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

TPH as Extractables



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 1, 2009

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Extractables

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 Total Petroleum Hydrocarbons (TPH) as Extractables.

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 all 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.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Sample FB080409-GW was identified as a field blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. 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

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	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 Total Petroleum Hydrocarbons as Extractables - 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 Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG R0904290

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG R0904290

No Sample Data Qualified in this SDG

SDG # Labora METH The sa	#: R0904290 atory: <u>Columbia Analytical Servi</u>	rthgate Henderson PLETENESS WORKSHEET Stage 2B Page: 10f Reviewer: 1/25/6 2nd Reviewer: 2nd Reviewer: 1/25/6 following validation areas. Validation findings are noted in attached	
	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 8/04 /09
lla.	Initial calibration	A	'
IIb.	Calibration verification/ICV	Ä	CCV/1W = 20 }
111.	Blanks	A	
IVa.	Surrogate recovery	Á	
IVb.	Matrix spike/Matrix spike duplicates	N	client gree

Note:

IVc.

V.

VI.

VII.

VIII.

IX.

A = Acceptable

Field duplicates

Field blanks

N = Not provided/applicable SW = See worksheet

Laboratory control samples

System Performance

Overall assessment of data

Target compound identification

Compound Quantitation and CRQLs

ND = No compounds detected

ND

Ν

Ν

Ν

R = Rinsate FB = Field blank D = Duplicate

TB = Trip blank
EB = Equipment blank

Validated Samples:

Water

	Nater								
1	FB080409-GW	11		21		31			
2	93292- MB	12		22		32			
3		13		23		33			
4		14		24		34			
5		15		25		35			
6		16		26		36			
7		17		27		37			
8		18		28		38			
9		19		29		39			
10		20		30		40			

FB =

Notes:			 			
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Laboratory Data Consultants, Inc. Data Validation Report

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

Henderson, Nevada

Collection Date: September 8, 2009

LDC Report Date: December 1, 2009

Matrix: Soil/Water

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905115

Sample Identification

EB090809-SO1

SA54-10B

SA54-20B

SA54-31B

SA50-12B

SA50009-12B

SA50-25B

SA50-36B

SA170-20B

SA170-31B

SA170-0.5B

SA170-10B

SA135-0.5B

SA135-10B

SA135009-10B

SA135-25B

SA135-37B

SA54-31BMS

SA54-31BMSD

Introduction

This data review covers 18 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Extractables.

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 all 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.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Sample EB090809-SO1 was identified as an equipment blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank.

Samples FB072909-SO (from SDG R0904226) and FB080309-SO (from SDG R0904279) were identified as field blanks. No total petroleum hydrocarbons as extractable contaminants were found in these blanks.

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) and relative percent differences (RPD) were within QC limits.

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905115	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

Samples SA50-12B and SA50009-12B and samples SA135-10B and SA135009-10B were identified as field duplicates. No total petroleum hydrocarbons as extractables were detected in any of the samples with the following exceptions:

	Concentrat	ion (ug/Kg)	222	D.W.			
Compound	SA135-10B	SA135009-10B	RPD (Limits)	Difference (Limits)	Flags	A or P	
Diesel range organics	38000	42000U	-	4000 (≤42000)	-	-	
Oil range organics	77000	42000U	-	35000 (≤42000)	-	-	

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG R0905115

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905115	EB090809-SO1 SA54-10B SA54-20B SA54-21B SA50-12B SA50-09-12B SA50-25B SA50-36B SA170-20B SA170-20B SA170-0.5B SA170-10B SA135-0.5B SA135-0.5B SA135-10B SA135-10B SA135-25B SA135-25B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG R0905115

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Equipment Blank Data Qualification Summary - SDG R0905115

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG R0905115

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

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LDC #: 21991B8	VALIDATION COMPLETENESS WORKSHEET
SDG #:R0905115	_ Stage 2B
Labarata o Oalimaka Araalida	- L Complete

Date: 11/30/00
Page: <u>1</u> of <u>)</u>
Reviewer:
2nd Reviewer:

Laboratory: Columbia Analytical Services

METHOD: GC TPH as Extractables (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
lla.	Initial calibration	A	,
IIb.	Calibration verification/ICV	A	CW/W = 20 B
III.	Blanks	A	
IVa.	Surrogate recovery	*	
IVb.	Matrix spike/Matrix spike duplicates	*	
IVc.	Laboratory control samples	A	us/b
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	$^{*}D_{1} = 5,6$ $D_{2} = 14,15$
Χ.	Field blanks	ND	FB = 1 FB = FB 072909-50 (from R0904226)

FB080309-50 (from R0904279)

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

*ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate

TB = Trip blank EB = Equipment blank

Validated Samples:

	water + Soil								
- 1	EB090809-SO1	W	11	SA170-0.5B	S 2	<u> 1</u>)	95622-MB	31	
2	SA54-10B		12	SA170-10B	2:	⁻ 2 ≯	95622-MB 95663-MB	32	
3	SA54-20B		13	SA135-0.5B	2:	3		33	
4	SA54-31B		14	SA135-10B Dy	24	4		34	
5	SA50-12B	D,	_ 15	SA135009-10B D _Y	2:	5		35	
4 5 6 7	SA50009-12B	Ь,	16	SA135-25B	20	6		36	
7	SA50-25B		17	SA135-37B	2	7		37	
8	SA50-36B		18	SA54-31BMS	2	8		38	
9	SA170-20B		19	SA54-31BMSD	2	9		39	
10	SA170-31B	<u> </u>	20		3(0		40	

Notes:_	 		 	 	

VALIDATION FINDINGS WORKSHEET

Page: Reviewer: 2nd reviewer:

Field Duplicates

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SDG#:

LDC #: 21 991 88

METHOD: GC HPLC
Y N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Parent only All Samples Qualification 4000 (4 42000 %RPD 35 000 42000 U Concentration (49/KS) 7 4 7 7000 28000 ORO DR6 Compound

Compound	Concentration ((%RPD	Qualification
				Parent only / All Samples

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/Water

Parameters: Total Petroleum Hydrocarbons as Extractables

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

RSAU7-0.5B

RSAU7009-0.5B

RSAU7-10B

RSAU7-25B

RSAU7-40B

RSAU7-54B

SA204-0.5B

SA204-10B

SA204009-10B

SA204-30B

SA204-45B

EB090309-SO2

SA53-10BMS

SA53-10BMSD

Introduction

This data review covers 19 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 Total Petroleum Hydrocarbons (TPH) as Extractables.

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 all 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.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Sample EB090309-SO2 was identified as an equipment blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB090309-SO2	9/3/09	Diesel range organics	120 ug/L	RSAU7-0.5B RSAU7-09-0.5B RSAU7-10B RSAU7-25B RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B SA204009-10B SA204-30B SA204-45B

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

Samples FB072909-SO (from SDG R0904226) and FB080309-SO (from SDG R0904279) were identified as field blanks. No total petroleum hydrocarbons as extractable contaminants were found in these blanks.

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) and relative percent differences (RPD) were within QC limits.

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 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

Samples RSAU7-0.5B and RSAU7009-0.5B and samples SA204-10B and SA204009-10B were identified as field duplicates. No total petroleum hydrocarbons as extractables were detected in any of the samples with the following exceptions:

	Concentrat	ion (ug/Kg)		D:#		
Compound	SA204-10B	SA204009-10B	RPD (Limits)	Difference (Limits)	Flags	A or P
Diesel range organics	40000	40000	-	0 (≤42000)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - 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 RSAU7-0.5B RSAU7-10B RSAU7-10B RSAU7-40B RSAU7-54B SA204-0.5B SA204-0.5B SA204-10B SA204009-10B SA204-30B SA204-30B SA204-45B EB090309-SO2	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG R0905072

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Equipment Blank Data Qualification Summary - SDG R0905072

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG R0905072

No Sample Data Qualified in this SDG

SDG#	t:21991C8 #:R0905072 atory:_Columbia_Analytic	_	LIDATIOI		LÉ.				SHEE.	т	2nd	Pag	ate: 11/30/0 ge: \of \ ver: \nu(
WETH	IOD: GC TPH as Extrac	tables	(EPA SW	846 Metho	d 80)15B)					2.11	4 1 (01)01	,01.	-
	amples listed below wer tion findings worksheets		ewed for ea	ch of the f	ollow	ving va	lidati	on areas	Validat	tion find	ings a	re noted	in attached]
	Validation	Area							Com	ments				
1.	Technical holding times			A	Sam	ipling da	ites:	9/03	109					
IIa.	Initial calibration			A					•					
IIb.	Calibration verification/ICV			A		ca,	100	€ 20`	δ					
III.	Blanks			A						•				
IVa.	Surrogate recovery			A										
IVb.	Matrix spike/Matrix spike de	uplicate	s	A										
IVc.	Laboratory control samples	5		A		us ?	<u>D</u>							
	Target compound identifica	ation		N										
VI.	Compound Quantitation an	d CRQ	Ls	N										
VII.	System Performance			N										
VIII.	Overall assessment of data	a		A	ل 	اد								
IX.	Field duplicates			SM	+-	$D_1 =$					4, 15			
X.	Field blanks			ZM.	<u> </u>	第=1	<u>s</u>	FB=	FBC	7290	1- SO	(from	K090425 m R09042	
	A = Acceptable N = Not provided/applicab SW = See worksheet ed Samples:		R = Rin	eld blank	s det		·	D = Dupli TB = Trip EB = Equ	cate blank		- 50	(f-o	m RO 9842	? 74
1	SA53-10B	11	RSAU7-40B		<u>-</u> -	21	•	95518-	MB	31				
2	SA53-25B	12	RSAU7-54B			22		75415	-	32				
1 3	SA53-32B	13	SA204-0.5B			23				33				
4	SA106-12B	14	SA204-10B	ρ_{γ}		24				34				
5	SA106-20B	+ 15	SA204009-10	$\mathcal{D}_{oldsymbol{\gamma}}$		25				35				
	SA106-35B	16	SA204-30B			26		***		36				
7	RSAU7-0.5B D 1	17	SA204-45B		-	27				37				
8	RSAU7009-0.5B 0	187	EB090309-S	O2		V 28		·		38				
9	RSAU7-10B	19	SA53-10BMS	3		29				39				
10	RSAU7-25B	20	SA53-10BMS	SD	,	/ 30				40				

Notes:			
	 		

La Gras 2) 491 CB # 00

VALIDATION FINDINGS WORKSHEET Field Blanks

ا اور	3	1
Page:	Reviewer:	2nd Reviewer:

		(\$7			
	is SDG?	Ware target compounds detected in the field blanks?	mo/kg	1	The second secon
	Were field blanks identified in this SDG?	N/A Ware target compounds detected in the field b	ated sample units		
GC HPLC	Were field blan	Were target co	/L , Associa	Sampling date: 7/03/69	i
WETHOD: CGC	N/A	N/N	units: 25	ing date:	
METH	X >	Z	31ank	Sampl	1 1 1

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

7-17

Associated Samples:

Sample Identification 40 000 p 40000 Blank ID Blank 10 8 8 DRO Compound CROL

Associated Samples:

Sample Identification Blank units:
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:

UNIONED 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".

VALIDATION FINDINGS WORKSHEET

Page: \ of \

2nd reviewer:___ Reviewer:_

Field Duplicates

SDG #: La Gor LDC #: 21 991 C8

METHOD: Y N N/A

GC __ HPLC Were field duplicate pairs identified in this SDG?

Were target compounds detected in the field duplicate pairs?

Parent only // All Samples Qualification 6 4×000 %RPD Lmit 0 40000 Concentration (Mg /kg) 7 40 000 4 DRO Compound

Concentration (%RPD	Qualification
	Lait	Parent only / All Samples
-		

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: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905177

Sample Identification

EB091009-SO1

EB091009-SO2

SA102-10B

SA102-30B

SA109-10B

SA109-25B

SA109-23B

SA125-25B

SA125-23B

SA125009-39B

SA125-0.5B

SA125-10B

SA126-0.5B

SA126-10B

SA126-18B

SA126-25B

SA126-40B

SA126-40BMS

SA126-40BMSD

Introduction

This data review covers 17 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Extractables.

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 all 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.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Samples EB091009-SO1 and EB091009-SO2 were identified as equipment blanks. No total petroleum hydrocarbons as extractable contaminants were found in these blanks.

Sample FB072909-SO (from SDG R0904226) was identified as a field blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. 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) and relative percent differences (RPD) were within QC limits.

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905177	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 SA125-39B and SA125009-39B were identified as field duplicates. No total petroleum hydrocarbons as extractables were detected in any of the samples.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG R0905177

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905177	EB091009-SO1 EB091009-SO2 SA102-10B SA102-30B SA109-10B SA109-25B SA109-34B SA125-25B SA125-39B SA125-39B SA125-0.5B SA125-10B SA126-10B SA126-10B SA126-18B SA126-25B SA126-40B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG R0905177

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Equipment Blank Data Qualification Summary - SDG R0905177

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG R0905177

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

_DC #:21991D8	VALIDATION COMPLETENESS WORKSHEET	Da
SDG #:R0905177	Stage 2B	Pag
_aboratory: Columbia Analytica	<u> Il Services</u>	Review

2nd Reviewer: METHOD: GC TPH as Extractables (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: 9/10/09
lla.	Initial calibration	/	
lib.	Calibration verification/ICV	A	con how = 20 2
III.	Blanks	A	
lVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	us/b
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	NP	b = 9,10
Χ.	Field blanks	ND	EB = 1, 2 FB = FB072909-50 (frm AM

A = Acceptable Note:

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate

TB = Trip blank EB = Equipment blank

Validated Samples:

/alida	ted Samples:	water	+	Soi)		
1	EB091009-SO1	h	11	SA125-0.5B	21 \ 95911-MB	31
2	EB091009-SO2		12	SA125-10B	22 7 95875-	32
3	SA102-10B	2	<u>1</u> 3	SA126-0.5B	23	33
4	SA102-30B		14	SA126-10B	24	34
5	SA109-10B		15	SA126-18B	25	35
16	SA109-25B		16	SA126-25B	26	36
7	SA109-34B		17	SA126-40B	27	37
ا ∞	SA125-25B		18	SA126-40BMS	28	38
lο	SA125-39B	D	19	SA126-40BMSD	29	39
10	SA125009-39B	b	20		30	40

Notes:		
	 - · · · · · · · · · · · · · · · · · · ·	

Laboratory Data Consultants, Inc. Data Validation Report

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

Henderson, Nevada

Collection Date: September 9, 2009

LDC Report Date: December 5, 2009

Matrix: Soil

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905138

Sample Identification

SA187-10B RSAQ5-41BMS SA187-25B RSAQ5-41BMSD

SA187-39B

SA45-10B

SA45-25B

0,110 200

SA45-36B

SA186-10B

SA186-25B

SA186-37B

SA188-10B

SA188-25B

SA188-37B

RSAQ5-0.5B

RSAQ5-10B

RSAQ5-25B

RSAQ5-41B

SA122-0.5B

SA122-10B

SA122-20B

SA122-31B

Introduction

This data review covers 22 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Extractables.

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 all 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.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Sample FB072909-SO (from SDG R0904226) was identified as a field blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. 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) 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 R0905138	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 Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG R0905138

SDG	Sample	Compound	Flag	A or P	Reason
R0905138	SA187-10B SA187-25B SA187-25B SA187-39B SA45-10B SA45-25B SA45-36B SA186-10B SA186-25B SA186-37B SA188-10B SA188-25B SA188-37B RSAQ5-0.5B RSAQ5-10B RSAQ5-10B RSAQ5-25B RSAQ5-41B SA122-0.5B SA122-10B SA122-20B SA122-31B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG R0905138

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG R0905138

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #: 21991E8	VALIDATION COMPLETENESS WORKSHEET
SDG #:R0905138	Stage 4
Laboratory: Columbia Analytical	Services

Reviewer: 2nd Reviewer:_

METHOD: GC TPH as Extractables (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: 9/0a/0g
lla.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	CN/W = 20 }
111.	Blanks	À	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	ics B
V	Target compound identification	A	
VI.	Compound Quantitation and CRQLs	A	
VII.	System Performance	A	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N 'N	
X.	Field blanks	ND	FB = FB072909-SO (from R0904226)

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

1	SA187-10B	11	SA188-25B	21	RSAQ5-41BMS	31	95742-MB
2	SA187-25B	12	SA188-37B	22	RSAQ5-41BMSD	32	
3	SA187-39B	13	RSAQ5-0.5B	23		33	
4	SA45-10B	14	RSAQ5-10B	24		34	
5	SA45-25B	15	RSAQ5-25B	25		35	
6	SA45-36B	16	RSAQ5-41B	26		36	
7	SA186-10B	17	SA122-0.5B	27		37	
8	SA186-25B	18	SA122-10B	28		38	
9	SA186-37B	19	SA122-20B	29		39	
10	SA188-10B	20	SA122-31B	30		40	

Notes: (All No)		

DC#: 21991 E8 DG#: See Cover Page: of Reviewer: 5/4
2nd Reviewer: V

Method: ____GC ____HPLC

VI_1: J_4: A	Yes	No	NA	Findings/Company
Validation Area	Tes	l Mo	INA	Findings/Comments
I. Technical holding times	آ	-		
All technical holding times were met.	+			
Cooler temperature criteria was met.	1	<u> </u>	l	
II. Initial calibration		· · · · · ·	-	T
Did the laboratory perform a 5 point calibration prior to sample analysis?	<u> </u>		<u> </u>	
Were all percent relative standard deviations (%RSD) < 20%?	<u> </u>			
Was a curve fit used for evaluation?	<u> </u>			
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?	<u> </u>	ļ	1	
Were the RT windows properly established?	$\perp <$	<u> </u>		
IV. Continuing calibration			· · · · · · · · · · · · · · · · · · ·	
Was a continuing calibration analyzed daily?			_	
Were all percent differences (%D) < 20%.0 or percent recoveries 80-120%?				
Were all the retention times within the acceptance windows?		<u> </u>		
V Blanks	.,	,	,	
Was a method blank associated with every sample in this SDG?	/			
Was a method blank analyzed for each matrix and concentration?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet				
Vt. Surrogate spikes				
Were all surrogate %R within the QC limits?		<u> </u>		
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				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	_			
Was a MS/MSD analyzed every 20 samples of each matrix?				
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?				
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
IX Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		/	F	
Were the performance evaluation (PE) samples within the acceptance limits?	1		1	

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2 Reviewer: 574 2nd Reviewer: _____

Validation Area	Yes	No	NA	Findi	ngs/Com	ments	
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							1.5
System performance was found to be acceptable.							
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.		/	1				

87166K SDG #: See Cover LDC#:

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

1 of 1	2)(3
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:

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

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

ı									
				Reported	Recalculated	Reported	Recalculated	Renorted	Recalculated
*	Standard ID	Calibration Date	Compound	cF (<i>l හ</i> න std)	cF (ص) std)		Average CF (inklal)	%RSD	%RSD
-	1CAL	9/8/69	DRD	32 806.0	813206	0.044 et	29 7 7 6 6 6	914	4.16
		_							
2									
6									
4									
П		1							
		ř							

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.

SDG #: 3691 E8

VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification

Reviewer: 5/C
2nd Reviewer:

METHOD: GC_____HPLC__

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

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

Where: ave. CF = initial calibration average CF

CF = continuing calibration CF
A = Area of compound

C = Concentration of compound

# Standard ID Calibration Compound Average CF(Ical)		Reported R	Recalculated	Reported	Recalculated
CW 9B 9/22/04 DRD 944272 CW 10 9/22/04 CCW 11 9/23/04	Average CF(Ical)/ CCV Conc.	CF/Conc. CCV	CF/Conc. CCV	۵%	۵%
CCV 10 9/23/04 CCV11 9/23/04	944272	4	442897	1.0	0.1
CCV 10 9/23/04 CCV 11 9/23/04					
CCVII 9/23/04		8 40008	820 794	13.]	13.1
CCVII 9/23/04					
40/23/04		1	642 202	<i>۲ م</i>	
		\top			2
				-	
4					

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

83 166K	See Cores
DC#:	SDG #:

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

of	372	2
Page:	Reviewer:	2nd reviewer:

METHOD: __GC __ HPLC

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

% Recovery: SF/SS * 100

SF = Surrogate Found SS = Surrogate Spiked

Where:

Surrogate Surrogate Percent Percent Percent Difference Spiked Found Recovery Recovery Difference O TP PP Spiked Found Reported Recalculated Spiked Percent Percent Difference Spiked Found Recovery Recovery Difference OF TP PP Spiked Found Recovery Recovery Difference Spiked Found Reported Recalculated Difference OF TP PP Spiked Found Recovery Recovery Difference Percent Percent Percent Difference Percent Percent Percent Difference Percent	Sample ID: #)		SS = Surrogate Spiked				
2b-5 100 81.56 82 87	Surrogate	Columnipetector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
2b-5 100 81.56 82					Reported	Recalculated	
	17 - O	2b-5	100	81.56	28	κ	0

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4
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Percent Difference			
Percent Recovery	Recalculated		
Percent Recovery	Reported		
Surrogate Found			
Surrogate Spiked			
Column/Detector			
Surrogate			

Sample ID:

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

21 491 EX LDC #: SDG#:

Matrix Spike/Matrix Spike Duplicates Results Verification VALIDATION FINDINGS WORKSHEET

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

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

SC = Sample concentration

SSC = Spiked sample concentration SA = Spike added MS = Matrix spike RPD =(((SSCMS - SSCMSD) * 2) / (SSCMS + SSCMSD))*100

MSD = Matrix spike duplicate

MS/MSD samples:_

アイ

	Spike Added	ke	Sample Conc.	Spike 5	Spike Sample	Matrix	Matrix spike	Matrix Spike Duplicate	Duplicate	MS/MSD	ISD
Compound	1,647	7	(m/h)) (NC)	(Ec.)	Percent Recovery	Recovery	Percent Recovery	ecovery	RPD	٥
	MS	MSD	0.7	MS	0 MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)	27300	273000	٥	195000	219600	12	1/2	80	Ş	Ž	3
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Staller See Cover LDC #: SDG#:

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

Reviewer: 2nd Reviewer:_

- Jo Page:

> CGC_HPLC METHOD:

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 = 1 LCS - LCSD 1 * 2/(LCS + LCSD)

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

SC = Concentration

LCSD = Laboratory control sample duplicate percent recovery

457 9574V LCS/LCSD samples:

	<u> </u>	Spike	Spiked	Sample	רכ	rcs	CSD	SD	SOT	LCS/LCSD
Compound	74)	1/6)	/ 5n)	2/5c)	Percent I	Percent Recovery	Percent Recovery	Recovery	æ	RPD
	rcs	LCSD	rcs	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)	257000	251000	215000	218 000	<i>₹</i>	9×8	87	8		-
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.

\d \d \-	3
399	3
.DC #:	SDG #:

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page: \of__ Reviewer: Znd Reviewer:

	HPLC
•	၁၅
	METHOD:

_	_	_	
	۲	N/A	/ /
/	Z	Z)
•	×	Z	
	>	Υ	

samples? In 10% of the reported results?

Were all reported results recalculated and verifled for all level IV were all recalculated results for detected target compounds with	Example:
Were all reported results red Were all recalculated results	(A)(Fv)(Df)
N N/A	Concentration≈

A= Area or height of the compound to be measured Fv= Final Volume of extract Df= Dilution Factor (RF)(Vs or Ws)(%S/100) RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Concentration =_

Compound Name

Sample ID.

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 10 trough September 16, 2009

LDC Report Date: December 5, 2009

Matrix: Soil

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905192

Sample Identification

SA102-10BSPLP2

SA102-10BSPLP3

SA102-30BSPLP2

SA102-30BSPLP3

SA30-9BSPLP2

SA30-9BSPLP3

SA128-10BSPLP2

SA128-10BSPLP3

SA128-29BSPLP2

SA128-29BSPLP3

Introduction

This data review covers 10 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Extractables.

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 all 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.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. 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)	Α

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 Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG R0905192

SDG	Sample	Compound	Flag	A or P	Reason
R0905192	SA102-10BSPLP2 SA102-10BSPLP3 SA102-30BSPLP2 SA102-30BSPLP3 SA30-9BSPLP2 SA30-9BSPLP3 SA128-10BSPLP2 SA128-10BSPLP3 SA128-29BSPLP2 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 Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG R0905192

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG R0905192

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET LDC #: 21991F8 SDG #: R0905192 Stage 4

Reviewer: 2nd Reviewer:

Laboratory: Columbia Analytical Services

METHOD: GC TPH as Extractables (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: 9/10/09 - 9/16/09
lla.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	CW/10 € 202
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	client sker
IVc.	Laboratory control samples	A	Client quer US /D
V.	Target compound identification	A	
VI.	Compound Quantitation and CRQLs	A	
VII.	System Performance	A	
VIII.	Overall assessment of data	À	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate TB = Trip blank

EB = Equipment blank

Validated Samples:

 $\leq a$:1

	3011			
1 SA102-10BSPLP2	11 /	96632 - MB	21	31
2 SA102-10BSPLP3	12	96548-	22	32
3 SA102-30BSPLP2	13 3	97240-	23	33
4 > SA102-30BSPLP3	14 7	97010- }	24	34
5 SA30-9BSPLP2	15 2	SPLP-BIKI	25	35
6 2 SA30-9BSPLP3	16 1	SPLP-BIKZ	26	36
7 3 SA128-10BSPLP2	17 4	SPIP-BIK3	27	37
8 7 SA128-10BSPLP3	18 3	SPLK-BK4	28	38
9 3 SA128-29BSPLP2	19	,	29	39
10 9 SA128-29BSPLP3	20		30	40

Notes:		

VALIDATION FINDINGS CHECKLIST

Method:_	 GC_	HPLC

Validation Area	Yes	No	NA	Findings/Comments
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%?		<u></u>		
Was a curve fit used for evaluation?		_		
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?				
Were the RT windows properly established?				
IV. Continuing calibration	,			
Was a continuing calibration analyzed daily?				
Were all percent differences (%D) < 20%.0 or percent recoveries 80-120%?				
Were all the retention times within the acceptance windows?				
V Blanks				
Was a method blank associated with every sample in this SDG?	/_			
Was a method blank analyzed for each matrix and concentration?			ļ	
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		· · · · · ·	· · · · · · · · · · · · · · · · · · ·	
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?			1	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			/	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?				
Was an LCS analyzed per extraction batch?		<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?				

DC#: 21 AAIF8 DG#: Sre Cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 1

Validation Area	Yes	No	NA	Findings/Comments
X. Target compound identification				
Were the retention times of reported detects within the RT windows?				
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XII. System performance				
System performance was found to be acceptable.				
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.				
XIV Field duplicates				
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.			/	

2) ABBI F8 See Cover SDG #: LDC #:

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

o l 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

				Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date	Compound	CF (1070std)	CF () صرا)	,	Average CF (initial)	%RSD	%RSD
-	1547	9/8	D KO	0, 903+6	0, 403-66 0, 903-6		0, 444 86 0,944 86	91 m	7175
)							
1									
7	72	10/0/01	DRD	0.5000	0, 922 86	1.0 xx 06	22 mo')	7 47	747
6									
4									

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

8 = 15bk SDG# See Cover LDC#:

Continuing Calibration Results Verification VALIDATION FINDINGS WORKSHEET

Page: 1 of 2 Reviewer:_ 2nd 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	Receivingted	Deported	Deteliniend
		Calibration		Average CF(Ical)/	CF/Conc.	CF/Conc.	ď%	V%
*	Standard ID	Date	Compound	CCV Conc.	CCV	CCV		}
-	CCV 22	10/8/6	DRO	69 275 42	E 9 05 6 968	8	5.1	\S'
					l	1	,	
2	8¢ No	4/24/64			947252	947 252	۲٬0	6,0
က	CC 27	4/20/04			p 99 40p	904 664	4.7	4.2
		-						
4	62 MJ	10/1/01			266335	266 797	2.7	2,7
		•						

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.

84 156 1 # SON SDG #: Se Cover

VALIDATION FINDINGS WORKSHEET

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Page:	Reviewer:	2nd Reviewer:

Continuing Calibration Results Verification

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

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

Where: ave. CF = initial calibration average CF

CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

					Reported	Recalculated	Reported	Recalculated
*	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	CF/Conc. CCV	CF/Conc. CCV	0%	۵%
-	[20]	10/06/09	9	9592201	946 247	446247	52	٧.٢
7								
3						-		
			·	-				
4								
				-				

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

MM91 FB	See Cover
LDC #:	SDG#:

VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Reviewer: 10f 2nd reviewer: 2nd reviewer:

METHOD: __GC __ HPLC

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found SS = Surrogate Spiked

Surrogate	ColumnDetector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
0- TPH	ZB-5	<u>e</u>	89.75	20	93	8
		·				

	•	•	•
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•	•	•	•
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	1	į	
	i	ľ	ľ

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	

LDC # > | 991 F8 SDG#: See Guer

VALIDATION FINDINGS WORKSHEET

Page: Reviewer: Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

2nd Reviewer:__

C GC HPLC METHOD:

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 = 1 LCS - LCSD 1 * 2/(LCS + LCSD)

SC = Concentration

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

LCSD = Laboratory control sample duplicate percent recovery

0 537 8 x59 6 LCS/LCSD samples:_

	S	Spike	Spiked	Sample	T	rcs	07	TCSD	SOT	LCS/LCSD
Compound	Ž)	2/2)			Percent	Percent Recovery	Percent Recovery	Recovery		RPD
	SOT	LCSD	rcs	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc
Gasoline (8015)										
Diesel (8015)	(05	(25)	342	411	78	7.8	8	7	\	
Benzene (8021B)									1	,
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.

DC # 2) 14
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1 00

METHOD: GC HPLC

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

2nd Reviewer:	Reviewer:	Page:
>	7	00

 	Ws)(%S/100) Sample ID. the compound Concentration = Compound
the compound Concentration = (Ws)(%S/100) Sample ID. the compound Concentration =
	Area or height of the compound to be measured (RF)(Vs or Ws)(%S/100) Sinal Volume of extract

Qualifications

2 110 mg/

- > 113,7

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: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905198

Sample Identification

RSAQ6-0.5B

RSAQ6-10B

RSAQ6-25B

RSAQ6-38B

RSAQ6009-38B

SA41-12B

SA41-25B

SA41-38B

SA40-10B

SA40-25B

SA40-41B

SA114-10B

SA114-30B

SA40-41BMS

SA40-41BMSD

Introduction

This data review covers 15 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Extractables.

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 all 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.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Sample FB072909-SO (from SDG R0904226) was identified as a field blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. 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) and relative percent differences (RPD) were within QC limits.

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 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

Samples RSAQ6-38B and RSAQ6009-38B were identified as field duplicates. No total petroleum hydrocarbons as extractables were detected in any of the samples.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG R0905198

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905198	RSAQ6-0.5B RSAQ6-10B RSAQ6-25B RSAQ6-38B RSAQ6009-38B SA41-12B SA41-25B SA41-25B SA40-10B SA40-25B SA40-41B SA114-10B SA114-30B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG R0905198

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG R0905198

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #:_	21991G8	VALIDATION COMPLETENESS WORKSHI
SDG #:_	R0905198	Stage 2B
Laborato	ory: Columbia Analytica	I Services

Page: 12/01/0
Page: 10f 1
Reviewer: 5/6
2nd Reviewer: 1

METHOD: GC TPH as Extractables (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/n /0 9
lla.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	ca /W = 20 Z
111.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	Α	
IVc.	Laboratory control samples	A	ics/p
<u>V.</u>	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	D = 4,5
X.	Field blanks	MD	FB = FB072909 -50 (from R0904226)

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

	301	1					
1 1	RSAQ6-0.5B	11	SA40-41B	21	96120-MB	31	
2	RSAQ6-10B	12	SA114-10B	22		32	
3	RSAQ6-25B	13	SA114-30B	23		33	
4	RSAQ6-38B D,	14	SA40-41BMS	24		34	
5	RSAQ6009-38B D,	15	SA40-41BMSD	25		35	
- 6	SA41-12B	16		26		36	
7	SA41-25B	17		27		37	
8	SA41-38B	18		28		38	
9	SA40-10B	19		29		39	
10	SA40-25B	20		30		40	

Notes:		

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

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

Henderson, Nevada

Collection Date: September 14, 2009

LDC Report Date: December 5, 2009

Matrix: Soil/Water

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905218

Sample Identification

EB091409-S01

SA42-10B

SA42009-10B

SA42-25B

SA42-38B

SA43-10B

SA43-25B

SA43-43B

SA44-10B

SA44-25B

SA44-42B

RSAR6-37B

RSAR6-25B

RSAR6-0.5B

RSAR6-9B

RSAO8-43B

RSAO8-11.5B

RSAO8-21.5B

RSAR6-37BMS

RSAR6-37BMSD

Introduction

This data review covers 19 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 Total Petroleum Hydrocarbons (TPH) as Extractables.

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 all 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.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Sample EB091409-SO1 was identified as an equipment blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB091409-SO1	9/14/09	Diesel range organics	130 ug/L	SA42-10B SA42009-10B SA42-25B SA42-38B SA43-10B SA43-25B SA43-43B SA44-10B SA44-25B SA44-25B SA44-25B SA44-625B RSAR6-37B RSAR6-95B

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

Samples FB072909-SO (from SDG R0904226) and FB082809-SO (from SDG R0904894) were identified as field blanks. No total petroleum hydrocarbons as extractable contaminants were found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB082809-SO	8/28/09	Diesel range organics	110 ug/L	RSAO8-43B RSAO8-11.5B RSAO8-21.5B

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) and relative percent differences (RPD) were within QC limits.

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905218	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

Samples SA42-10B and SA42009-10B were identified as field duplicates. No total petroleum hydrocarbons as extractables were detected in any of the samples with the following exceptions:

	Concentrat	ion (ug/Kg)				
Compound	SA42-10B	SA42009-10B	RPD (Limits)	Difference (Limits)	Flags	A or P
Diesel range organics	2200000	4100000	60 (≤50)	-	J (all detects)	А

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG R0905218

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905218	EB091409-SO1 SA42-10B SA42009-10B SA42-25B SA42-25B SA43-10B SA43-25B SA43-43B SA44-10B SA44-25B SA44-25B SA44-25B SA44-25B RSAR6-37B RSAR6-25B RSAR6-95B RSAR6-95B RSAR6-95B RSAR6-95B RSAO8-43B RSAO8-21.5B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0905218	SA42-10B SA42009-10B	Diesel range organics	J (all detects)	А	Field duplicates (RPD) (fd)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG R0905218

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Equipment Blank Data Qualification Summary - SDG R0905218

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG R0905218

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

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.DC #: 21991H8	VALIDATION COMPLETENESS WORKSHEET	Date
SDG #:_ R0905218	Stage 2B	Page:
aboratory: Columbia A	nalytical Services	Reviewer
-		2nd Reviewer

METHOD: GC TPH as Extractables (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: 9/14/09
lla.	Initial calibration	A	
llb.	Calibration verification/ICV	A	CW/W = 20 }
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	us b
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	b = 2,3
Χ.	Field blanks	SW	EB = 1 FB = FB 0729 09-50 (from R0904) \$\frac{1}{2}\$ = FB 082809-50 (from R0904)

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

YND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Water + Soil

		• • • • • •	*	'	3011					
1 1	EB091409-SO1		٧	11 3	SA44-42B	ے ک	11	96290-MB	31	
2 >	SA42-10B	Ŋ	5	12	RSAR6-37B	22		96/20-	32	
3 7	SA42009-10B	b		13	RSAR6-25B	23	201	96218-1	33	
4 7	SA42-25B			14	RSAR6-0.5B	24	4		34	
5 ³	SA42-38B			15	RSAR6-9B	25	5		35	
6	SA43-10B			16	RSAO8-43B	26	6		36	
7 ン	SA43-25B			17	RSAO8-11.5B	2	7		37	
8 7	SA43-43B			18	RSAO8-21.5B	28	8		38	
ر 9	SA44-10B			19	RSAR6-37BMS	29	9		39	
10 3	SA44-25B		$oldsymbol{\downarrow}$	20	RSAR6-37BMSD	30	<u>。</u>		40	

Notes:			

なって 3H 16612 SDG #: LDC #:

VALIDATION FINDINGS WORKSHEET Field Blanks

Page: lof Reviewer: 2nd Reviewer:

> Were field blanks identified in this SDG? HPLC 25 METHOD: Y N/A

WN N/A

Were target compounds detected in the field blanks?

Associated sample units: 45/58/09 Élank units: ַ

Sampling date:

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

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

16-18 Associated Samples:

F	$\overline{}$				 	_	_
					i.		
	ation						
	Sample Identification						
	Blank ID Blank ID	FB 08 28 09-50					
1 (0)0011111	Blank ID	FB 082					
	Compound		DRO				CROL

Associated sample units: Mg /kg Blank units: 49 /L Field blank type: (circle one) Field Blank / Trip Blank/ Atmospheric Blank/ Ambient Blank

Rinsate / Equipment Rinsate Equipment Blans / Source Blank / Other:

70 į 8 Associated Samples:

Compound	Blank ID	Blank ID				Sample Ide	Sample Identification		
DRO	130		(All Hesnit	its eit	ts either NO or > EB)	w.	> EB)		
								-	
CROL									
			THANK TAY CANDO I COT THE VERTICAL CONTRACT CONT		- C L L - H	TATO CIAINA	F1 4 L7 4 L		

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".

SDG #: 24 (27-1) 1DC #: 21 491 H8

VALIDATION FINDINGS WORKSHEET

Page: of

Reviewer._ 2nd reviewer:

Field Duplicates

Were target compounds detected in the field duplicate pairs? METHOD: GC HPLC
Y N N/A Were field duplicate pairs identified in this SDG?
Y M N/A Were target compounds detected in the field dupli

2
2 200 000

	Concentration (()	%RPD	Qualification
Compound			Limit	Parent only / All Samples

Laboratory Data Consultants, Inc. Data Validation Report

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

Henderson, Nevada

Collection Date: September 15 through September 16, 2009

LDC Report Date: December 5, 2009

Matrix: Soil/Water

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905260

Sample Identification

EB091509-SO1 SA153-25BMSD

SA136-0.5B

SA136-10B

SA136-25B

SA136-40B

SA30-5B

SA30-9B

SA30-25B

SA30-38B

SA153-10B

SA153-25B

SA153-38B

SA172-10B

SA172-25B

SA172-40B

EB091609-SO1

SA128-0.5B

SA128-10B

SA128-29B

SA153-25BMS

Introduction

This data review covers 19 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Extractables.

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.

1. 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 all 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.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Samples EB091509-SO1 and EB091609-SO1 were identified as equipment blanks. No total petroleum hydrocarbons as extractable contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB091509-SO1	9/15/09	Diesel range organics	95 ug/L	SA136-0.5B SA136-10B SA136-25B SA136-40B SA30-5B SA30-9B SA30-25B SA30-25B SA153-10B SA153-10B SA153-25B SA153-25B SA172-40B

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 total petroleum hydrocarbons as extractable contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. 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) and relative percent differences (RPD) were within QC limits.

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905260	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

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG R0905260

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905260	EB091509-SO1 SA136-0.5B SA136-10B SA136-25B SA136-40B SA30-5B SA30-9B SA30-9B SA30-25B SA30-38B SA153-10B SA153-10B SA153-25B SA172-10B SA172-25B SA172-40B 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 Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG R0905260

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Equipment Blank Data Qualification Summary - SDG R0905260

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG R0905260

No Sample Data Qualified in this SDG

SDG # Labora	: 21991I8 VALIDATIO t: R0905260 atory: Columbia Analytical Services	N COMF	PLETENESS WORKSHEET Stage 2B Date: 12/01/09 Page: 1 of 1 Reviewer: 30/0 2nd Reviewer:
The sa			nod 8015B) following validation areas. Validation findings are noted in attached
validat ——	ion findings worksheets.		
	Validation Area		Comments
l.	Technical holding times	A	Sampling dates: 9/15 - 16 /09
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	À	ca/w ≤ 20 2
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS /b
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	* *
X.	Field blanks	SW	EB = 1, 16 FB = FB072909-50 (from K190
Note:	N = Not provided/applicable R = Rir	nsate ïeld blank	nds detected D = Duplicate TB = Trip blank EB = Equipment blank
Fil	4.1.3		
1 1	EB091509-SO1		\$ 21 SA153-25BMSD \$ 31 9 6290 - MB

11	EB091509-SO1 W	ン 11	SA153-25B	21	SA153-25BMSD	31	96290-MB
2 >	SA136-0.5B	12 3	SA153-38B	22		32 ×	96218-
3 2	SA136-10B	13	SA172-10B	23		33 3	96 443 -
4 ك	SA136-25B	14	SA172-25B	24		34	
5 γ	SA136-40B	15 3	SA172-40B	25		35	
6 Y	SA30-5B	16	EB091609-SO1 W	26		36	
7 7	SA30-9B	17 3	SA128-0.5B S	27		37	
8 7	SA30-25B		SA128-10B	28		38	
9 r	SA30-38B	193	SA128-29B	29		39	
10 ~	SA153-10B	20	SA153-25BMS	30		40	

Notes:		 	

VALIDATION FINDINGS WORKSHEET	Field Blanks
LDC #: 21991 I'8	SDG #: 25 CF/

lof)	376	}
Page:	Reviewer:_	2nd Reviewer:_

METHOD: G(V N N/A We We Slank units: W6 Sampling date: Circle blank type: (Circle blan	GC HPLC Were field blar Weye target co Weye target co Associ	anks identific compounds c ciated sampl	METHOD: GC HPLC Y N N/A Were field blanks identified in this SDG? Were field blanks identified in this SDG? Were target compounds detected in the field blanks? Blank units: Wf / Associated sample units: Wf / Asso		Associated Sam	Associated Samples: $2 - 1 \mathcal{G}$ (ND)	(ND)	
	Rinsate /	Equipment Ri	Rinsate / Equipment Rinsate (Equipment Blank)/ Source Blank / Other	ier:				
Compound	Blank ID	Blank ID		Sample Id	Sample Identification		,	
DRO	25							
CROL								
Blank units:	Asso	Associated sample units:	le units:					
Sampling date: Field blank type: (ci	rcle one) Fi	eld Blank / Tri	Sampling date: Field blank type: (circle one) Field Blank / Trip Blank/ Atmospheric Blank/ Ambient Blank		Associated Samples:	es:		
	Rinsate /	/ Equipment R	Rinsate / Equipment Rinsate / Equipment Blank / Source Blank / Other	her.				

	Sample Identification					D BY THE FOLLOWING STATEMENT
	Blank ID					CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT
1561	ID Bla				 -	T QUALIFIE
	Blank ID					VERE NO
	Compound				CROL	CIRCLED RESULTS V

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: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905331

Sample Identification

SA165-0.5B

SA165-10B

SA165-28B

SA151-0.5B

SA151-10B

SA151-25B

SA151-39B

SA151009-39B

SA51-10B

SA51009-10B

SA51-25B

SA51-36B

SA165-10BMS

SA165-10BMSD

Introduction

This data review covers 14 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Extractables.

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 all 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.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Sample FB072909-SO (from SDG R0904226) was identified as a field blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. 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) and relative percent differences (RPD) were within QC limits.

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905331	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 SA151-39B and SA151009-39B and samples SA51-10B and SA51009-10B were identified as field duplicates. No total petroleum hydrocarbons as extractables were detected in any of the samples.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG R0905331

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905331	SA165-0.5B SA165-10B SA165-28B SA151-0.5B SA151-10B SA151-25B SA151-39B SA151009-39B SA51-10B SA51-10B SA51-10B SA51-25B SA51-25B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG R0905331

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG R0905331

No Sample Data Qualified in this SDG

Trongy Northgate Henderson

	Hollox Hollingate Heliacison	
LDC #: 21991J8	_ VALIDATION COMPLETENESS WORKSHEET	Date: 12/01/0
SDG #: R0905331	Stage 2B	Page: <u> </u>
Laboratory: Columbia Analy	rtical Services	Reviewer: 🔍 🗸 💪
		2nd Reviewer:

METHOD: GC TPH as Extractables (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: 9/17/04
lla.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	COVKCV = 20%
111.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS 10
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	$D_1 = 7.8$ $D_2 = 9.70$ FB = FB 172909 - 50 (from R0904226)
X.	Field blanks	ND	F8 = FB 172909-50 (from R0904276)

A = Acceptable Note:

ND = No compounds detected D = Duplicate

N = Not provided/applicable SW = See worksheet

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

Validated Samples:

Soil

		T	1 100	I- II	
1 1	SA165-0.5B	11 >	SA51-25B	21/ 97150-MB	31
- ک	SA165-10B	122	SA51-36B	22 7 96443.	32
` 3 }	SA165-28B	13	SA165-10BMS	23	33
<u>4</u> >	SA151-0.5B	14	SA165-10BMSD	24	34
5 ×	SA151-10B	15		25	35
} 6	SA151-25B	16		26	36
7 7	SA151-39B D,	17		27	37
、 8	SA151009-39B D,	18		28	38
) 9	SA51-10B D _v	19		29	39
10 7	SA51009-10B 04	20		30	40

Notes:		

Laboratory Data Consultants, Inc. Data Validation Report

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

Henderson, Nevada

Collection Date: September 18, 2009

LDC Report Date: December 5, 2009

Matrix: Soil

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905348

Sample Identification

SA117-0.5B

SA117-9B

SA117-25B

SA117-41B

SA117-9BMS

SA117-9BMSD

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 Total Petroleum Hydrocarbons (TPH) as Extractables.

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 all 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.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Sample FB072909-SO (from SDG R0904226) was identified as a field blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. 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) and relative percent differences (RPD) were within QC limits.

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905348	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

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG R0905348

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905348	SA117-0.5B SA117-9B SA117-25B SA117-41B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG R0905348

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG R0905348

No Sample Data Qualified in this SDG

SDG:	#:21991K8 #:R0905348 atory:_Columbia_Analytica	_	LIDATION	N COMP	thgate H LETENE tage 2B			IEET		Date: 12/61/60 Page: of Page:
METH	IOD: GC TPH as Extract	ables	(EPA SW 8	346 Metho	od 8015B)					
	amples listed below were tion findings worksheets.	revie	wed for eac	ch of the fo	ollowing va	alidatio	n areas. Va	alidation f	inding	s are noted in attached
	Validation	Area			1			Commen	ts	
1.	Technical holding times			A	Sampling d	ates:		409		
lla.	Initial calibration			A				-/ - - -		
IIb.	Calibration verification/ICV			A	ca	New	€202			
III.	Blanks			Ā						
IVa.	Surrogate recovery			Ą						
IVb.	Matrix spike/Matrix spike du	plicates	5	A						
IVc.	Laboratory control samples			A	u	s 4)			
V.	Target compound identification			N						
VI.	Compound Quantitation and CRQLs			N						
VII.	System Performance			N	ļ					
VIII.	Overall assessment of data			A	ļ					
IX.	Field duplicates			N					01	
X.	Field blanks			ND	FB:	= FE	307290	62-1	Jum.	R0904276)
Note: Validat	A = Acceptable N = Not provided/applicable SW = See worksheet red Samples:	•	R = Rins	o compound sate eld blank	s detected		D = Duplicate TB = Trip bla EB = Equipm	nk		
1 -	SA117-0.5B	11	9676	45-MB	21			31		
2 `	SA117-9B	12			22			32	2	
3 -	SA117-25B	13			23			33	<u> </u>	
4-	SA117-41B	14			24			34	<u> </u>	
5	SA117-9BMS	15			25		<u> </u>	35	<u>; </u>	
6	SA117-9BMSD	16			26			36	;	
7		17			27			37		
8		18			28			38	3	
9		19			29			39		
10		20			30	ł		40	,	

Notes:____

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: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905387

Sample Identification

SA32-0.5B

SA32-9B

SA32-25B

SA32009-25B

SA32-37B

SA66-0.5B

SA66009-0.5B

SA66-10B

SA66-28B

SA129-10B

SA129-29B

RSAT4-0.5B

RSAT4-10B

RSAT4-25B

RSAT4-40B

RSAT4-53B

Introduction

This data review covers 16 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Extractables.

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 all 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.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Samples FB072909-SO (from SDG R0904226) and FB080309-SO (from SDG R0904279) were identified as field blanks. No total petroleum hydrocarbons as extractable contaminants were found in these blanks.

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

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 SA32-25B and SA32009-25B and samples SA66-0.5B and SA66009-0.5B were identified as field duplicates. No total petroleum hydrocarbons as extractables were detected in any of the samples with the following exceptions:

	Concentrat	ion (ug/Kg)		5		
Compound	SA66-0.5B	SA66009-0.5B	RPD (Limits)	Difference (Limits)	Flags	A or P
Diesel range organics	490000	470000	4 (≤50)	-	-	-
Oil range organics	84000	95000	-	11000 (≤44000)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG R0905387

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905387	SA32-0.5B SA32-9B SA32-25B SA32-09-25B SA32-37B SA66-0.5B SA66-0.5B SA66-10B SA66-10B SA66-28B SA129-10B SA129-10B SA129-10B SA129-29B RSAT4-0.5B RSAT4-0.5B RSAT4-10B RSAT4-53B	All compounds reported below the PQL.	J (all detects)	Α	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG R0905387

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG R0905387

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #: 21991L8	VALIDATION COMPLETENESS WORKSHEET
SDG #: R0905387	Stage 2B

Laboratory: Columbia Analytical Services

2nd Reviewer:

METHOD: GC TPH as Extractables (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 /21 /0 9
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	COV/W = 20 }
111.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	LCS 10
IVc.	Laboratory control samples	A	LCS /p
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	$*D_1 = 3,4$ $D_2 = 6,7$
Χ.	Field blanks	ND	FB = FB672909-50 (fm R0904226)

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

#ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate

TB = Trip blank EB = Equipment blank

Validated Samples:

coil

	2011						
1	SA32-0.5B	11	SA129-29B	21	96745-MB	31	
1 2	SA32-9B	12	RSAT4-0.5B	22	***************************************	32	
3	SA32-25B D1	13	RSAT4-10B	23		33	
4	SA32009-25B p,	14	RSAT4-25B	24		34	
5	SA32-37B	15	RSAT4-20B	25		35	
1 6	SA66-0.5B D _Y	_ 16	RSAT4-53B	26		36	
7	SA66009-0.5B 2	17		27		37	
8	SA66-10B	18		28		38	
4	SA66-28B	19		29		39	
10	SA129-10B	20		30		40	

Notes:		 	

VALIDATION FINDINGS WORKSHEET Field Duplicates

SDG #: Tee Cover

87 16612

LDC#:

Page: lof Reviewer: 2nd reviewer.

> GC HPLC
> Were field duplicate pairs identified in this SDG? METHOD:

Y N N/A

Were target compounds detected in the field duplicate pairs?

DRO 440 000 470 000 4 (±50°6 800) ORO 8400 95 000 11000 (± 4400 D) Concentration () "ARPD LIMI	Postorio	Concentration (49 Kg)	ug kg,	Oda%	Qualification
DRO 440 000 470 000 4 (£50% RPD) ORO 84 C00 95 000 11000 (£ 44 000 D) Concentration () "ARPD Limit		9	7	i E	Parent only // All Samples
080 11000 (£ 4400 D) Concentration() %APD Limit———————————————————————————————————	DRO	0	470 000		\ (a
Concentration () "ARPD Limit	O RO	84000	dz 000	1	- (6
Concentration () %RPD				i	
Concentration () %APD					
Concentration () %RPD					
Concentration () WRPD Limit					
Concentration () %RPD Limit					
Concentration () %RPD					
Concentration () %RPD					
Concentration ()					
	Pomocano	Concentration (•	%RPD	Qualification
				Lait	Parent only / All Samples
		-			

Laboratory Data Consultants, Inc. Data Validation Report

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

Henderson, Nevada

Collection Date: September 24 through September 25, 2009

LDC Report Date: December 5, 2009

Matrix: Soil/Water

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905464

Sample Identification

SA205-0.5B SA208-0.5B SA205-10B SA208-7B

SA205-25B SA101-0.5BMS SA205-41B SA101-0.5BMSD

SA84-0.5B SA84-10B SA84009-10B

SA84-25B SA84-43B

EB092509-SO1A2

EB092509-SO2A4

SA101-0.5B

SA101-10B

SA101-25B

SA101-42B

SA121-0.5B

SA121009-0.5B

SA121-10B

SA121-25B

SA121-44B

Introduction

This data review covers 22 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Extractables.

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 all 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.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Samples EB092509-SO1A2 and EB092509-SO2A4 were identified as equipment blanks. No total petroleum hydrocarbons as extractable contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB092509-SO1A2	9/25/09	Diesel range organics	94 ug/L	SA208-0.5B SA208-7B
EB092509-SO2A4	9/25/09	Diesel range organics	120 ug/L	SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121009-0.5B SA121-10B SA121-25B SA121-44B

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

Samples FB072909-SO (from SDG R0904226), FB080309-SO (from SDG R0904279), and FB080309-SORE (from SDG R0904279) were identified as field blanks. No total petroleum hydrocarbons as extractable contaminants were found in these blanks.

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) and relative percent differences (RPD) were within QC limits.

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905464	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

Samples SA84-10B and SA84009-10B and samples SA121-0.5B and SA121009-0.5B were identified as field duplicates. No total petroleum hydrocarbons as extractables were detected in any of the samples.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG R0905464

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905464	SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-10B SA84-0.5B SA84-25B SA84-25B SA84-25B SA84-25B SA84-25B SA101-0.5B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B SA121-0.5B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG R0905464

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Equipment Blank Data Qualification Summary - SDG R0905464

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG R0905464

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

SDG #: R0905464 Laboratory: Columbia Analytical Services

LDC #: 21991N8

Stage 2B

2nd Reviewer:_____

METHOD: GC TPH as Extractables (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: 9/24 - 25/09
lla.	Initial calibration	A	
llb.	Calibration verification/ICV	A	CW/W = 202
111.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	les/b
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	$D_{r} = 6.7$ $D_{r} = 16.7$
Χ.	Field blanks	SW	## = #B072909-50 (from R0904226) EB #B080309-50 (from R0904274) #B080309-50 (from R0904274)

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

YND = No compounds detected

R = Rinsate FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Soil + Water

1	SA205-0.5B S	11	EB092509-SO2A4 W	21 3	SA208-0.5B	31	97150-MB
2	SA205-10B	12	SA101-0.5B S	۰ ا	SA208-7B	32	97237-
3	SA205-25B	13_	SA101-10B	23	SA101-0.5BMS	33 3	97335-
4	SA205-41B	14	SA101-25B	24	SA101-0.5BMSD	34	
∔ 5	SA84-0.5B	15	SA101-42B	25		35	
6	SA84-10B b ,	16	SA121-0.5B Dr	26		36	
7	SA84009-10B D,	17	SA121009-0.5B ₽√	27		37	
8	SA84-25B	18	SA121-10B	28		38	
9	SA84-43B	19	SA121-25B	29		39	
10	EB092509-SO1A2 h)	20	SA121-44B	30		40	

Notes:	 		
	 	 	· · · · · · · · · · · · · · · · · · ·

N8	2
21991 N	3
LDC #:	

VALIDATION FINDINGS WORKSHEET FIELD Blanks

METHOD: 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?

Alank units: $\frac{19}{12}$ Associated sample units: $\frac{1}{12}$ Sampling date: $\frac{9}{12}$

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

Associated Samples: 2l, 2ν ($\hbar\nu$)

	10000			ľ
Compound	Blank ID	Blank ID Blank ID	Sample Identification	
	0			
DRO	46			
CROL				

Blank units: 45/L, Associated sample units: 45/kg

Sampling date: 9/2x/64 Field blank type: (circle one) Field Blank / Trip Blank/Atmospheric Blank/Ambient Blank

XX 12-20

Associated Samples:_

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

Sample Identification 32000 Blank ID Blank ID 7 DR6 Compound 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".