Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Data Validation Reports LDC #21991

Gasoline Range Organics



Laboratory Data Consultants, Inc. Data Validation Report

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

Henderson, Nevada

Collection Date: August 4, 2009

LDC Report Date: December 18, 2009

Matrix: Water

Parameters: Gasoline Range Organics

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0904290

Sample Identification

FB080409-GW

Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Gasoline Range Organics.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

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

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

III. Blanks

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

Sample FB080409-GW was identified as a field blank. No gasoline range organic contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples	
FB080409-GW	8/4/09	Gasoline range organics	10 ug/L	No associated samples in this SDG	

IV. Accuracy and Precision Data

a. Surrogate Recovery

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

b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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 R0904290	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 Gasoline Range Organics - Data Qualification Summary - SDG R0904290

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0904290	FB080409-GW	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG R0904290

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Field Blank Data Qualification Summary - SDG R0904290

No Sample Data Qualified in this SDG

SDG # See Cons LDC# 21991 A7

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: of Reviewer:_ 2nd Reviewer:

МЕТНОD: GC HPLC

Y N N/A

Were field blanks identified in this SDG?

Were target compounds detected in the fi

Were target compounds detected in the field blanks?

// Associated sample units: NA
8/04/01 Blank units: w

Sampling date:

Field blank type: (circle one) Field Blank / Trip Blank / Atmospheric Blank / Ambient Blank

Associated Samples:_

Rinsate / Equipment Rinsate / Equipment Blank / Source Blank / Other

Sample Identification Blank ID Blank ID Q G R0 Compound CROL

Associated sample units:
ank units:

Sampling date:

Field blank type: (circle one) Field Blank / Trip Blank/ Atmospheric Blank/ Ambient Blank Blank / Source Blank / Other

Associated Samples

Sample Identification Blank ID Blank ID Compound

Samples with compound concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U" CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT

Laboratory Data Consultants, Inc. Data Validation Report

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

Henderson, Nevada

Collection Date: September 8, 2009

LDC Report Date: December 1, 2009

Matrix: Soil/Water

Parameters: Gasoline Range Organics

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905115

Sample Identification

EB090809-SO1

SA50-12B

SA50009-12B

SA50-25B

SA50-36B

SA50-12BMS

SA50-12BMSD

Introduction

This data review covers 6 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Gasoline Range Organics.

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.

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Field duplicates are summarized in Section IX.

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- 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 as required by the method.

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

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

III. Blanks

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

Sample EB090809-SO1 was identified as an equipment blank. No gasoline range organic contaminants were found in this blank.

Sample FB072909-SO (from SDG R0904226) was identified as a field blank. No gasoline range organic contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB072909-SO	7/29/09	Gasoline range organics	27 ug/L	All soil samples in SDG R0905115

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

IV. Accuracy and Precision Data

a. Surrogate Recovery

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

b. Matrix Spike/Matrix Spike Duplicates

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

c. Laboratory Control Samples

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

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905115	All compounds reported below the PQL.	J (all detects)	Α

Raw data were not reviewed for this SDG.

VII. System Performance

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

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

IX. Field Duplicates

Samples SA50-12B and SA50009-12B were identified as field duplicates. No gasoline range organics were detected in any of the samples.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Data Qualification Summary - SDG R0905115

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905115	EB090809-SO1 SA50-12B SA50009-12B SA50-25B SA50-36B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG R0905115

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Equipment Blank Data Qualification Summary - SDG R0905115

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Field Blank Data Qualification Summary - SDG R0905115

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

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LDC #:	21991B7	VALIDATION COMPLETENESS WORKSHEET
SDG #:_	R0905115	Stage 2B
Laborato	ry: Columbia Ana	lytical Services

Date:	11/30/09
Page:_	1 of]
Reviewer:	345
nd Reviewer:	Q .

METHOD: GC Gasoline Range Organics (EPA SW 846 Method 8015B)

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: 9 /08 /09
IIa.	Initial calibration	Α	·
IIb.	Calibration verification/JCV	Α	ca ≤ 20 Z
111.	Blanks	A	
IVa.	Surrogate recovery	#	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	2,3
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	D = 2, 2
Χ.	Field blanks	sM	YEB=1 FB= FB072909-50 (from R09092)6

N	Inf	حا	

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	EB090809-SO1		W	11 1	169728-WMB	21	3.	1
2	SA50-12B	D	ζ	12 >	-SMB	22	32	2
3	SA50009-12B	b	ĺ	13		23	33	3
4	SA50-25B			14		24	34	4
5	SA50-36B			15		25	35	5
6	SA50-12BMS			16		26	36	6
7	SA50-12BMSD		\/	17		27	37	7
8				18		28	38	8
9				19		29	39	9
10				20		30	40	0

Notes:					

7	- Tank
39.2	24 0
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VALIDATION FINDINGS WORKSHEET Field Blanks

		4
Page:	Reviewer	2nd Reviewer

Meruon.	70					2nd Reviewer:	ewer:
Y N N/A We	are field bla	inks identifie ompounds c	Y N N/A Were fleid blanks identified in this SDG? Y N N/A Were target compounds detected in the field blanks? Blank units: 09 L Associated sample units: 05 KS				(
Field blank type: (ci	rcle one) Fig	id Blank Tri	ip Blank / Atmospheric Blank / Ambient Bla	آء 	Associated Samples:_	All 501/2	\int
	/ DIRSUIL	Equipment P	Kinsate / Equipment Kinsate / Equipment Blank / Source Blank / Other:	Other:			
Compound	Blank ID	Blank ID		Sample 1de	Sample Identification	-	
	FB072909-50	05-60					
G RB	27				-		

Sampling date:
Sampling date:
Field blank type: (circle one) Field Blank / Trip Blank / Atmospheric Blank / Ambient Blank / Other:
Rinsate / Equipment Rinsate / Equipment Blank / Source Blank / Other:

Associated Samples:

Compound	Blank ID		Blank ID Sample Identification	
CROL				
Caratte Anna To Manage MAT All Anna Cara	TON JOB	A LEIEN ALL	A1: DFG: FF 1104 G104: FF 1144 F A1: DFG: FF 1144 F	

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT: Samples with compound concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date:

September 3, 2009

LDC Report Date:

December 1, 2009

Matrix:

Soil

Parameters:

Gasoline Range Organics

Validation Level:

Stage 2B

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905072

Sample Identification

SA53-10B

SA53-25B

SA53-32B

SA106-12B

SA106-20B

SA106-35B

Introduction

This data review covers 6 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Gasoline Range Organics.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

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

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

III. Blanks

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

Sample FB072909-SO (from SDG R0904226) was identified as a field blank. No gasoline range organic contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB072909-SO	7/29/09	Gasoline range organics	27 ug/L	All samples in SDG R0905072

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

IV. Accuracy and Precision Data

a. Surrogate Recovery

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

b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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 R0905072	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 Gasoline Range Organics - Data Qualification Summary - SDG R0905072

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905072	SA53-10B SA53-25B SA53-32B SA106-12B SA106-20B SA106-35B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG R0905072

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Field Blank Data Qualification Summary - SDG R0905072

No Sample Data Qualified in this SDG

Tronox Northaate Henderson

LDC #:	21991C7	VALIDATION COMPLETENESS WORKSHEET	
SDG #:_	R0905072	Stage 2B	
Laborato	ry: Columbia Analytica	al Services	

Reviewer: 2nd Reviewer:

METHOD: GC Gasoline Range Organics (EPA SW 846 Method 8015B)

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
l.	Technical holding times	A	Sampling dates: 9/03/04
IIa.	Initial calibration	A	
lib.	Calibration verification/ICV	A	CCV € 20 }
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	Client spec
IVc.	Laboratory control samples	A	LCS '
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	SW	FB = FB072909-50 (frm R6904226)

Note:

A = Acceptable

ND = No compounds detected

D = Duplicate TB = Trip blank

N = Not provided/applicable SW = See worksheet

R = Rinsate FB = Field blank

EB = Equipment blank

Validated Samples:

Call

	3011					
1	SA53-10B	11	16 9541 - MP	21	31	
2	SA53-25B	12		22	32	
3	SA53-32B	13		23	33	
4	SA106-12B	14		24	34	
5	SA106-20B	15		25	35	
¹ 6	SA106-35B	16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

Notes:		

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VALIDATION FINDINGS WORKSHEET Field Blanks

Of	36	1
Page:	Reviewer:	Reviewer:
		2nd

		blanks?		
	in this SDG?	tected in the field	units: Mg/tg/	2
HPLC	Were field blanks identified in this SDG?	Nyre target compounds detected in the field blanks?	Associated sample units: VO	61
20	Were fle	Wøre tar	1/6m	ate: 7/34
AETHOD:	∀ Z ≻	YN N/A	Slank units	sampling date

7

Rinsate / Equipment Rinsate / Equipment Blank / Source Blank / Other. Field blank type: (circle one) Field Blank Trip Blank / Atmospheric Blank / Ambient Blank

Associated Samples:

Compound	Blank 10	Blank 10	Sample Identification
	FB072	FB07 29 01-50	
GRB	27		
CRQL			

	le one) Fiel Rinsate / E	eduipment R	rield blank type: (circle one) rield blank / Irip blank/ Atmospheric bl Rinsate / Equipment Rinsate / Equipment Blase	e one) Field Blank / Irip Blank/ Atmospheric Blank/ Ambient Blank Rinsate / Equipment Rinsate / Equipment Blank / Source Blank / Other:	lank/ Ambient Blank ik / Source Blank / Other:	-	Associated Samples:_	pies:	
Compound	Blank ID	Blank ID				Sample ide	Sample Identification		
		_							
CRQL									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT: Samples with compound concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

Laboratory Data Consultants, Inc. Data Validation Report

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

Henderson, Nevada

Collection Date: September 10, 2009

LDC Report Date: December 1, 2009

Matrix: Soil/Water

Parameters: Gasoline Range Organics

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905177

Sample Identification

EB091009-SO1

SA102-10B

SA102-30B

SA109-10B

SA109-25B

SA109-34B

SA109-10BMS

SA109-10BMSD

Introduction

This data review covers 7 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Gasoline Range Organics.

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.

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- 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 as required by the method.

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

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

III. Blanks

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

Sample EB091009-SO1 was identified as an equipment blank. No gasoline range organic contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB091009-SO1	9/10/09	Gasoline range organics	18 ug/L	All soil samples in SDG R0905177

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

Sample FB072909-SO (from SDG R0904226) was identified as a field blank. No gasoline range organic contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB072909-SO	7/29/09	Gasoline range organics	27 ug/L	All soil samples in SDG R0905177

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

IV. Accuracy and Precision Data

a. Surrogate Recovery

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

b. Matrix Spike/Matrix Spike Duplicates

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

c. Laboratory Control Samples

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

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905177	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 Gasoline Range Organics - Data Qualification Summary - SDG R0905177

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905177	EB091009-SO1 SA102-10B SA102-30B SA109-10B SA109-25B SA109-34B	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG R0905177

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Equipment Blank Data Qualification Summary - SDG R0905177

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Field Blank Data Qualification Summary - SDG R0905177

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET LDC #: 21991D7 Stage 2B SDG #: ___R0905177 Laboratory: Columbia Analytical Services Reviewer: 2nd Reviewer: **METHOD:** GC Gasoline Range Organics (EPA SW 846 Method 8015B) 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 9/10/09 Sampling dates: Technical holding times Initial calibration IIa. COV £ 20 2 Calibration verification/ICV IIb. III. Blanks IVa. Surrogate recovery IVb. Matrix spike/Matrix spike duplicates KS IVc. Laboratory control samples V. Target compound identification Ν VI. Compound Quantitation and CRQLs Ν VII. System Performance Ν A VIII. Overall assessment of data N IX. Field duplicates SW EB = 1 FB = FB 072909-50 (from R0904 226) Field blanks A = Acceptable Note: ND = No compounds detected D = Duplicate N = Not provided/applicable R = Rinsate TB = Trip blank SW = See worksheet FB = Field blank EB = Equipment blank Validated Samples:

5 SA109-25B 6 SA109-34B	\$\frac{1}{13}\$ 14 15 16	-SMB	22 23 24 25	32 33 34 35	
3 SA102-30B 4 SA109-10B 5 SA109-25B 6 SA109-34B	14		24	34	
4 SA109-10B 5 SA109-25B 6 SA109-34B	15				
5 SA109-25B - SA109-34B			25	35	
6 SA109-34B	16				
7 04400 40014			26	36	
7 SA109-10BM	S 17		27	37	
8 SA109-10BM	SD 18		28	38	
9	19		29	39	
10	20		30	40	

219912	Les Come
LDC #:	SDG #:

VALIDATION FINDINGS WORKSHEET Field Blanks

of	3/6	1
	Reviewer:_	2nd Reviewer:_

					2nd Reviewer:
METHOD:GCHPLCY N N/AWere field blanks identified in thisY N N/AWere target compounds detected in this	GC HPLC Were field blar Were target co	anks identifie compounds d	<i>(</i>) ⊏		
Sampling date:	1/2 Assut	Jateu Sampi	enines.		Kin Oaila
Field blank type: (ci	ircle one) Fie	eld Blank / Tri	Field blank type: (circle one) Field Blank / Trip Blank / Atmospheric Blank / Ambient Blank	Associated Samples	Associated Samples: At A ASSOCIATED AND ASSOCIATED ASSOCIATED AND ASSOCIATED AND ASSOCIATED AND ASSOCIATED ASS
	Kinsate / t	Equipment Ki	Kinsate / Equipment Kinsate /(Equipment Blank.) Source Blank / Other		
Compound	Blank ID	Blank ID		Sample Identification	
	-				
GRO	81				
CROL					
Blank units: $\frac{Mg}{L}$ Sampling date: $\frac{7}{L}$	2 / 29 /5 2 / 29 / 5	ciated sample	Blank units: $\frac{49}{1}$ /L Associated sample units: $\frac{45}{15}$ /K-S Sampling date: $\frac{7}{159}$ /6 - Field Blank Atmospheric Blank Ambient Blank	Associated Samples:	Ay Soils (ND)

Rinsate / Equipment Rinsate / Equipment Blank / Source Blank / Other

Field blank type: (circle one) Field Blank Trip Blank/ Atmospheric Blank/ Ambient Blank

Associated Samples:

Compound	Blank ID	Blank ID	Sample Identification
	FAOTA	FA072909-50	
G.RO	/c		
CROL			
	TOTA TOT	- 14 CLLICA	CONTRACT TO WITH THE MALE DESIGNATION OF THE BOARD OF THE FOLLOWING STATEMENT

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT.
Samples with compound concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

Laboratory Data Consultants, Inc. Data Validation Report

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

Henderson, Nevada

Collection Date: September 10 through September 16, 2009

LDC Report Date: December 5, 2009

Matrix: Soil

Parameters: Gasoline Range Organics

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905192

Sample Identification

SA102-10BSPLP3

SA102-30BSPLP3

SA128-10BSPLP3

SA128-29BSPLP3

Introduction

This data review covers 4 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Gasoline Range Organics.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

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

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No gasoline range organic contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
SPLP-Bik1	9/17/09	Gasoline range organics	27 ug/L	SA102-10BSPLP3 SA102-30BSPLP3
SPLP-Blk2	9/24/09	Gasoline range organics	7,3 ug/L	SA128-10BSPLP3 SA128-29BSPLP3

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SA102-10BSPLP3	Gasoline range organics	8.3 ug/L	8.3U ug/L
SA128-10BSPLP3	Gasoline range organics	6.5 ug/L	6.5U ug/L

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Surrogate Recovery

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

b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

c. Laboratory Control Samples

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

V. Target Compound Identification

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 R0905192	All compounds reported below the PQL.	J (all detects)	А

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 Gasoline Range Organics - Data Qualification Summary - SDG R0905192

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905192	SA102-10BSPLP3 SA102-30BSPLP3 SA128-10BSPLP3 SA128-29BSPLP3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG R0905192

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905192	SA102-10BSPLP3	Gasoline range organics	8.3U ug/L	А	Ы
R0905192	SA128-10BSPLP3	Gasoline range organics	6.5U ug/L	А	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Field Blank Data Qualification Summary - SDG R0905192

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 21991F7 VALIDATION COMPLETENESS WC SDG #: R0905192 Stage 4
Laboratory: Columbia Analytical Services

Date:11/30/60
Page: lof l
Reviewer: VC
2nd Reviewer: L

METHOD: GC Gasoline Range Organics (EPA SW 846 Method 8015B)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 1/10/09 - 9/10/09
lla.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	CCV < 20 B
III.	Blanks	SW	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	Client Spec
IVc.	Laboratory control samples	Д	Us /D
V.	Target compound identification	A	
VI.	Compound Quantitation and CRQLs	A	
VII.	System Performance	A	
VIII.	Overall assessment of data	Α	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note:

A = Acceptable

ND = No compounds detected

D = Duplicate

N = Not provided/applicable SW = See worksheet R = Rinsate FB = Field blank TB = Trip blank EB = Equipment blank

Validated Samples:

Soil

	V/		
1 SA102-10BSPLP3	- 111 171343-MB	21	31
2 / SA102-30BSPLP3	12 1728/3-	22	32
3 SA128-10BSPLP3	tall SPLP. BIKI	23	33
† γ SA128-29BSPLP3	tax SPLP-BILY	24	34
5	15	25	35
6	16	26	36
7	17	27	37
8	18	28	38
9	19	29	39
10	20	30	40

Notes:	 	

VALIDATION FINDINGS CHECKLIST

Page:_	1 of -
Reviewer:	216
2nd Reviewer:	V-

Method:	GC	HPLC

Validation Area	Yes	No	NA	Findings/Comments
1 Technical holding times				
All technical holding times were met.	_			
Cooler temperature criteria was met.	_			
II. Initial calibration				
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?			<u>Ł</u>	
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?				
Were the RT windows properly established?	/			
IV. Continuing calibration	,		,,,,,	
Was a continuing calibration analyzed daily?	(<u> </u>	
Were all percent differences (%D) ≤ 20%.0 or percent recoveries 80-120%?			_	
Were all the retention times within the acceptance windows?				
V Blanks		Υ	1	
Was a method blank associated with every sample in this SDG?	/	<u></u>		
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.		<u> </u>		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?		ļ		
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			<u>,</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?	<u> </u>			
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	<u> </u>		
Was an LCS analyzed per extraction batch?	/	<u> </u>	<u> </u>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		<u> </u>		
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		/	1	
Were the performance evaluation (PE) samples within the acceptance limits?				

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 3/4
2nd Reviewer: 4

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

LDC #: 21 99 177 SDG #: See Cons

GC HPLC

METHOD:

VALIDATION FINDINGS WORKSHEET

Blanks

Page: 1 of 2nd Reviewer: Reviewer:

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

Were all samples associated with a given method blank? A/N N A/N N/A

Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?

Was a method blank performed with each extraction batch? Y/N N/A Y N N/A

Were any contaminants found in the method blanks? If yes, please see findings below.

evel IV/D Only

Conc. units: Ng/L

(Gasoline and aromatics only)Was a method blank analyzed with each 24 hour batch? Y N N/A Y N N/A

Was a method blank analyzed for each analytical / extraction batch of ≤20 samples? on date: 4/17/09 Blank analysis date: 4/22/09 Associated Blank extraction date: 4/17/09

Associated samples:

60	Zan Can								-
		Blank ID			S	Sample Identification			_
		Step-8K1							
	6 Ro	1	8,3/11				***************************************		
P Blank extraction da Conc. units: ما الم	ion date: 9/	P Blank extraction date: 9/24/69 Blank analysis date: 9	nalysis date:	1/20/04	Associ	Associated samples:	34	(61)	
Compound	puno	Blank ID			•5				
		7 2 2 2 2	٠	1	87	Sample identification			
_			•	•		-		_	

ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT. All contaminants within five times the method blank concentration were qualified as not detected. "U" 4 8 ンアレアーカバ SS

71991F7 SDG #: See Cover LDC #:

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

1 of 1 Page: Reviewer: 2nd Reviewer:

> HPLC METHOD: GC_

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

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

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

CF Average CF Average CF (initial) (initial) (initial) (initial) %RSD 0.24 07 0.20 0 0					Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
9/62/04 G7RO (C6-G0) 0.2107 0.2107 0.2058 0.2058 S.		Standard ID	Calibration Date	Compound	CF () かstd)	CF ((vV)sst d)	Average CF (initial)	Average CF (initial)		%RSD
		787	9/03/04	C7 RO (C6-G0)	0.2107	0,2107	0.2058	० अध	<i>S</i> .	5
		-	-							
	,									
			•							

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

21991 F7 Sec Coner SDG #: LDC #:

Continuing Calibration Results Verification VALIDATION FINDINGS WORKSHEET

Page: 2nd Reviewer; Reviewer:

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	g%	a %
-	Ç	10/25/6	G R 0	850c '0	0, 2137	0.2/32	t	4
		10:4%						
7	3	4/30/04	_	-	0, 1941	D 1 1 0	ر	9
- 1		× . & .						
		٥٤,٥						
က			-					
		7						
4								
f								
		A						

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

1111117	See Cover
LDC #:	# 000

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Reviewer: _____ Page:

> METHOD: 6 GC HPLC SDG#:

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

% Recovery: SF/SS * 100

SF = Surrogate Found SS = Surrogate Spiked Where:

Sample ID:

Surrogate	Column/Petector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
	<i>y</i>			Reported	Recalculated	
3-Flyord chlorober zene	€17	30	(6) 450°06 Fort	7 199	(5)	P

Sample ID:						
Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID:

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

21991F SDG#: See Guer LDC#:

<u>Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification</u> VALIDATION FINDINGS WORKSHEET

Reviewer: 314

Page: lof / 2nd Reviewer:__

METHOD: CC_HPLC

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

% Recovery = 100* (SSC-SC)/SA RPD = I LCS - LCSD I * 2/(LCS + LCSD)

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

SC = Concentration

LCSD = Laboratory control sample duplicate percent recovery

171343-45 LCS/LCSD samples:

	S S	Spike	Spiked	Spiked Sample		LCS	CSD	SD	รวา	TCS/TCSD
Compound	Ä	574	, 54.)	T Canon	Percent	Percent Recovery	Percent Recovery	Зесолегу		RPD
	rcs	LCSD	rcs	GSOT	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)	2.50	₹ 2	مع	ΝA	Ē	3				
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.

7991F7 Sec Cores LDC #: SDG#:

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Reviewer: 2nd Reviewer:

> GC HPLC METHOD:

Y N N/A

Were all recalculated results for detected target compounds within 10% of the reported results? Were all reported results recalculated and verified for all level IV samples?

(RF)(Vs or Ws)(%S/100) (A)(Fv)(Df) Concentration=

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor RF* Average response factor of the compound

Vs= Initial volume of the sample Ws= Initial weight of the sample %S= Percent Solid In the initial calibration

Concentration =

SR Compound Name

#

Sample ID.

Example:

1000 78908 - 61744 0,2058

Qualifications				
Recalculated Results Concentrations				
Reported Concentrations	-			
Compound				
Sample ID				
#				

Comments:

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date:

September 11, 2009

LDC Report Date:

December 5, 2009

Matrix:

Soil

Parameters:

Gasoline Range Organics

Validation Level:

Stage 2B

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905198

Sample Identification

SA114-10B

SA114-30B

Introduction

This data review covers 2 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Gasoline Range Organics.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

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

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

III. Blanks

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

Sample FB072909-SO (from SDG R0904226) was identified as a field blank. No gasoline range organic contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB072909-SO	7/29/09	Gasoline range organics	27 ug/L	All samples in SDG R0905198

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

IV. Accuracy and Precision Data

a. Surrogate Recovery

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

b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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 R0905198	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 Gasoline Range Organics - Data Qualification Summary - SDG R0905198

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905198	SA114-10B SA114-30B	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG R0905198

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Field Blank Data Qualification Summary - SDG R0905198

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #:	21991G7	VALIDATION COMPLETENESS WORKSHEET
SDG #:_	R0905198	Stage 2B
Laborato	ry: Columbia Analytica	I Services

Date:	12/01/04
Page:	1 of 1
Reviewer:	<u> </u>
2nd Reviewer:	

METHOD: GC Gasoline Range Organics (EPA SW 846 Method 8015B)

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	Α	Sampling dates: 9/11/05
lla.	Initial calibration	A	
IIb.	Calibration verification/IGV	Α	100 € 20 Z
111.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	Client spec
IVc.	Laboratory control samples	A .	us '
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	SW	FB = FB 072909-50 (from R0904276)

A = Acceptable Note:

N = Not provided/applicable

ND = No compounds detected

D = Duplicate

SW = See worksheet

R = Rinsate FB = Field blank TB = Trip blank
EB = Equipment blank

Validated Samples:

CAIL

	201				 	
1	SA114-10B	11	2	21	 31	
2	SA114-30B	12	2	22	32	
3	170704-MB	13	2	23	 33	
4		14	2	24	 34	
5		15	2	25	 35	
6		16	2	26	36	
7		17	2	27	37	
8		18	2	28	38	
9		19	2	29	39	
10		20	3	30	40	

Notes:		

2199167	ないい
LDC #:	SDG #:

VALIDATION FINDINGS WORKSHEET Field Blanks

o 	25/	4
	Reviewer:	2nd Reviewer:

HPLC	Were field blanks identified in this SDG?	Were target compounds detected in the field blanks?	, Associated sample units: NG /FS	7/29/09
))			7 64	
#ETHOD:	Y N/A	Y/N N/A	flank units:	ampling date

Field blank type: (circle one) Field Blank) Trip Blank / Atmospheric Blank / Ambient Blank

Sampling date:_

Associated Samples: A V (MB)

Sample Identification Rinsate / Equipment Rinsate / Equipment Blank / Source Blank / Other FB072909-50 Blank ID Blank ID 80 Compound S CROL

Field blank type: (circle one) Field Blank / Trip Blank/ Atmospheric Blank / Ambient Blank / Other: Rinsate / Equipment Rinsate / Equipment Blank / Source Blank / Other:	Blank ID Blank ID Sample Identification					CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT. Samples with compound concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".
cle one) Field Rinsate / Ed	Blank ID					RE NOT QUAL
ield blank type: (cir	Compound				CROL	SIRCLED RESULTS WE samples with compound of

Associated sample units:

Sampling date:

Blank units:

Laboratory Data Consultants, Inc. Data Validation Report

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

Henderson, Nevada

Collection Date: September 16, 2009

LDC Report Date: December 5, 2009

Matrix: Soil/Water

Parameters: Gasoline Range Organics

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905260

Sample Identification

EB091609-SO1 SA128-0.5B SA128-10B SA128-29B SA128-10BMS SA128-10BMSD

Introduction

This data review covers 5 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Gasoline Range Organics.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

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

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

III. Blanks

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

Sample EB091609-SO1 was identified as an equipment blank. No gasoline range organic contaminants were found in this blank.

Sample FB072909-SO (from SDG R0904226) was identified as a field blank. No gasoline range organic contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB072909-SO	7/29/09	Gasoline range organics	27 ug/L	All samples in SDG R0905260

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

IV. Accuracy and Precision Data

a. Surrogate Recovery

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

b. Matrix Spike/Matrix Spike Duplicates

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

c. Laboratory Control Samples

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

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905260	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 Gasoline Range Organics - Data Qualification Summary - SDG R0905260

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905260	EB091609-SO1 SA128-0.5B SA128-10B SA128-29B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG R0905260

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Equipment Blank Data Qualification Summary - SDG R0905260

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Field Blank Data Qualification Summary - SDG R0905260

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #:	2199117	VALIDATION COMPLETENESS WORKSHEET
SDG #:_	R0905260	Stage 2B
Laborato	rv: Columbia Analytica	I Services

Date:	12/01/09
Page:_	<u></u> of_]_
Reviewer:	376
2nd Reviewer:	

METHOD: GC Gasoline Range Organics (EPA SW 846 Method 8015B)

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: 9/16/09
lla.	Initial calibration	À	
llb.	Calibration verification/IEV	A	cw € 20 }
10.	Blanks	Á	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	પુડ
V.	Target compound identification	N 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	FB = FB07 2909-50 (from R090 42

No	٠	

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

		• •	7 -01			
1 /	EB091609-SO1 W	11/	171124 WMB	21	31	
2 2	SA128-0.5B S	12 >	171124-SMB	22	32	
3 -	SA128-10B	13		23	33	
4	SA128-29B	14		24	34	
5 7	SA128-10BMS	15		25	35	
6 Y	SA128-10BMSD	16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	 40	

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VALIDATION FINDINGS WORKSHEET Field Blanks

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Page:	Reviewer:_	2nd Reviewer:_

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METHOD:	GC HPLC
Y/N N/A	Were field blanks identified in this SDG?
A/N N/A	Weye target compounds detected in the field blanks?
Blank units:	thg / Associated sample units: かの / kター
Sampling date:	9/1
Field blank type: (circle	rpe: (circle one) Field Blank / Trip Blank / Atmospheric Blank / Ambient Blank

Sample Identification Rinsate / Equipment Rinsate / Equipment Blank / Source Blank / Other Blank ID FB072909-50 Blank ID 27 G R0 Compound

Blank units: Sampling date: Field blank type: (circle one) Field Blank / Trip Blank / Atmospheric Blank / Source Blank / Other: Compound Blank ID Blank ID Sample Identification Sample Identification Sample Identification	her:
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CROL	Compound	Biank ID	Blank ID		Sample Ide	Sample Identification		
CROL								
CROL								
CRQL								
CRQL								
CRQL								
CRQL								
CRQL								
	CROL							

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with compound concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

Laboratory Data Consultants, Inc. Data Validation Report

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

Henderson, Nevada

Collection Date: September 17, 2009

LDC Report Date: December 5, 2009

Matrix: Soil

Parameters: Gasoline Range Organics

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905331

Sample Identification

SA51-10B SA51009-10B SA51-25B SA51-36B

Introduction

This data review covers 4 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Gasoline Range Organics.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

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

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

III. Blanks

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

Sample FB072909-SO (from SDG R0904226) was identified as a field blank. No gasoline range organic contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB072909-SO	7/29/09	Gasoline range organics	27 ug/L	All samples in SDG R0905331

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

IV. Accuracy and Precision Data

a. Surrogate Recovery

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

b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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 R0905331	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 SA51-10B and SA51009-10B were identified as field duplicates. No gasoline range organics were detected in any of the samples.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Data Qualification Summary - SDG R0905331

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905331	SA51-10B SA51009-10B SA51-25B SA51-36B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG R0905331

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Field Blank Data Qualification Summary - SDG R0905331

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #:_	21991J7	VALIDATION COMPLETENESS WORKSHEET	
SDG #:_	R0905331	Stage 2B	
Laborato	ry: Columbia A	Analytical Services	Re

Date:	12/61/0
Page:_	<u></u> of_)_
Reviewer:	
2nd Reviewer:	

METHOD: GC Gasoline Range Organics (EPA SW 846 Method 8015B)

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
l.	Technical holding times	Ą	Sampling dates: 9/17/6 9
IIa.	Initial calibration	A	
IIb.	Calibration verification#	A	COV 620 2
111.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	Client 9/10c
IVc.	Laboratory control samples	A	Client 9/Lec KS
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, >
X.	Field blanks	SM	FB = FB 072909-50 (from R0904226)

Note:

A = Acceptable

SW = See worksheet

N = Not provided/applicable

ND ≈ No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Soil

1	SA51-10B D	11	21	31	
2	SA51009-10B	12	22	32	
3	SA51-25B	13	23	33	
4	SA51-36B	14	24	34	
5	171124-MB	15	25	35	
6		16	26	36	
7		17	27	37	
8		18	28	38	·
9		19	29	39	
10		20	30	40	

Notes:		 		
			•	

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DC #:	#:

VALIDATION FINDINGS WORKSHEET Field Blanks

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Page:	Reviewer	2nd Reviewer:_

WETHOD: G(V) N/A W(V) N/A W(V) N/A W(V) N/A W(V) Sampling date:	Mere field blan Were target co	anks identific ompounds c	WETHOD: GC HPLC Y N N/A Were field blanks identified in this SDG? Y N N/A Were target compounds detected in the field blanks? Blank units: いう / Associated sample units: いら / Sampling date: フタイクタイク	
Field blank type: (c	ircle one)/Eig Rinsate / E	eld Blank / Tr Equipment Ri	fe one)Eield Blank / 7rip Blank / Atmospheric Blank / Ambient Blank Rinsate / Equipment Rinsate / Equipment Blank / Source Blank / Other:	Associated Samples: 7.1/
Compound	Blank ID	Blank ID		Sample Identification
	FB07290950	1-50		
680	74			
	,			

Associated Samples: Rinsate / Equipment Rinsate / Equipment Blank / Source Blank / Other Field blank type: (circle one) Field Blank / Trip Blank/ Atmospheric Blank/ Ambient Blank Blank units:_____Sampling date:_

Associated sample units:

Compound	Blank ID	Blank ID	sk ID Sample Identification	
CRQL				
W OT II IOUG GU IOGIO	TOT ALOT		CION TO PERSITE WERE MOT OTHER ATTENDED AT FORT TO MOT CION FOR THE FOLLOWING STATEMENT:	

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT: Samples with compound concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

Laboratory Data Consultants, Inc. Data Validation Report

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

Henderson, Nevada

Collection Date: September 21, 2009

LDC Report Date: December 1, 2009

Matrix: Soil

Parameters: Gasoline Range Organics

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905387

Sample Identification

SA66-0.5B

SA66009-0.5B

SA66-10B

SA66-28B

SA70-30B

SA129-10B

SA129-29B

SA66-0.5BMS

SA66-0.5BMSD

Introduction

This data review covers 9 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Gasoline Range Organics.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

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

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 20.0% QC limits.

III. Blanks

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

Sample FB072909-SO (from SDG R0904226) was identified as a field blank. No gasoline range organic contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB072909-SO	7/29/09	Gasoline range organics	27 ug/L	All samples in SDG R0905387

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

IV. Accuracy and Precision Data

a. Surrogate Recovery

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

b. Matrix Spike/Matrix Spike Duplicates

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

c. Laboratory Control Samples

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

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905387	All compounds reported below the PQL.	J (all detects)	Α

Raw data were not reviewed for this SDG.

VII. System Performance

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

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

IX. Field Duplicates

Samples SA66-0.5B and SA66009-0.5B were identified as field duplicates. No gasoline range organics were detected in any of the samples.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Data Qualification Summary - SDG R0905387

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905387	SA66-0.5B SA66009-0.5B SA66-10B SA66-28B SA70-30B SA129-10B SA129-29B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG R0905387

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Gasoline Range Organics - Field Blank Data Qualification Summary - SDG R0905387

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET LDC #: 21991L7 Stage 2B SDG #: R0905387 Laboratory: Columbia Analytical Services

Reviewer: 2nd Reviewer:

METHOD: GC Gasoline Range Organics (EPA SW 846 Method 8015B)

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
l.	Technical holding times	A	Sampling dates: 9 /21 /0 9
IIa.	Initial calibration	À	
llb.	Calibration verification#EV	A	COV = 20]
111.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	las
V	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	b=1.~
Χ	Field blanks	SW)	FB = FB072909-SO (from R0904226)

Note: A = Acceptable

N = Not provided/applicable

ND = No compounds detected

D = Duplicate TB = Trip blank

SW = See worksheet

R = Rinsate FB = Field blank

EB = Equipment blank

Validated Samples:

(102)

	301	<u> </u>			
1	SA66-0.5B D	11 171617-MB	21	31	
2 2	SA66009-0.5B D	127 171737-	22	32	
3 >	SA66-10B	13	23	33	
4 1	SA66-28B	14	24	34	
5	SA70-30B	15	25	35	
6 1	SA129-10B	16	26	36	
7 1	SA129-29B	17	27	37	
8	SA66-0.5BMS	18	28	38	
9	SA66-0.5BMSD	19	29	39	
10		20	30	40	

Notes:	no IW)

219612	techor
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VALIDATION FINDINGS WORKSHEET Field Blanks

Page: \of	Reviewer: DVC	2nd Reviewer;
		N

September 100	(10)								ASU DU7	FIID REVIEWELL
Y N/A W/A W/W W/W W/W W/W Blank units: Mg/	ere field bla pre target of	inks identifi ompounds	Y N N/A Were fleld blanks identified in this SDG? Y N N/A Were target compounds detected in the fleld Blank units: 19 L Associated sample units: 45 L Associ	blanks?				•	٤	,
Field blank type: (c	irčle one) <u>Eie</u> Rinsate /	Equipment F	Field blank type: (circle one) Field Blank) Trip Blank / Atmospheric Blank / Ambient Blank / Otton Blank / Otton Blank / Source Blank / Otton	ic Blank / Am Slank / Source	ric Blank / Ambient Blank Blank / Source Blank / Other		Associated Samples:_		MY IN	
	Olembi I	Q1 4 m = 10								
DIE COLLEGE	DIGITA 10	DISINK ID				Sample Identification	intification			
	FB072909-50	05-6								
GRO	27									
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2								-		

Compound Blank ID Sample Identification Sample Identification	Field blank type: (ci	rcle one) Fie Rinsate /	ild Blank / Tr Equipment R	Field brank type: (circle one) Field Blank / Trip Blank/ Atmospheric Blank/ Ambient Blank Rinsate / Equipment Rinsate / Equipment Other:	' Ambient Blank ource Blank / Other:	Asso	Associated Samples:	
CRQL	Compound	Blank ID				Sample Identifica	ition	
CRQL								
CRQL								
CRQL								
CRQL								
CRQL								
CRQL								
CROL								
	CROL							

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with compound concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

FBLKASCNew.wpd