Tokuthion	Ś			S. Merphos	D. Diethyl phosphi	rodithioic acid
U. Tokuthion				T. Stirofos	E. 4- chlorobenze	nesultonic acid
				U. Tokuthion		

Notes:

LDC #: 21423 #47 SDG #: 24 Gray

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page: 1 of 1 Reviewer: 3/6 2nd reviewer: 8

	Were field duplicate pairs identifie
METHOD:	Y/N N/A

 $\frac{Y/N}{X}$  Were field duplicate pairs identified in this SDG? X N/N/A Were tamet communds detected in the field duminate activity

	Qualification	Parent only / All Samples	a diff )					
	%RPD ∠ → ∩ →		0.0=)0	J				
rs?	( 7 Su	6	0.053					
d in the field duplicate pai	Concentration (		0.053					
V N/A VV ere target compounds detected	Jammanud		æ					

				1
Communication	Concentration (	V.RPD	Qualification	r
			Parent only / All Samples	
				_
				_
				_

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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: June 3, 2009

LDC Report Date: September 2, 2009

Matrix: Water

Parameters: Organic Acids

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): TRX09060456

### Sample Identification

M-7BB M-7BBMS M-7BBMSD

### Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

No field blanks were identified in this SDG.

### IV. Accuracy and Precision Data

### a. Surrogate Recovery

Surrogates were not required by the method.

### 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 TRX09060456	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 Organic Acids - Data Qualification Summary - SDG TRX09060456

SDG	Sample	Compound	Flag	A or P	Reason
TRX09060456	M-78B	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09060456

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09060456

No Sample Data Qualified in this SDG

### Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: <u>TRX09060456</u> Laboratory: <u>Alpha Analytical</u>, Inc.

LDC #: 21423F47

## Date: <u>8/31/0</u>9 Page: \_\_of\_/ Reviewer: \_\_<u>\_\_</u> 2nd Reviewer: \_\_\_\_\_

### METHOD: HPLC Organic Acids (HPLC Method)

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: 6/03/09
lla.	Initial calibration	A	r ~ '
llb.	Calibration verification/ICV	A	$COV \leq 20$ $20$ $100 \leq 30$ $20$
- 111.	Blanks	A	
IVa.	Surrogate recovery	N	Not regid.
IVb.	Matrix spike/Matrix spike duplicates	A	<i>v</i>
IVc.	Laboratory control samples	A	KÇ
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	X	
IX.	Field duplicates	N	
<b>X</b> .	Field blanks	N	

Note:

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

Mater

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

Validated Samples:

1	M-7BB	11	21	31
2	M-7BBMS	12	22	32
3	M-7BBMSD	13	23	33
4	MB1K-22184	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:

# Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: June 3, 2009

LDC Report Date: September 1, 2009

Matrix: Soil

Parameters: Organic Acids

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): TRX09060457

### Sample Identification

RSAM3-0.5B RSAM2-0.5B

### Introduction

This data review covers 2 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

No field blanks were identified in this SDG.

### **IV. Accuracy and Precision Data**

### a. Surrogate Recovery

Surrogates were not required by the method.

### 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 not within QC limits. Since there were no associated samples, no data were qualified.

### 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 TRX09060457	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 Organic Acids - Data Qualification Summary - SDG TRX09060457

SDG	Sample	Compound	Flag	A or P	Reason
TRX09060457	RSAM3-0.5B RSAM2-0.5B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09060457

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09060457

No Sample Data Qualified in this SDG

### Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: <u>TRX09060457</u> Laboratory: <u>Alpha Analytical, Inc.</u>

LDC #: 21423G47

# Date: \$/31/69 Page: 1 of 1 Reviewer: 3V6 2nd Reviewer:

### METHOD: HPLC Organic Acids (HPLC Method)

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: 6/03/09
lla.	Initial calibration	A	r٣
IIb.	Calibration verification/ICV	A	CON 5 20 Z 100 5 30 Z
	Blanks	A	
IVa.	Surrogate recovery	N	
IVb.	Matrix spike/Matrix spike duplicates	SW	09060566-01 (No as oriented sample, No gran
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
<b>X</b> .	Field blanks	N	

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	RSAM3-0.5B	11	21	31
2	RSAM2-0.5B	12	22	32
3	MBUK-22155	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:\_

21423G47W.wpd

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Tronox	LLC	Facility,	2009	Phase	В	Investigation,
	Hender	son, N	Vevada				

Collection Date: June 4, 2009

LDC Report Date: September 1, 2009

Matrix: Soil

Parameters: Organic Acids

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): TRX09060566

### Sample Identification

RSAJ3-0.5B RSAJ3-0.5BMS RSAJ3-0.5BMSD

### Introduction

This data review covers 3 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

Sample FB060409 (from SDG TRX09060567) was identified as a field blank. No organic acid contaminants were found in this blank.

### **IV. Accuracy and Precision Data**

### a. Surrogate Recovery

Surrogates were not required by the method.

### 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) were not within QC limits for one compound, the 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) 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 TRX09060566	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 Organic Acids - Data Qualification Summary - SDG TRX09060566

SDG	Sample	Compound	Flag	A or P	Reason
TRX09060566	RSAJ3-0.5B	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09060566

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09060566

No Sample Data Qualified in this SDG
Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: <u>TRX09060566</u> Laboratory: <u>Alpha Analytical, Inc.</u>

LDC #: 21423H47

#### METHOD: HPLC Organic Acids (HPLC Method)

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	A	Sampling dates: 6/64 /01				
lla.	Initial calibration	A					
lib.	Calibration verification/ICV	A	$cav \in zo Z$ $10v \in 303$				
<u> </u>	Blanks	A					
IVa.	Surrogate recovery	(x	Not regid.				
IVb.	Matrix spike/Matrix spike duplicates	SW					
IVc.	Laboratory control samples	A	VCS				
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					
<b>X</b> .	Field blanks	ND	TB = FBOG0409 from TRX09060567				

Note: A

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	RSAJ3-0.5B	11	21	31
2	RSAJ3-0.5BMS	12	22	32
3	RSAJ3-0.5BMSD	13	23	33
4	MBLK - 22155	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

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METHOD: GC / HPLC

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A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensulfothion	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Bolstar	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X. EPN	EE. Ethyl Benzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	Y. Azinphos-methyl	SSS. O-Xylene
E. Benzo(a)pyrene	E. Tetryl	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. MP-Xylene
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total Xylene
G. Benzo(g,h,i)perylene	G. 2.4.6-Trinitrotoluene	G. Dicamba	G. Sulfotep	BB. Trichloronate	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Trichlorinate	
I. Chrysene	1. 2-Amino-4,6-dinitrotoluene	I. MCPP	l. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotolune	J. MCPA	J. Diazinon	EE. Def	
K. Fiuoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowl	
L. Fluorene	L. 2-Nitrotoluene	L 2,4,5-TP (silvex)	L. Parathion-methyl	GG. Ethion	
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel	HH. Tetrachlorvinphos	
N. Naphthalene	N. 4-Nitrotoiuene		N. Malathion	II. Sulprofos	
O. Phenanthrene	0.		O. Chlorpyrtfos	Corganic Aci.	~ ~
P. Pyrene	P.		P. Fenthion	A Pimethul phosphoi	odithioic acid
Ģ.	۵		Q. Parathion-ethyl	B. Benzene sulfonic	aid
R.			R. Trichloronate	c. Phthalie acid	
s.			S. Merphos	D. Dictury Phospho	rodithioic acid
			T. Stirofos	E. 4- chlorobenze	nesultanic acid
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cmpd\_list.wpd

LDC #: 2 1423 H47

# VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates



METHOD: GC HPLC Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A" N NA Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? AN N/A

Was an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

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*	MS/MSD ID	Compound	%R (Limits)		MSD %R (Limi	lts)	RPD (L	lmits)	Associated Semalar	
	4/2	LL	28 (60-1-	<b>6</b> ) J	01) bi	-1401		-		QUALITICATIONS
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# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Tronox l	LLC	Facility,	2009	Phase	В	Investigation,
-	Henderso	on, N	levada				

Collection Date: June 4, 2009

LDC Report Date: September 2, 2009

Matrix: Water

Parameters: Organic Acids

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): TRX09060567

# Sample Identification

M-5AB FB060409

#### Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

# III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

Sample FB060409 was identified as a field blank. No organic acid contaminants were found in this blank.

# **IV. Accuracy and Precision Data**

#### a. Surrogate Recovery

Surrogates were not required by the method.

# 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 TRX09060567	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 Organic Acids - Data Qualification Summary - SDG TRX09060567

SDG	Sample	Compound	Flag	A or P	Reason
TRX09060567	M-5AB FB060409	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09060567

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09060567

No Sample Data Qualified in this SDG

# Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET Stage 2B

SDG #: TRX09060567

LDC #: 21423I47

Laboratory: Alpha Analytical, Inc.

# Date: 8/31/69 Page: lof / Reviewer: N4 2nd Reviewer: \_\_\_\_\_

#### METHOD: HPLC Organic Acids (HPLC Method)

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: 6/04 /0 g
lla.	Initial calibration	A	r <sup>Y</sup>
IIb.	Calibration verification/ICV	A	CCN 6 20 2 100 6 30 3
Ш.	Blanks	A	
IVa.	Surrogate recovery	N	Not regid.
IVb.	Matrix spike/Matrix spike duplicates	A	09060456-01
IVc.	Laboratory control samples	Α	lCs
V	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
<b>X</b> .	Field blanks	ND	TB = 2

Note: A = Acceptable N = Not provided/applicable

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-5AB	11	21	31	
2	FB060409	12	22	32	
3	MBLK-22184	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:

# Laboratory Data Consultants, Inc. Data Validation Report

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

Collection Date: June 5, 2009

LDC Report Date: September 2, 2009

Matrix: Water

Parameters: Organic Acids

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): TRX09060840

#### Sample Identification

M-23B M-23009B

#### Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

# III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

No field blanks were identified in this SDG.

# **IV. Accuracy and Precision Data**

#### a. Surrogate Recovery

Surrogates were not required by the method.

# 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

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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 TRX09060840	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-23B and M-23009B were identified as field duplicates. No organic acids were detected in any of the samples.

# Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Data Qualification Summary - SDG TRX09060840

SDG	Sample	Compound	Flag	A or P	Reason
TRX09060840	M-23B M-23009B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09060840

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09060840

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET Stage 2B

SDG #: TRX09060840

LDC #: 21423J47

Laboratory: Alpha Analytical, Inc.

# Date: <u>9/61/09</u> Page: <u>1 of )</u> Reviewer: <u>N6</u> 2nd Reviewer: <u>\_\_\_</u>

#### METHOD: HPLC Organic Acids (HPLC Method)

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: 6/05/69
Ila.	Initial calibration	A	٢Ŷ
llb.	Calibration verification/ICV	A	COVE 202 101 = 302
111.	Blanks	A	
IVa.	Surrogate recovery	Ń	Not rejd.
IVb.	Matrix spike/Matrix spike duplicates	A	09060456-01
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	NB	$\mathcal{D} = l_1 \gamma$
Χ.	Field blanks	Ń	

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-23B	11	21	31
2	M-23009B	12	22	32
3	MBLK - 22184	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:\_

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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 9 through June 17, 2009
LDC Report Date:	September 2, 2009
Matrix:	Soil
Parameters:	Organic Acids
Validation Level:	Stage 2B
Laboratory:	Alpha Analytical, Inc.
Sample Delivery Group (SDG):	TRX09061850

# Sample Identification

SA35-0.5B SA176-0.5B SA166-0.5B SA182-0.5B SA85-0.5B SA92-0.5B SA85-0.5BMS SA85-0.5BMSD

#### Introduction

This data review covers 8 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

# III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

No field blanks were identified in this SDG.

# **IV. Accuracy and Precision Data**

#### a. Surrogate Recovery

Surrogates were not required by the method.

# 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 TRX09061850	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 Organic Acids - Data Qualification Summary - SDG TRX09061850

SDG	Sample	Compound	Flag	A or P	Reason
TRX09061850	SA35-0.5B SA176-0.5B SA166-0.5B SA182-0.5B SA85-0.5B SA92-0.5B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09061850

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09061850

No Sample Data Qualified in this SDG

# Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET Stage 2B

SDG #: TRX09061850

LDC #: 21423K47

Laboratory: Alpha Analytical, Inc.

# Date: <u>\$\21/09</u> Page: <u>1</u> of <u>1</u> Reviewer: <u>3\4</u> 2nd Reviewer: \_\_\_\_

#### METHOD: HPLC Organic Acids (HPLC Method)

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: $6/09 - 17/09$
lla.	Initial calibration	A	r٧
IIb.	Calibration verification/ICV	A	$CON \in 20$ ? $ION \in 30$ ?
111.	Blanks	A	
IVa.	Surrogate recovery	N	Not raid.
IVb.	Matrix spike/Matrix spike duplicates	A	
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	Ă	
IX.	Field duplicates	N	
<b>X</b> .	Field blanks	N	

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

Soll

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

EB = Equipment blank

Validated Samples:

1	SA35-0.5B	11	MO1K-22247	21	3	31
2	SA176-0.5B	12	· /	22	3	32
3	SA166-0.5B	13		23	3	33
4	SA182-0.5B	14		24	3	34
5	SA85-0.5B	15		25	3	5
6	SA92-0.5B	16	· · · · · · · · · · · · · · · · · · ·	26	3	6
7	SA85-0.5BMS	17		27	3	7
8	SA85-0.5BMSD	18		28	3	8
9		19		29	3	9
10		20		30	4	0

Notes:\_\_

# 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 17, 2009
LDC Report Date:	September 2, 2009
Matrix:	Water
Parameters:	Organic Acids
Validation Level:	Stage 2B
Laboratory:	Alpha Analytical, Inc.
Sample Delivery Group (SDG):	TRX09061951

# Sample Identification

M-44B M-6AB M-142B M-39B M-123B M-123009B M-44BMS M-44BMSD

#### Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

#### III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

No field blanks were identified in this SDG.

#### **IV. Accuracy and Precision Data**

#### a. Surrogate Recovery

Surrogates were not required by the method.

#### 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 TRX09061951	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 organic acids were detected in any of the samples.

# Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Data Qualification Summary - SDG TRX09061951

SDG	Sample	Compound	Flag	A or P	Reason
TRX09061951	M-44B M-6AB M-142B M-39B M-123B M-123009B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09061951

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09061951

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: <u>TRX09061951</u> Laboratory: <u>Alpha Analytical</u>, Inc.

LDC #: 21423L47

# Date: <u>8 / 21 / 1</u> 9 Page: <u>1</u> of \_\_\_\_ Reviewer: \_\_\_\_\_ 2nd Reviewer: \_\_\_\_\_\_

#### METHOD: HPLC Organic Acids (HPLC Method)

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: 6/08-17/09
lla.	Initial calibration	A	r٧
IIb.	Calibration verification/ICV	A	CON 5 202 101 530 %
111.	Blanks	A	
IVa.	Surrogate recovery	Ň	Not regid.
IVb.	Matrix spike/Matrix spike duplicates	A	U
IVc.	Laboratory control samples	A	LCS
<b>V</b> .	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	J = 5,6
<b>X</b> .	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:

	Water				 	
1	M-44B	11	NDLK-22256	21	31	
2	M-6AB	12		22	32	
3	M-142B	13		23	 33	
4	M-39B	14		24	 34	
5	м-123В р	15		25	 35	
6	М-123009В 🎾	16		26	36	
7	M-44BMS	17		27	37	
8	M-44BMSD	18		28	38	
9		19		29	 39	
10		20		30	40	

Notes:

21423L47W.wpd

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Collection Date:	June 18 through July 1, 2009
LDC Report Date:	September 1, 2009
Matrix:	Soil
Parameters:	Organic Acids
Validation Level:	Stage 2B
Laboratory:	Alpha Analytical, Inc.
Sample Delivery Group (SDG):	TRX09070755

# Sample Identification

SA86-0.5B SA129-0.5B SA106-0.5B SA82-0.5B SA82-10B SA82-29B SA82-0.5BMS SA82-0.5BMSD

#### Introduction

This data review covers 8 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

#### III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

No field blanks were identified in this SDG.

#### **IV. Accuracy and Precision Data**

# a. Surrogate Recovery

Surrogates were not required by the method.

#### 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 relative percent differences (RPD) were not within QC limits for one compound, the MS/MSD 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) 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 TRX09070755	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 Organic Acids - Data Qualification Summary - SDG TRX09070755

SDG	Sample	Compound	Flag	A or P	Reason
TRX09070755	SA86-0.5B SA129-0.5B 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)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09070755

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09070755

No Sample Data Qualified in this SDG

**Tronox Northgate Henderson** VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: TRX09070755 Laboratory: Alpha Analytical, Inc.

LDC #: 21423M47

### METHOD: HPLC Organic Acids (HPLC Method)

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 /18 - 7 /01 /09
lla.	Initial calibration	A	12
llb.	Calibration verification/ICV	A	CON 5 202 10 530?
- 111.	Blanks	A	
IVa.	Surrogate recovery	N	Not regid.
IVb.	Matrix spike/Matrix spike duplicates	SW	D
IVc.	Laboratory control samples	A	VCS
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	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:

vallua	Soil				
1	SA86-0.5B	11	Mblk-22316	21	31
2	SA129-0.5B	12		22	32
4 3	SA106-0.5B	13		23	33
4	SA82-0.5B	14		24	34
5	SA82-10B	15		25	35
6	SA82-29B	16		26	36
7	SA82-0.5BMS	17		27	37
8	SA82-0.5BMSD	18		28	38
9		19		29	39
10		20		30	40

Notes:

Date: 9/01 /09 Page: 1 of / Reviewer: \_\_\_\_\_\_ 2nd Reviewer: \_\_\_\_\_\_

# 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	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-methyl	SSS. O-Xylene
E. Benzo(a)pyrene	E. Tetryl	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. MP-Xylene
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total Xylene
G. Benzo(g,h,i)perylene	G. 2.4.6-Trinitrotoluene	G. Dicamba	G. Sulfotep	BB. Trichloronate	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Trichlorinate	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	l. 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. 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. Tetrachlorvinphos	
N. Naphthalene	N. 4-Nitrotoiuene		N. Malathion	II. Sulprofos	
O. Phenanthrene	0		O. Chlorpyrifos	organic Aci	1,4 1,4
P. Pyrene	Ŀ		P. Fenthion	A Dimethyl phospho	pdithioic acid
Ċ	Ø		Q. Parathion-ethyl	B. Benzene sulfonio	aid
R.			R. Trichloronate	c. Phthalie acid	
S.			S. Merphos	D. Diethyl phosphe	ordithioic acid
			T. Stirofos	E. 4- chlorobenze	ne sultanic acid
			U. Tokuthion		

Notes:

LDC #: 21423 M47 SDG #: <u>See Core</u>

## VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates



METHOD: GC / HPLC Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A" X N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? Y N N/A

Was an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

)						<ul> <li>IIIIIIS ;</li> </ul>	
*	DI OSW/SW	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Accordiated Semalae	
	7/8	9	( )		21.7 , 20 ,		ALC ALCOUR
	/.		( )				/ 1.5 2.5 5
T				· (			1 w Real Years
			( )	(	-		
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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 19 through June 29, 2009
LDC Report Date:	September 2, 2009
Matrix:	Water
Parameters:	Organic Acids
Validation Level:	Stage 4
Laboratory:	Alpha Analytical, Inc.
Sample Delivery Group (SDG):	TRX09071051

### Sample Identification

M-34B M-125B EB062609-SO M-111AB EB062909-GW M-125BMS M-125BMSD

### Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% 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 organic acids were found in the method blanks.

Samples EB062609-SO and EB062909-GW were identified as equipment blanks. No organic acid contaminants were found in these blanks.

### **IV. Accuracy and Precision Data**

### a. Surrogate Recovery

Surrogates were not required by the method.

### 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 were within validation criteria.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG TRX09071051	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 Organic Acids - Data Qualification Summary - SDG TRX09071051

SDG	Sample	Compound	Flag	A or P	Reason
TRX09071051	M-34B M-125B EB062609-SO 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 Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09071051

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09071051

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET \_\_\_\_\_ Stage 2B- 存

SDG #: <u>TRX09071051</u>

Laboratory: Alpha Analytical, Inc.

LDC #: 21423N47

### Date: 9/01/09 Page: 1 of 1 Reviewer: 3/6 2nd Reviewer: 9

### METHOD: HPLC Organic Acids (HPLC Method)

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: 6/19 - 29 /09
lla.	Initial calibration	A	rr
IIb.	Calibration verification/ICV	A	COV € 202 10V € 302
- 111.	Blanks	Á	
IVa.	Surrogate recovery	N	Not regid.
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
<b>X</b> .	Field blanks	ND	EB = 3 5

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:

Note:

Water

1	M-34B	- 11	MBLK - 22333	21	31	
2 2	M-125B	12		22	32	
3	EB062609-SO	13		23	 33	
4	M-111AB	14		24	 34	
5	EB062909-GW	15		25	 35	
6	M-125BMS	16		26	 36	
7	M-125BMSD	17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	 40	

Notes:\_

Method: GC HPLC				
Validation Area	Yes	No	NA	Findings/Comments
Ivirechniteelutoleinegumtes.			برگ دور در فسته ا	
All technical holding times were met.				
Cooler temperature criteria was met.			19 A.J. 19 A.A.	
i), Initia calibration	il in the second			
Did the laboratory perform a 5 point calibration prior to sample analysis?	$\leq$			
Were all percent relative standard deviations (%RSD) < 20%?	ļ		/	
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?				
IV. Continuingreatibration				
Was a continuing calibration analyzed daily?				
Were all percent differences (%D) < 15%.0 or percent recoveries 85-115%?				
Were all the retention times within the acceptance windows?				
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				Martin States of the State
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 - Matnx spike/Matnx spike/duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.				
Was a MS/MSD analyzed every 20 samples of each matrix?	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?				
VIII, Laboratory control samples				
Was an LCS analyzed for this SDG?				
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?			- 1. Far.	
IX: Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				

Validation Area	Yes	No	NA	Findings/Comments
Were the retention times of reported detects within the RT windows?	-			
XI. 25 dimpodine quentitement/CROL				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?		-		
XI System nethiologists:				
System performance was found to be acceptable.				
Kill (everalize) sessment or dela 🛼 🐄 🖏 🖓 👘		83) 1833		Christ Rendered Annalysis
Overall assessment of data was found to be acceptable.		-		
XW Field outplicates				Carl State Francisco
Field duplicate pairs were identified in this SDG.			$\setminus$	
Target compounds were detected in the field duplicates.				
XV- FileId Blanks		15		
Field blanks were identified in this SDG.		-		
Target compounds were detected in the field blanks.		/		

LDC # 21 423 N7 SDG# 20 (200)

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

0 Page: \_\_\_\_\_ of \_\_\_\_ Reviewer: *JVb* 2nd Reviewer:

METHOD: HPLC

Parameter: 4-Chlorobenzenesulfonic acid

		×	Y	Y^2
		conc bpm)	Alea	
4-(	ilorobenzenesulfonic acid 0.	0.025	105332	
	0	0.050	201649	
	Ö	0.100	464100	
	0	0.250	1152183	
	0	0.500	2262016	
		1.000	4485504	
		1.500	6696299	
	Ň	2.000	8851547	

4641000 4608732 4524032 4485504

RF 4213280 4032980 4425774

Ave 4424438

4464199

Regression Output:			Repor	ted
Constant		-4.19374E-003	11 0	-0.004194
Std Err of Y Est		0.00735		
R Squared		0.999917	r2	0.999917
No. of Observations		8.00000		
Degrees of Freedom		6.00000		
X Coefficient(s)	2 254E_007	0 415 015	1	2 254E 007

LDC #: 214 29 N7 SDG #: See Cover

**Continuing Calibration Results Verification** VALIDATION FINDINGS WORKSHEET

Page: 1 of 1 36 2nd Reviewer: Reviewer:

> HPLC METHOD: GC\_

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below 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	¥	Y*
-	B4665001.1	7.4	4- CBSA		1, 00	0. 991	0,991	99, J	99.1
		7/12/69							
7	84678001.D	24	+		0, 500	0.50)	1 25 , 0	100,2	100,2
		7/2/04							
		,							
<u>س</u>									
		1							
4									
		<b>r</b>							
		-							
Con	nments: <u>Refer t</u> Itculated results	to Continuing Ce	libration findings work	sheet for list o	of qualifications an	d associated sam	ples when reported	1 results do not ag	ree within 10.0%

CONCLC.1S

SDG #: See Conny LDC #: 21429 N47

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

Page: / of /

Reviewer: JVb 2nd Reviewer:

### CC /HPLC **METHOD:**

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using SC = Sample concentration Where the following calculation: %Recovery = 100 \* (SSC - SC)/SA

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

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

MSD = Matrix spike duplicate

6/7 MS/MSD samples:

$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		Spir	e 3	Sample	Spike S	Sample	Matrix	: spike	Matrix Spike	e Duplicate	U/SW	ISD
MSD          MSD         Reported         Reported            10         2.224         1234         1.0         101            10         2.224         1234         1.0         101            10         2.224         1234         1.0         101            10         1234         1.0         100         101            10         1234         1.0         101         101            10         1234         1.0         100         101            10         12         10         101         101            10         11         10         101         101            11         11         11         101         101            11         11         11         101         101            11         11         11         101         101            11         11         11         101         101            11         11         11 <th></th> <th><b>Add</b> ( から 人</th> <th><b>0</b></th> <th>conc. (からん)</th> <th>ر مم مراجع (</th> <th>itration ん)</th> <th>Percent I</th> <th>Recovery</th> <th>Percent F</th> <th>Recovery</th> <th>R</th> <th>٥</th>		<b>Add</b> ( から 人	<b>0</b>	conc. (からん)	ر مم مراجع (	itration ん)	Percent I	Recovery	Percent F	Recovery	R	٥
1.0     0.1     0.1     1.234     1.0     100       101     0.1     0.1     0.1     0.1     101		WS	MSD		WS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
	<b>~</b>	0	1.0	0.224	1.226	1. 234	1 10	001	101	log	a 7	0. 7
										-		
									:			
												-

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123	ર્ડ
2	ÿ
#	#
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:

% 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

LCS/LCSD samples:

	<i>.</i>	pike	Spiked	Sample		S	ΓC	so	LCS/	LCSD
Compound	А ( Э́,	1000 1000 (7)	Conce	ntration	Percent	Recovery	Percent F	Recovery	R	0
	LCS	rcsD	LCS L	rcsD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasolino (8015) - P-CBCA	ہ. ہ	₹ Z	0, 504	A M	101	101				
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: ] + 403 N47 SDG #: See Cover

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

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

METHOD: \_\_\_\_\_GC \_\_\_\_HPLC



Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds within 10% of the reported results?



Recalculated Results Concentrations (				
Reported Concentrations				
Compound				
Sample ID				
*				

Comments:

SAMPCALew.wpd

### 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 13, 2009
LDC Report Date:	September 11, 2009
Matrix:	Soil
Parameters:	Organic Acids
Validation Level:	Stage 2B
Laboratory:	Alpha Analytical, Inc.

Sample Delivery Group (SDG): TRX09071450

### Sample Identification

SA85-33B RSAM2-10B RSAM2-35B SA35-10B SA35-32B SA35009-32B RSAM3-30B SA176-10B SA176-09-37B SA176-37B SA176-37BMS SA176-37BMS

### Introduction

This data review covers 12 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

No field blanks were identified in this SDG.

### **IV. Accuracy and Precision Data**

### a. Surrogate Recovery

Surrogates were not required by the method.

### 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 TRX09071450	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 and samples SA176009-37B and SA176-37B were identified as field duplicates. No organic acids were detected in any of the samples.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Data Qualification Summary - SDG TRX09071450

SDG	Sample	Compound	Flag	A or P	Reason
TRX09071450	SA85-33B RSAM2-10B RSAM2-35B SA35-10B SA35-32B SA35-32B SA35-32B RSAM3-30B SA176-10B SA176-009-37B SA176-37B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09071450

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09071450

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

LDC #: 21423047

### SDG #: TRX09071450

Laboratory: Alpha Analytical, Inc.

### Date: 8/31/8 Page: 1 of 1 Reviewer: 16 2nd Reviewer:

### METHOD: HPLC Organic Acids (HPLC Method)

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: 7/69 - 13/09
IIa.	Initial calibration	A	r~
Ilb.	Calibration verification/ICV	A	CON 6 20 2 101 5 30 %
111.	Blanks	Á	
IVa.	Surrogate recovery	N_	Not regid.
IVb.	Matrix spike/Matrix spike duplicates	A	0
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	$D_1 = 5.6$ $D_2 = 9.0$
<b>X</b> .	Field blanks	No	EB = EB071009-50 from TRX 09672044

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:

Note:

1	SA85-33B	11	SA176-37BMS	21	MBLK - 22342	31
2	RSAM2-10B	12	SA176-37BMSD	22		32
3`	RSAM2-35B	13		23	······································	33
4	SA35-10B	14		24		34
5	SA35-32B 🎾	15		25		35
è	SA3509-32B	16		26		36
7	RSAM3-30B	17		27	L	37
8	SA176-10B	18		28		38
9	SA176009-37B Dy	19		29		39
10	SA176-37B 🖉 🗸	20		30		40

Notes:

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

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

Collection Date: July 10 through July 17, 2009

LDC Report Date: December 3, 2009

Matrix: Water

Parameters: Organic Acids

Validation Level: Stage 4

Laboratory:

Alpha Analytical, Inc.

Sample Delivery Group (SDG): TRX09072041

Sample Identification

EB071009-SO TR-8B M-97B TR-6B EB-071709-GW EB071009-SOMS EB071009-SOMSD

### Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% 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 organic acids were found in the method blanks.

Samples EB-071709-GW and EB071009-SO were identified as equipment blanks. No organic acid contaminants were found in these blanks.

### **IV. Accuracy and Precision Data**

### a. Surrogate Recovery

Surrogates were not required by the method.

### 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 were within validation criteria.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG TRX09072041	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 Organic Acids - Data Qualification Summary - SDG TRX09072041

SDG	Sample	Compound	Flag	A or P	Reason
TRX09072041	E3071009-SO TR-68 M-07B TR-68 E3-071709-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 Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09072041

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09072041

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: TRX09072041 Laboratory: Alpha Analytical, Inc.

LDC #: 21423P47

Date: 9/61/69 Page: 1 of 1 Reviewer: \_\_\_\_\_ 2nd Reviewer: \_\_\_\_\_

### METHOD: HPLC Organic Acids (HPLC Method)

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 notding times	A	Sampting caces: 7/0 - 17/01
lla	Inicial cationation	A	r*
LED.	Calibration ventocation/ICV	<u>k</u>	COV 5 202 100 5 30 2
13.	Blanks	Λ	
IVa.	Surragate recovery	N	Not regid
Mb.	Matrix spike/Matrix spike duplicates	A	· · · · · · · · · · · · · · · · · · ·
Nc.	Laboratory control samples	<u>^</u>	us
V.	Target compound identification -	к	
И.	Compound Quantitation and CROLs	к	
VII.	System Performance	м	
	Overall assessment of data	A	
IX.	Field suplicates	A	
X.	Field stanks	04	EB = 5 1

Note:

A = Acceptable N \* Not provided/applicable SW/ = See worksheet ND = No compounds detected R = Rinsate FB = Field blank D = Ouplicate T8 = Trip otank E8 = Equipment blank

Valiciated Samples

• •	hate	ct			
~ 1	EB071009-SO	11- MB1K - 22318	21	31	
2	TR-86	12	22	32	
3	IA-97B	13	23	33	
ā	TR-66	14	24	34	
5	EB-071709-GW	15 :	25	35	
6	EB07:009-SOMS	15	25	36	
7	EB071009-SOMSD	17 -	27	37	
æ		18	28	38	
9		19 -	29	39	
10	<u> </u>	20 ·	30	40	

Notes

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

Method:GCHPLC			r	
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	<u> </u>			50
All technical holding times were met.				
Cooler temperature criteria was met.		Ľ.,		
I. Initial calibration	-			· · · .
Did the laboratory perform a 5 point calibration prior to sample analysis?	$\leq$			
Were all percent relative standard deviations (%RSD) < 20%?		/		
Was a curve fit used for evaluation?	$\langle$			
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?	1			
Were the RT windows property established?		·		
IV. Continuing celluration			- `- T	
Was a continuing calibration analyzed daily?	4			
Were all percent differences (%D) < 20%.0 or percent recoveries 80-120%?	<u> </u>	<u> </u>		
Were all the retention times within the acceptance windows?	Ļ		L_	t Kathata a
V. Blanks		؛ 	, I	
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.		/	Ł	1 
VI. Surrogate spikes	<u> </u>		<u> </u>	
Were all surrogate %R within the QC limits?			1	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			/	
VII. Meerix spike/http:// spike ckapicees			{	
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG7 If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.				
Was a MS/MSD analyzed every 20 samples of each matrix?				
Were the MSAMSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			/	
Vill, Laboratory control samples		<u></u>	1.) ,	
Wastan LCS analyzed for this SDG?	1	<u> </u>	<u>                                     </u>	
Was an LCS analyzed per extraction batch?	$\leq$	<u> </u>		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	/			
DX. Regional Quality Assurance and Quality Control	• • • • •		ç	
Were performance evaluation (PE) samples performed?		1	L	
Were the performance evaluation (PE) samples within the acceptance limits?			1	

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### VALIDATION FINDINGS CHECKLIST

LDC #: 24 423 P 47 SDG #: Sre Correc

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	Page:	20	1-2-
	Reviewer	: d	N
2nd	Reviewer	: 1	
		7	

Validation Area	Yes	No	NA	Findings/Comments
X. Target compound identification		[		
Were the retention times of reported detects within the RT windows?	1			
XI. Compound guargestion/CRQLs			2	
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	1	/		
XII. System performance		2		1
System performance was found to be acceptable.	/	<b></b>		
XIII, Overall assessment of data				an an b
Overall assessment of data was found to be acceptable.		•		
XIV. Field cuplicates	·			
Field-duplicate pairs were identified in this SDG.		/		
Target compounds were detected in the field duplicates,				
XV. Field blanks		_ <u>'</u>	<u>.</u>	P
Field blanks were identified in this SDG.	/			
Target compounds were detected in the field blanks.		7		

SDG# Sre Chiny LDC # 21 123 P47

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page: 1 of ) Rovlower: 3/6 2nd Rovlower: \_\_\_\_\_

METHOD: HPLC

4-Chlorobenzenesulfonic acid

Paramotor:

			×	7	۲^2
Date	Detector	Compound	Conc	Area	
			(mdd)		
0/03 10 0/03/00	S	4-Chlorobenzenesultonia said	0.025	106332	
	HPLC 3		0.050	201649	
			0.100	464100	
			0.250	1152183	
			0.500	2262016	
			000'1	4485504	
			1.500	6696299	
			2,000	8851547	

4213280 4032880

Яβ

4641000 4606732 4524032

4485504 4484189 4425774 Ave 4424438

			S. BOAR SC
	-4.19374E-003	• 0	-0.004194
	0.00735		
	0.000017	12	0.000017
	0.00000		
	6.00000		8
2.2646-007	-9.412-015	<b>.</b>	2.254E-007
2.264		0.00735 0.00000 6.00000 6.00000	0.00001735 / 2 0.00000 / 2 0.00000 / 2 0.00000 / 2 0.00000 / 2 0.01(2-015 / b =

2422647. Sec Cover LDC #: SDG:#:

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

••

JVC Page: 1 of 1 9 2nd Reviewer. Roviewor.

> HPLO 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 everage CF CF = continuing calibration CF

A = Area of compound C = Concentration of compound

					Roported	Recalcutated	Rapotind	Breatcutatad
æ	Blandard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Cone.	CF/Conc. CCV	CP/Conc. CCV	¥	d.
-	B466000,	Dol	4- C65A	0.50	0.499	0.499.	99.7	99.7
		7 /20 /04					-	
					-		-	
2	3 46710010	2 V	_>	1,000	1.023	1.073	E'co1 .	102.3
		2/20/2		-				
		lala is						
•								
4		-						
}		•					-	
Con	nments: Rofer t	o Continuina Co	ulbration findings worksheet for list o	f gual/fications and	1 Associated sam	plos when reported	results do not ad	ree within 10.0%

CONCLC.10

recalculated results.
Z LDC #: 21423 P47 sog #: ردد ا

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

Page: \_\_of\_ Reviewer: 2nd Reviewer:

METHOD: ... GC / MPLC • 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 SC = Sample concentration the following calculation: %Recovery = 100 \* (SSC - SC)/SA

RPD =(((SSCMS · SSCMSD) · 2) / (SSCMS + SSCMSD))-100 Where

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

MSO = Marrix aplka duplicate

ຄັ
Spike Addeg
di ng di

		Spike	•	Sample	Spike 3	ample	Matrix	epike	Matrix Spike	• Duplicate	SM/8M	9
Compound		Ser C	27	( mg //+	Concen	(1-1)	Percent F	Recovery	Percent R	ecovery	RPD	
		M8	MBD		MS /	MSO	Reported	Recalc.	Reported	Recato.	Reported	Recelo.
Gesoline (8015)												
Diesel (8015)												Ţ
Benzene (80218)												
Methane (RSK-175												T
2,4-D (8151)												
Dinoseb (8151)												
Naphthalana (8310)												
Anthrocone (8310)												
(8330) XMH												
2,4,6-Trinitrotoluene (833	) Q											
4-cBSA (Hru	-	0	6.1	0	1.004	1.01	es l	an 1	لانم	. ~0]	¢ .	2
						1						
Comments: Refer to Mair	ix Spike	<b>Matrix S</b>	ipike Dup	licates finding	18 WOrksheel	for list of quali	fications and e	1880clated ser	oles when re	ported result	s do not naree	within 10.0%

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LDC	SDG

# VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification



METHOD: \_\_ GC \_\_HPLC

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

% Roovery = 100" (85C-SC)SA RPD = 1 LC3 - LC3D 1 - 2(LC3 + LC3D)

US. 22368

LCS/LCSD samples:\_\_

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

SC = Concentration

LCSD = Laboratory control sample duplicate percent recovery

	18 18	olke	Spiked	Bampie		18	٦C	80	LC8/	LC8D
Compound	R E	N.	Conce		Percent	Recovery	Parcant f	Becoverv	à	
	LC8	LCBD	LCB	1,000	Reported	Receto.	Reported	Racato	Renorted.	Bacalo
Gasoline (8015)										
Diesel (8015)							2			T
Benzene (8021B)										
Mothane (RSK-176)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalono (8310)										
Anthracono (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										
4- CBSA (HPLC)	0 ف	NA	0.417	A.M	. 65	62				
										2
Comments: Refer to Labors	atory Control	Sample/Lab	bratory Control	Samole Duol	rete flodince uz	strated for the				
results do not soree within 1	0.0% of the r	acelculeted	andto.			ALL TOT TOTAL TOTAL	LOL GUIRNING SHIOLDS			<u>nen reporte</u>

V:/Validation Worksheets/GCLC80CLC\_GC.wpd

results do not agree within 10.0% of the receivented results.

Page: <u>of L</u> Revlewer. <u>Of L</u> 2nd Revlewer	<b>.</b>					Qualifications			-						
SHEET fon		sported results?	npound Name		-	Recalculated Results Concentrations				-					
ION FINDINGS WORKS		sc all tovel.IV samples? spounds within 10% of the re	Сол			Reported Concentrations	-	-				-	•	•	
VALIDAT		lts recalculated and vorified (c esults for detected target corr	Example: Samplo ID.	Concentration .	-	Compound			-		•				
21420 P47	0D: OCHPLC	Were all reported resu	Itration= (A)(EV)(Df) (RF)(Va or VVs)(%S/100) as or height of the compound to be measure val Volume of extract	ution Factor srage response factor of the compound he initial calibration ital volume of the sample ital weight of the sample roent Bolid	-	8ample ID	-				-	-		nts:	0
# 00s 800 #	METH	х ZZ ЛЯ	Concor Fv Are			#								Comme.	

BAMPCALew.wpd

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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 22, 2009
LDC Report Date:	September 8, 2009
Matrix:	Soil/Water

Parameters: Organic Acids

Validation Level: Stage 4

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): TRX09072352

### Sample Identification

EB072109-SO FB072109-SO SA166-10B SA166-31B SA182-10B SA182-38B EB072209-SO EB072109-SOMS EB072109-SOMSD SA166-10BMS SA166-10BMSD

### Introduction

This data review covers 6 soil samples and 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% 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 organic acids were found in the method blanks.

Samples EB072109-SO and EB072209-SO were identified as equipment blanks. No organic acid contaminants were found in these blanks.

Sample FB072109-SO was identified as a field blank. No organic acid contaminants were found in this blank.

### **IV. Accuracy and Precision Data**

### a. Surrogate Recovery

Surrogates were not required by the method.

### 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 were within validation criteria.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG TRX09072352	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 Organic Acids - Data Qualification Summary - SDG TRX09072352

SDG	Sample	Compound	Flag	A or P	Reason
TRX09072352	EB072109-SO FB072109-SO SA166-10B SA166-31B SA182-10B SA182-38B EB072209-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 Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09072352

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09072352

No Sample Data Qualified in this SDG

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

Stage 2B- 4-

SDG #: TRX09072352

LDC #: 21423Q47

Laboratory: Alpha Analytical, Inc.

Date: 9/01/09 Page: 1\_of\_ Reviewer: NC 2nd Reviewer: n/

### METHOD: HPLC Organic Acids (HPLC Method)

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: $7/21 - 22/09$
lla.	Initial calibration	A	۲Ÿ
IIb.	Calibration verification/ICV	A	CCV 6 202 100 5 302
- 111.	Blanks	A	
IVa.	Surrogate recovery	N	Not regid.
IVb.	Matrix spike/Matrix spike duplicates	A	<i>*</i>
IVc.	Laboratory control samples	Â	<u>Ks</u>
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
<u>X</u> .	Field blanks	ND	$EB_2 1,7$ $FB_2 2$

Note:

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

R = Rinsate

Soil

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FB = Field blank

SW = See worksheet

TB = Trip blank EB = Equipment blank

Validated Samples:	Weter
--------------------	-------

1 1	EB072109-SO	W	11	SA166-10BMSD 5	21	MB1K-22404	31	
21	FB072109-SO	V	12		22	MB1K-22400	32	
3-	SA166-10B	S	13		23		33	
4	SA166-31B		14		24		34	
5	SA182-10B		15		25		35	
6	SA182-38B		16		26		36	
<u> </u>	EB072209-SO	W	17		27		37	
8 I	EB072109-SOMS		18		28		38	
9	EB072109-SOMSD	V	19		29		39	
10	SA166-10BMS	5	20		30		40	

Notes:

21423Q47W.wpd

### VALIDATION FINDINGS CHECKLIST

Page: 1 of 2 Reviewer: <u>Jvc</u> 2nd Reviewer:

Method:GCHPLC				· · · · · · · · · · · · · · · · · · ·
Validation Area	Yes	No	NA	Findings/Comments
te tree antest de la fine angel				
All technical holding times were met.	/			
Cooler temperature criteria was met.				
i mita editation	eren anara			
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Were all percent relative standard deviations (%RSD) < 20%?			/	
Was a curve fit used for evaluation?	/			
Did the initial calibration meet the curve fit acceptance criteria of $\geq 0.990$ ?	/			
Were the RT windows properly established?				
	de distai			
Was a continuing calibration analyzed daily?				
Were all percent differences (%D) < 25%.0 or percent recoveries 88-1167%?				
Were all the retention times within the acceptance windows?				
WiBlanks				A CARLEND AND A CARL
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.			-	
Vir Surrogate spikes	æ/.	1%	t in	Rothie Press
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 duplicates		教授	(納	Contraction and the
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	/			
Was a MS/MSD analyzed every 20 samples of each matrix?				
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?				
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	1			
Was an LCS analyzed per extraction batch?	$\leq$			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				

### VALIDATION FINDINGS CHECKLIST

Page: 2 of 2 Reviewer: 3VC 2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
2. Isloe conforma continenton				
Were the retention times of reported detects within the RT windows?				
28. Composing qualification (CRC)		1. 1	n de la composition An de la composition de	
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
SAL SKRAN SANATANS				
System performance was found to be acceptable.				
<ol> <li>Succession of the state of the</li></ol>			2	
Overall assessment of data was found to be acceptable.		-		
Av Fela duplicates				
Field duplicate pairs were identified in this SDG.	1			
Target compounds were detected in the field duplicates.				
Field blanks were identified in this SDG.	$\square$			
Target compounds were detected in the field blanks.				

LDC # 71423 & 47 SDG# 22 C-

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

Z Page: 0f Reviewer:

НРLС METHOD:

4-Chlorobenzenesulfonic acid Parameter:

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Date	Detector	Compound	Conc	Area		
			(ppm)			
6/02 to 6/03/09	S	4-Chlorobenzenesulfonic acid	0.025	105332		RF 4213280
	HPLC 3		0.050	201649		4032980
			0.100	464100		4641000
			0.250	1152183		4608732
			0.500	2262016		4524032
			1.000	4485504		4485504
			1.500	6696299		4464199
			2.000	8851547		4425774

Ave 4424438 4425774

Regression Output:			Repor	rted
Constant		-4.19374E-003	u U	-0.004194
Std Err of Y Est		0.00735		
R Squared		0.999917	r2	0.999917
No. of Observations		8.00000		
Degrees of Freedom		6.00000		
X Coefficient(s)	2.254E-007	-9.41E-015	= 9	2.254E-007

21423 247 SDG #: See Cover LDC #:

**Continuing Calibration Results Verification** VALIDATION FINDINGS WORKSHEET

Page: 1 of / Reviewer: JVC 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

*       Standard ID       Calibration       Compound       Average CF(cal)       CFConc.       PC						Reported	Recalculated	Reported	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	Average CF(Ical)/ CCV Conc.	CF/Conc. CCV	CF/Conc. CCV	₩	٨٣
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	+-	B4701001.D	i c	p-cbsA	o, V	0, 50C	0' 29C	101.1	1.101
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$			7/24 109						_
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			10143						
$\frac{7/24/05}{20:50} = \frac{7/24/05}{5:55} = \frac{0.50}{5:5} = \frac{0.50}{5:$	<u>р</u> И	\$4710 0010	10		l, b	1.016	1.016	101.0	101, 0
$\frac{10}{3} = 4714001. D_{1} = 7/35/69 + 7/35/69 + 7/35/69 + 7/35/69 + 10/1.0 + 10/1.$			7/24/05					-	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			20:03						
$4 \frac{b4752601}{7} \sqrt{x669} = \frac{1.02}{1000} \frac$	m	B4719001.D	1 5		0,50	505 0	JES '0	101.2	6 101 S
$4 \begin{array}{c} 24752601. b_{3}7}{7} \times 69 \\ 100. 1 \\ 100. 0 \\ 10$			69/22/1						
4 B47 52601. Ds. 7 28.69 19:09 19:09			<< · ·						
7x69 19:09	4	B47 52 601.	¢3√ /		1.0	. 02	1.021	102.1	102.1
10:09			60/ xc/2					-	
			10:09						

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 #: 21 423 647 SDG #: Sre Cover

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



METHOD: GC / HPLC The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using Where the following calculation: %Recovery = 100 \* (SSC - SC)/SA

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

SC = Sample concentration

 $\overline{}$ ٩ MS/MSD samples.

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

MSD = Matrix spike duplicate

				(R015)	Gasoline
WS	0	USD	WS		
Spl Con	Sample Conc. ( mc / )	ke ed رج	Spi Add 1/611	compound	0

		9 J	Sample	Spike	sample	Matrix	spike	Matrix Spik	e Duplicate	WS/W	Ő
Compound	1/64 )	ور کا ا	( mc/c)	Concer - 51c	itration	Percent F	Recoverv	Percent F	Recovery	Laa	
	SW	MSD	0"	SWS	Qisid Misid	Reported	Recalc.	Reported	Recalc.	Reported	Recelc
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)											
4-CBSA (vm. Avits	2.0	٥. ٢	٥	1,91	1, 97	95	56	95.	99	3.5	3, 1
In HOLC)											
Comments: <u>Refer to Matrix Sp</u> of the recalculated results.	ike/Matrix S	spike Dupl	icates finding	s worksheet f	or list of qualit	fications and a	ssociated sam	iples when re	ported results	s do not agree	within 10.0%

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Ē	SD

VALIDATION FINDINGS WORKSHEET tory Control Sample/I aboratory Control Sample Duminate Decuite V

Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification



### METHOD: \_\_ GC \_\_HPLC

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

% Recovery = 100\* (SSC-SC)/SA RPD = 1 LCS - LCSD 1 \* 2/(LCS + LCSD) UCS-22400

LCS/LCSD samples:\_

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

SC = Concentration

y LCSD = Laboratory control sample duplicate percent recovery

	Spi	ke	Spiked	Sample		SS	TC	SD	rcs,	LCSD
Compound	Ð	۲۲ ( کا ۲۲ ( کا		htration (Lec.)	Percent	Recovery	Percent F	Recovery	8	0
	rcs		rcs		Reported	Recalc.	Reported	Recalc	Renorted	Baralc
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)										
4. CBSA (an . Arie	2.0	¥	1.98	NA	92	55	-			
IN HUC)					<i>l</i>					r

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of gualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

VALIDATION FINDINGS WORKSHEET       Page:of         Sample Calculation Verification       Reviewer:         PLC       2nd Reviewer:         PLC       Sonted results recalculated for all level IV samples?	V(Df) Example: )(%S/100) Sample ID. Compound Name Will Demonstrated to be measured and the Compound Name WD Compound to be measured Compound to be measured	Compound Reported Recalculated Results Concentrations Concentrations Concentrations Concentrations Qualifications	
LC orted results recalculate	v)(Df) (%S/100) to be measured compound	ů S O	

SAMPCALew.wpd

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

Project/Site Name:	Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Collection Date:	July 23 through July 24, 2009
LDC Report Date:	September 1, 2009
Matrix:	Soil/Water
Parameters:	Organic Acids
Validation Level:	Stage 2B
Laboratory:	Alpha Analytical, Inc.

### Sample Delivery Group (SDG): TRX09072741

### Sample Identification

EB072309-SO SA131-0.5B SA131009-0.5B SA131-10B SA131-27B EB072409-SO RSAH3-0.5B RSAH3-0.5B RSAH3-0.5B RSAH3-32B EB072309-SOMS EB072309-SOMSD RSAH3009-0.5BMS RSAH3009-0.5BMSD

### Introduction

This data review covers 9 soil samples and 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

Samples EB072309-SO and EB072409-SO were identified as equipment blanks. No organic acid contaminants were found in these blanks.

### **IV. Accuracy and Precision Data**

### a. Surrogate Recovery

Surrogates were not required by the method.

### 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 TRX09072741	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 SA131-0.5B and SA131009-0.5B and samples RSAH3-0.5B and RSAH3009-0.5B were identified as field duplicates. No organic acids were detected in any of the samples.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Data Qualification Summary - SDG TRX09072741

SDG	Sample	Compound	Flag	A or P	Reason
TRX09072741	EB072309-SO SA131-0.5B SA131009-0.5B SA131-10B SA131-27B EB072409-SO RSAH3-0.5B RSAH3-0.5B RSAH3-32B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09072741

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09072741

No Sample Data Qualified in this SDG

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

Stage 2B

SDG #: TRX09072741 Laboratory: Alpha Analytical, Inc.

LDC #: 21423R47

### METHOD: HPLC Organic Acids (HPLC Method)

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: 7/23 - 24 /09			
lla.	Initial calibration	A	rr			
IIb.	Calibration verification/ICV	A	CON = 20 ? 10N = 30 ?			
- 111.	Blanks	A				
IVa.	Surrogate recovery	N	Not revid.			
IVb.	Matrix spike/Matrix spike duplicates	A				
IVc.	Laboratory control samples	A	ucs			
V	Target compound identification	N				
VI.	Compound Quantitation and CRQLs	N				
VII.	System Performance	N				
VIII.	Overall assessment of data	A				
IX.	Field duplicates	$\mathcal{WP}$	$D_1 = 2, 2$ $D_2 = 7.8$			
<b>X</b> .	Field blanks	ND	EB = 1.6 BR			

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 + Soil

1	EB072309-SO		W	11	EB072309-SOMSD N	211 MB1K-22410	31
2	SA131-0.5B	D,	S	12	RSAH3009-0.5BMS 5	22 × MBK - 22409	32
3	SA131009-0.5B	D',		13	RSAH3009-0.5BMSD	23	33
4	SA131-10B			14		24	34
<b>1</b> 5	SA131-27B		V	15		25	35
$\frac{1}{6}\gamma$	EB072409-SO		W	16		26	36
7	RSAH3-0.5B	Dv	S	17		27	37
8	RSAH3009-0.5B	D-		18		28	38
5	RSAH3-32B			19		29	39
10 <b>~</b>	EB072309-SOMS		W	20		30	40

Notes:

Note:

Date: <u>9/61/69</u> Page: <u>1</u>of <u>1</u> Reviewer: NG 2nd Reviewer:

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

Project/Site Name:	Tronox	LLC	Facility,	2009	Phase	В	Investigation,
	Henders	son, N	levada				

Collection Date: July 29, 2009

LDC Report Date: September 10, 2009

Matrix: Soil/Water

Parameters: Organic Acids

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): TRX09073051

### Sample Identification

FB072909-SO SA73-0.5B SA73-30B RSAU4-20 RSAU4-50 SA73-0.5BMS SA73-0.5BMSD

### 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 HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

Sample FB072909-SO was identified as a field blank. No organic acid contaminants were found in this blank.

### **IV. Accuracy and Precision Data**

### a. Surrogate Recovery

Surrogates were not required by the method.

### 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 TRX09073051	All compounds reported below the PQL.	J (all detects)	А

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 Organic Acids - Data Qualification Summary - SDG TRX09073051

SDG	Sample	Compound	Flag	A or P	Reason
TRX09073051	FB072909-SO SA73-0.5B SA73-30B RSAU4-20 RSAU4-50	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09073051

### No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09073051

No Sample Data Qualified in this SDG

### LDC #: 21423S47 SDG #: TRX09073051

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

Stage 2B

Laboratory: Alpha Analytical, Inc.

### Date: 9/10 /09 Page: \_\_\_\_of\_\_/ Reviewer: \_\_\_\_\_\_ 2nd Reviewer:

### METHOD: HPLC Organic Acids (HPLC Method)

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	4	Sampling dates: 7 /29 /09
lla.	Initial calibration	A	12
llb.	Calibration verification/ICV	A	CON = 202 ION E 30 D
Ш.	Blanks	A	
IVa.	Surrogate recovery	Ň	Not regit
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	ics
<u>v</u> .	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
<b>X</b> .	Field blanks	ND	FB = 1

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:

Note:

Water

vanua	leu Samples.	Water	+	Sril		
1-1	FB072909-SO	W	ī1)	MB1K-22 436	21	31
2	SA73-0.5B	S	12 7	MO2K - 82444	22	32
3	SA73-30B		13		23	33
4	RSAU4-20		14		24	34
5	RSAU4-50		15		25	35
6	SA73-0.5BMS		16		26	36
7	SA73-0.5BMSD	V	17		27	37
8			18		28	38
9			19		29	39
10			20		30	40

Notes:\_\_

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

Project/Site Name:	Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Collection Date:	July 31 through August 3, 2009
LDC Report Date:	September 11, 2009
Matrix:	Soil/Water
Parameters:	Organic Acids
Validation Level:	Stage 2B
Laboratory:	Alpha Analytical, Inc.

Sample Delivery Group (SDG): TRX09080450

### Sample Identification

RSAU4-20BSPLP RSAU4-20BSPLPpH(SPLP) RSAU4-20BSPLP(DI SPLP) **RSAU4-50BSPLP** RSAU4-50BSPLPpH(SPLP) RSAU4-50BSPLP(DI SPLP) RSAJ3-10BSPLP RSAJ3-10BSPLPpH(SPLP) RSAJ3-10BSPLP(DI SPLP) RSAJ3-29BSPLP RSAJ3-29BSPLPpH(SPLP) RSAJ3-29BSPLP(DI SPLP) FB080309-SO RSAJ3-29BSPLPMS RSAJ3-29BSPLPMSD FB080309-SOMS FB080309-SOMSD

### Introduction

This data review covers 14 soil samples and 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per HPLC Method for Organic Acids.

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 V.

Field duplicates are summarized in Section XVI.

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.

A curve fit, based on the initial calibration, was established for quantitation. 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 within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

### III. Blanks

Method blanks were reviewed for each matrix as applicable. No organic acids were found in the method blanks.

Sample FB080309-SO was identified as a field blank. No organic acid contaminants were found in this blank.

### **IV. Accuracy and Precision Data**

### a. Surrogate Recovery

Surrogates were not required by the method.

### 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 TRX09080450	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 Organic Acids - Data Qualification Summary - SDG TRX09080450

SDG	Sample	Compound	Flag	A or P	Reason
TRX09080450	RSAU4-20BSPLP RSAU4-20BSPLPpH(SPLP) RSAU4-20BSPLP(DI SPLP) RSAU4-50BSPLPPH(SPLP) RSAU4-50BSPLPpH(SPLP) RSAJ3-10BSPLP RSAJ3-10BSPLPPH(SPLP) RSAJ3-10BSPLP(DI SPLP) RSAJ3-29BSPLP RSAJ3-29BSPLPPH(SPLP) RSAJ3-29BSPLPPH(SPLP) FB080309-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 Organic Acids - Laboratory Blank Data Qualification Summary - SDG TRX09080450

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Organic Acids - Field Blank Data Qualification Summary - SDG TRX09080450

No Sample Data Qualified in this SDG

## Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

Stage 2B

SDG #: <u>TRX09080450</u> Laboratory: <u>Alpha Analytical</u>, Inc.

LDC #: 21423T47

## Date: <u>9/10/69</u> Page: <u>of )</u> Reviewer: <u>3/2</u> 2nd Reviewer: <u>f</u>

## METHOD: HPLC Organic Acids (HPLC Method)

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>I.</u>	Technical holding times	A	Sampling dates: 7/31 - 8/03/19
lla.	Initial calibration	A	42
IIb.	Calibration verification/ICV	Á	COV = 202 ICV = 302
Ш.	Blanks	A	
IVa.	Surrogate recovery	N	Not regid.
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LES
V.	Target compound identification	N	
<u>VI.</u>	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
<b>X</b> .	Field blanks	ND	FB = 13

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:

Note:

Soil + WATEr

			0.01			
1	RSAU4-20BSPLP	11	RSAJ3-29BSPLP(SPLP)	5 2	11 MB4K - 22872	31
2	рн RSAU4-20BSPLP(SPLP)	12	A RSAJ3-29BSPLP(DI SPLP)	2	2 × MBIK -22472 D	32
3	A RSAU4-20BSPLP(DI SPLP)	13	RB080309-SO W	) 2	33 Mbik - 22473	33
4	RSAU4-50BSPLP	14	RSAJ3-29BSPLPMS	2	4	34
5	RSAU4-50BSPLP(SPLP)	15	RSAJ3-29BSPLPMSD	2	5	35
6	RSAU4-50BSPLP(DI SPLP)	16	RB080309-SOMS	2	6	36
7	RSAJ3-10BSPLP	17	F RB080309-SOMSD	2	7	37
8	RSAJ3-10BSPLP(SPLP)	18		2	8	38
9	RSAJ3-10BSPLP(DI SPLP)	19		2	9	39
10	RSAJ3-29BSPLP	20		3	0	40

Notes:\_

21423T47W.wpd