Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC# 21257

Wet Chemistry

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: June 16 through June 23, 2008

LDC Report Date: September 17, 2009

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844538

Sample Identification

PB061608B
PC-40B
H-48B
MC-66BD
MC-65B
MC-66B
PC-37B
PC-72B
M-94BX
MC-62B

Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 120.1 for Conductivity, EPA Method 218.6 for Hexavalent Chromium, EPA Method 350.1M for Ammonia as Nitrogen, EPA Method 365.1 for Total Phosphorus, EPA SW 846 Method 9012 for Total Cyanide, EPA SW 846 Method 9040 for pH, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, and Sulfate, EPA SW 846 Method 9060 for Total Organic Carbon, Standard Method 2320B for Alkalinity, Standard Method 2540C for Total Dissolved Solids, Standard Method 2540D for Total Suspended Solids, and Standard Method 5540C for Surfactants.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

*I. Technical Holding Times

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

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
PB061608B	Conductivity	39 days	28 days	J- (all detects) UJ (all non-detects)	P
PC-40B	Conductivity	37 days	28 days	J- (all detects) UJ (all non-detects)	P
H-48B	Conductivity	36 days	28 days	J- (all detects) UJ (all non-detects)	P
MC-66BD MC-65B MC-66B PC-37B	Conductivity	35 days	28 days	J- (all detects) UJ (all non-detects)	P
PC-72B M-94BX MC-62B	Conductivity	32 days	28 days	J- (all detects) UJ (all non-detects)	P
*H-48B	Ammonia as N Nitrate as N	35 days 53 hours	28 days 48 hours	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
*H-48B	Nitrite as N	99.25 hours	48 hours	J- (all detects) R (all non-detects)	A
MC-66B	Nitrite as N	75.5 hours	48 hours	J- (all detects) UJ (all non-detects)	A
MC-66BD	Nitrite as N	73.75 hours	48 hours	J- (all detects) UJ (all non-detects)	A
MC-65B	Nitrite as N	74 hours	48 hours	J- (all detects) UJ (all non-detects)	A
PC-37B	Nitrite as N	76.5 hours	48 hours	J- (all detects) UJ (all non-detects)	A

*Corrected analyte.

*All samples were received in good condition with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
H-48B	Total cyanide	Sample pH reported at approximately 5 upon receipt by the laboratory.	Sample must be preserved at pH >12.	J- (all detects) R (all non-detects)	P
MC-65B	Total cyanide	Sample pH reported at approximately 10 upon receipt by the laboratory.	Sample must be preserved at pH >12.	J- (all detects) R (all non-detects)	P

*Added sample H-48B to finding for total cyanide.

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

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

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

Sample FB062408GWAREA1 (from SDG R2844650) was identified as a field blank. No contaminant concentrations were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB062408GWAREA1	6/24/08	Conductivity pH	1.96 umhos/cm 5.87 S.U.	PC-40B H-48B MC-66BD MC-65B MC-66B PC-37B PC-72B M-94BX MC-62B

Sample PB061608B was identified as a pump blank. No contaminant concentrations were found in this blank with the following exceptions:

Pump Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
PB061608B	6/16/08	Total alkalinity Bicarbonate alkalinity Conductivity pH	2.90 mg/L 2.90 mg/L 1.65 umhos/cm 6.07 S.U.	PC-40B H-48B MC-66BD MC-65B MC-66B PC-37B PC-72B M-94BX MC-62B

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

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

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

VI. Laboratory Control Samples

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

LCS ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
LCS	Total suspended solids	74.1 (80-120)	MC-66BD MC-65B MC-66B PC-37B	J- (all detects) UJ (all non-detects)	P

VII. Sample Result Verification and Project Quantitation Limit

The QAPP PQLs were met with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
All samples in SDG R2844538	Nitrite as N	Laboratory reporting limit reported at 0.05 mg/L.	PQL should be reported at 0.01 mg/L per the QAPP.	None	P

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R2844538	All analytes reported below the PQL.	J (all detects)	A

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 MC-66B and MC-66BD were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	*MC-66BD	*MC-66B				
Ammonia as N	0.646 mg/L	0.0500U mg/L	-	0.596 (≤0.0500)	J (all detects) UJ (all non-detects)	A
Bicarbonate alkalinity	94.7 mg/L	93.3 mg/L	1 (≤30)	-	-	-
Total alkalinity	94.7 mg/L	93.3 mg/L	1 (≤30)	-	-	-
Bromide	1.41 mg/L	1.88 mg/L	29 (≤30)	-	-	-
Chloride	2210 mg/L	2220 mg/L	0 (≤30)	-	-	-
Conductivity	10700 umhos/cm	10600 umhos/cm	1 (≤30)	-	-	-
Hexavalent chromium	0.634 mg/L	0.106 mg/L	143 (≤30)	-	J (all detects)	A
Nitrate as N	33.3 mg/L	32.1 mg/L	4 (≤30)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	*MC-66BD	*MC-66B				
pH	7.46 S.U.	7.44 S.U.	0 (≤30)	-	-	-
Sulfate	2220 mg/L	2220 mg/L	0 (≤30)	-	-	-
Surfactants	0.292 mg/L	0.751 mg/L	88 (≤30)	-	J (all detects)	A
Total cyanide	0.0200U mg/L	0.0379 mg/L	-	0.0179 (≤0.0200)	-	-
Total dissolved solids	8530 mg/L	8040 mg/L	6 (≤30)	-	-	-
Total organic carbon (AVG)	2.27 mg/L	1.71 mg/L	-	0.56 (≤1.0)	-	-
Total phosphorus	0.0832 mg/L	0.0500U mg/L	-	0.0332 (≤0.0500)	-	-
Total suspended solids	77.7 mg/L	42.3 mg/L	59 (≤30)	-	J (all detects)	A

*Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R2844538

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2844538	PB061608B PC-40B H-48B MC-66BD MC-65B MC-66B PC-37B PC-72B M-94BX MC-62B	Conductivity	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
*R2844538	H-48B	Ammonia as N Nitrate as N	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
*R2844538	H-48B	Nitrite as N	J- (all detects) R (all non-detects)	A	Technical holding times (h)
R2844538	MC-66B MC-66BD MC-65B PC-37B	Nitrite as N	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
R2844538	H-48B MC-65B	Total cyanide	J- (all detects) R (all non-detects)	P	Sample condition (preservation) (pH)
R2844538	MC-66BD MC-65B MC-66B PC-37B	Total suspended solids	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R2844538	PB061608B PC-40B H-48B MC-66BD MC-65B MC-66B PC-37B PC-72B M-94BX MC-62B	Nitrite as N	None	P	Sample result verification

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2844538	PB061608B PC-40B H-48B MC-66BD MC-65B MC-66B PC-37B PC-72B M-94BX MC-62B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp#)
R2844538	MC-66B MC-66BD	Ammonia as N	J (all detects) UJ (all non-detects)	A	Field duplicates (Difference) (fd)
R2844538	MC-66B MC-66BD	Hexavalent chromium Surfactants Total suspended solids	J (all detects) J (all detects) J (all detects)	A	Field duplicates (RPD) (fd)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R2844538

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R2844538

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257A6
SDG #: R2844538
Laboratory: Columbia Analytical Services

Date: 8/11/09
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1M), Bromide, Chloride, Nitrate-N, Nitrite-N, Sulfate (EPA SW846 Method 9056), Conductivity (EPA Method 120.1), Cyanide (EPA SW846 Method 9012), Hexavalent Chromium (EPA Method 218.6), pH (EPA SW846 Method 9040), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), TDS (SM2540C), TSS (SM2540D), TOC (EPA SW846 Method 9060)

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 6/16/08 - 6/23/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	N	Client specified.
V	Duplicates	N	
VI.	Laboratory control samples	A/SW	LCS
VII.	Sample result verification	SW	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	(4.6)
X	Field blanks	SW	Pump Blank = 1, FB = FB062408GWAREA1 (SDG R2844650)

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: 10

1	PB061608B	11		21		31	
2	PC-40B	12		22		32	
3	H-48B	13		23		33	
4 ✓	MC-66BD	14		24		34	
5	MC-65B	15		25		35	
6 ✓	MC-66B	16		26		36	
7	PC-37B	17		27		37	
8	PC-72B	18		28		38	
9	M-94BX	19		29		39	
10	MC-62B	20		30		40	

Notes: Sample ID for #9 = M-94BX

LDC #: 21257A6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: ✓
2nd reviewer: ________

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-10	Aq	(Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond) ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments: ____

LDC #: 21457A6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 2
Reviewer: M
2nd reviewer: [illegible]

All circled dates have exceeded the technical holding time.
(Y) N N/A Were all samples preserved as applicable to each method ?
(Y) N N/A Were all cooler temperatures within validation criteria?

Method:		120.1	~~9040~~	350.1/M			
Parameters:		Conductivity	~~pH~~	NH3-N			
Technical holding time:		28 days	~~24 hrs~~	28 days			
Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
1	6/16/08	7/25/08	(39 days)				J-/UJ/A (h)
2	6/18/08		(37 days)				
3	6/19/08		(36 days)				
4-7	6/20/08		(35 days)				
8-10	6/23/08		(32 days)				
~~1~~	~~6/16/08~~ 1430		~~6/19/08~~ 1845	(28.25 hr)			~~J/UJ/A~~ (h)
2	6/18/08 1300		6/19/08 1440	(25.75 hr)			
3	~~6/19/08~~ 1230		6/20/08 1740	(31.25 hr)			
~~10~~	~~6/23/08~~ 1030		6/24/08 1145	(25.25 hr)			
3	6/19/08			7/24/08	(35 days)		J-/UJ/A (reruns)

LDC #: 21951A6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 2
Reviewer: W
2nd reviewer: [illegible]

All circled dates have exceeded the technical holding time.
(N) N/A Were all samples preserved as applicable to each method ?
(Y) N N/A Were all cooler temperatures within validation criteria?

Method:		9056		9056	9012		
Parameters:		NO_2-N		NO_3-N	CN		
Technical holding time:		48hr		48hr	14day		
Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
3	6/19/08 1030			6/21/08 1523	(53 hr)		J-/UJ/A
↓	↓	6/23/08 1338	(99.5hr)				J-/R/A
~~6~~	6/20/08 1050	6/23/08 1421	(75.5 hr)				J-/UJ/A
~~4~~	6/20/08 1200	6/23/08 1352	(73.75 hr)				↓
~~5~~	↓ 1300	6/23/08 1407	(74hr)				
7	↓ 1050	6/23/08 1435	(76.5 hr)				✓
3					pH=5		J/R/P
					(pH 7 R)		↓
5					pH~10		✓

(reran (hr))
(pH) ↓

LDC #: 21257A6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: _____ **Associated sample units:** _____
Sampling date: 6/24/08 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: FB Associated Samples: 2-10

Analyte	Blank ID	Sample Identification								
[illegible]	FB062408GW AREA1	Action Level	No samples were qualified							
Conductivity (umhos/cm)	1.96	19.6								
pH (S.U.)	5.87									

Sampling date: 6/16/08 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: Pump Blank Associated Samples: 2-10

Analyte	Blank ID	Sample Identification								
[illegible]	PB061608B	Action Level	No samples were qualified							
Total Alkalinity (mg/L)	2.90	29.0								
Bicarbonate Alkalinity (mg/L)	2.90	29.0								
Conductivity (umhos/cm)	1.65	16.5								
pH (S.U.)	6.07									

LDC #: 21757A6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: MH
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

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

Y N N/A Was a laboratory control sample (LCS) analyzed for each matrix in this SDG?

Y N N/A Were all LCS percent recoveries (%R) within the control limits of 80-120% (85-115% for Method 300.0)?

LEVEL IV ONLY:

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

#	LCS ID	Matrix	Analyte	%R (limits)	Associated Samples	Qualifications
1	LCS	AQ	TSS	74.1	4-7	J-/UJ/P (e)

Comments: + from cover letter.

LDC #: 21257A6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: MH
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

#	Sample ID	Analyte	Lab Reporting Limit (units)	APP limits ~~RDL (units)~~	Finding	Qualifications
1	A11	NO3-N	0.05 mg/L	0.01 mg/L	lab limit > APP limit	none/p

Comments:

LDC#: 21257A6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: [illegible]
2nd Reviewer: [illegible]

Inorganics, Method See Cover

(Y) N NA Were field duplicate pairs identified in this SDG?
(Y) N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (mg/L)		RPD (≤30)	Difference	Limits	Qualification (Parent only)
	4	6				
Ammonia as N	0.646	0.0500U		0.596	(≤0.0500)	J / UJ / A
Bicarbonate Alkalinity	94.7	93.3	1			
Total Alkalinity	94.7	93.3	1			
Bromide	1.41	1.88	29			
Chloride	2210	2220	0			
Conductivity (umhos/cm)	10700	10600	1			
Hexavalent Chromium	0.634	0.106	143			J det / A
Nitrate as N	33.3	32.1	4			
pH (S.U.)	7.46	7.44	0			
Sulfate	2220	2220	0			
Surfactants	0.292	0.751	88			J det / A
Total Cyanide	0.0200U	0.0379		0.0179	(≤0.0200)	
TDS	8530	8040	6			
TOC AVG	2.27	1.71		0.56	(≤1.0)	
Total Phosphorus	0.0832	0.0500U		0.0332	(≤0.0500)	
TSS	77.7	42.3	59			J det / A

(reason code fd)

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: June 24 through June 27, 2008

LDC Report Date: September 4, 2009

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844650

Sample Identification

M-44B
H-49AB
FB062408GWAREA1
MC-45B
MC-53B
M-23B
MC-97B
MC-94B
MW-16B
M-5AB
EB062608GW3
M-61B
M-88BB
M-7BB
M-67B
M-6AB
M-57AB
M-95B
M-68B
M-7BBMS
M-7BBDUP
M-5ABDL
M-61BDL

Introduction

This data review covers 23 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 120.1 for Conductivity, EPA Method 218.6 for Hexavalent Chromium, EPA Method 350.1M for Ammonia as Nitrogen, EPA Method 365.1 for Total Phosphorus, EPA SW 846 Method 9012 for Total Cyanide, EPA SW 846 Method 9040 for pH, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, and Sulfate, EPA SW 846 Method 9060 for Total Organic Carbon, Standard Method 2320B for Alkalinity, Standard Method 2540C for Total Dissolved Solids, Standard Method 2540D for Total Suspended Solids, and Standard Method 5540C for Surfactants.

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

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

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 with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
M-5ABDL M-61BDL	Surfactants	5 days	48 hours	J- (all detects) R (all non-detects)	A
MC-94B	pH	50.25 hours	48 hours	J (all detects) UJ (all non-detects)	P
M-44B H-49AB FB062408GWAREA1	Conductivity	31 days	28 days	J- (all detects) UJ (all non-detects)	P
MC-45B MC-53B M-23B MC-97B MC-94B	Conductivity	30 days	28 days	J- (all detects) UJ (all non-detects)	P
MW-16B M-5AB EB062608GW3 M-61B M-88BB M-7BB M-7BBDUP	Conductivity	29 days	28 days	J- (all detects) UJ (all non-detects)	P

All samples were received in good condition with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
H-49AB MC-94B	Total cyanide	Sample pH reported at approximately 10 upon receipt by the laboratory.	Sample must be preserved at pH >12.	J- (all detects) R (all non-detects)	P
MW-16B M-5AB	Total cyanide	Sample pH reported at approximately 8 upon receipt by the laboratory.	Sample must be preserved at pH >12.	J- (all detects) R (all non-detects)	P
M-6AB M-7BBMS M-7BBDUP	Total cyanide	Sample pH reported at approximately 9 upon receipt by the laboratory.	Sample must be preserved at pH >12.	J- (all detects) R (all non-detects)	P

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

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

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

Sample EB062608GW3 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB062608GW3	6/26/08	Chloride Conductivity pH	0.478 mg/L 4.95 umhos/cm 6.17 S.U.	MW-16B M-5AB

Sample FB062408GWAREA1 was identified as a field blank. No contaminant concentrations were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB062408GWAREA1	6/24/08	Conductivity pH	1.96 umhos/cm 5.87 S.U.	M-44B H-49AB MC-45B MC-53B M-23B MC-97B MC-94B MW-16B M-5AB M-61B M-88BB M-7BB M-67B M-6AB M-57AB M-95B M-68B

Sample PB061608B (from SDG R2844538) was identified as a pump blank. No contaminant concentrations were found in this blank with the following exceptions:

Pump Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
PB061608B	6/16/08	Total alkalinity Bicarbonate alkalinity Conductivity pH	2.90 mg/L 2.90 mg/L 1.65 umhos/cm 6.07 S.U.	M-44B H-49AB MC-45B MC-53B M-23B MC-97B MC-94B MW-16B M-5AB M-61B M-88BB M-7BB M-67B M-6AB M-57AB M-95B M-68B

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

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
M-7BBMS (M-61B M-88BB M-7BB)	Total cyanide	74 (75-125)	J- (all detects) UJ (all non-detects)	A

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

All sample result verifications were acceptable with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
M-5AB M-61B	Surfactants	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A
*M-44B	Hexavalent chromium	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

*This sample was diluted but the dilution factor could not be verified through laboratory documentation and was classified as not quantitative.

The QAPP PQLs were met with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
M-44B H-49AB FB062408GWAREA1 MC-45B MC-53B M-23B MC-97B MC-94B MW-16B M-5AB EB062608GW3 M-61B M-88BB M-7BB M-67B M-6AB M-57AB M-95B M-68B	Nitrite as N	Laboratory reporting limit reported at 0.05 mg/L.	PQL should be reported at 0.01 mg/L per the QAPP.	None	P

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R2844650	All analytes reported below the PQL.	J (all detects)	A

VIII. Overall Assessment of Data

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

Sample	Analyte	Flag	A or P
M-5AB M-61B	Surfactants	X	A

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R2844650

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2844650	M-5ABDL M-61BDL	Surfactants	J- (all detects) R (all non-detects)	A	Technical holding times (h)
R2844650	MC-94B	pH	J (all detects) UJ (all non-detects)	P	Technical holding times (h)
R2844650	M-44B H-49AB FB062408GWAREA1 MC-45B MC-53B M-23B MC-97B MC-94B MW-16B M-5AB EB062608GW3 M-61B M-88BB M-7BB	Conductivity	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R2844650	H-49AB MC-94B MW-16B M-5AB M-6AB	Total cyanide	J- (all detects) R (all non-detects)	P	Sample condition (preservation) (pH)
R2844650	M-61B M-88BB M-7BB	Total cyanide	J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
R2844650	M-5AB M-61B	Surfactants	J (all detects)	A	Sample result verification (e)
R2844650	M-44B	Hexavalent chromium	J (all detects)	A	Sample result verification (e)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2844650	M-44B H-49AB FB062408GWAREA1 MC-45B MC-53B M-23B MC-97B MC-94B MW-16B M-5AB EB062608GW3 M-61B M-88BB M-7BB M-67B M-6AB M-57AB M-95B M-68B	Nitrite as N	None	P	Sample result verification
R2844650	M-44B H-49AB FB062408GWAREA1 MC-45B MC-53B M-23B MC-97B MC-94B MW-16B M-5AB EB062608GW3 M-61B M-88BB M-7BB M-67B M-6AB M-57AB M-95B M-68B M-5ABDL M-61BDL	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
R2844650	M-5AB M-61B	Surfactants	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R2844650

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R2844650

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 21257B6
SDG #: R2844650
Laboratory: Columbia Analytical Services

Date: 8/10/09
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia (EPA Method 350.1M), Bromide, Chloride, Nitrate-N, Nitrite-N, Sulfate (EPA SW846 Method 9056), Conductivity (EPA Method 120.1), Cyanide (EPA SW846 Method 9012), Hexavalent Chromium (EPA Method 218.6), pH (EPA SW846 Method 9040), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), TDS (SM2540C), TSS (SM2540D), TOC (EPA SW846 Method 9060)

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 6/24/08 - 6/27/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	SW	3 MS/Dup
V	Duplicates	A	
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	SW	
VIII.	Overall assessment of data	SW	
IX.	Field duplicates	N	
X.	Field blanks	SW	FB=3, EB=1, Pump Blank = PB061608B (SDG R2844538)

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: All

1	M-44B	11	EB062608GW3	21	M-7BBDUP	31	MB
2	H-49AB	12	M-61B	22	M-5ABDL	32	
3	FB062408GWAREA1	13	M-88BB	23	M-61BDL	33	
4	MC-45B	14	M-7BB	24		34	
5	MC-53B	15	M-67B	25		35	
6	M-23B	16	M-6AB	26		36	
7	MC-97B	17	M-57AB	27		37	
8	MC-94B	18	M-95B	28		38	
9	MW-16B	19	M-68B	29		39	
10	M-5AB	20	M-7BBMS	30		40	

Notes:

LDC #: 47486b
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: jm
2nd Reviewer: [signature]

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.		✓		
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)	✓			
Were balance checks performed as required? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix Spike/Matrix Spike Duplicate				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory Control Samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?	✓	✓	✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 21357B6
SDG #: 1st cover

VALIDATION FINDINGS CHECKLIST

Reviewer: MM
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
[illegible]				
Overall assessment of data was found to be acceptable.	✓			
[illegible]				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
[illegible]				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: 21587B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: [signature]
2nd reviewer: [signature]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-19	Aq	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
22,23	✓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
20,21	Aq	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
✓ 21	✓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 19257B6
SDG #: see cover

Page: 1 of 2
Reviewer: [illegible]
2nd reviewer: [illegible]

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

All circled dates have exceeded the technical holding time.

Y (N) N/A Were all samples preserved as applicable to each method ?

(Y) N N/A Were all cooler temperatures within validation criteria?

Method:	SM5540C	9040				
Parameters:	surfactants	pH				
Technical holding time:	48hr	48hr				

Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
22	6/26/08 910	7/1/08 0845	(5 days)				J/R/A
23	6/26/08 1100	↓	↓				↓
1	6/24/08 910		6/25/08 1050	(25.75 hr)			J/UJ/P
2	↓ 900		1915	(32.25 hr)			
3	1200		↓	(29.25 hr)			
4	6/25/08 1300		6/26/08 1345	(24.75 hr)			
5	1200			(25.75 hr)			
6	800			(29.75 hr)			
7	930		↓	(28.25 hr)			↓
8	1431		6/27/08 1650	(50.25 hr)			J/R/P
9	6/26/08 1405			(26.75 hr)			J/UJ/P
10	910			(31.75 hr)			
11	1400			(26.75 hr)			
12	1100			(29.75 hr)			
13	0800			(32.75 hr)			
14,21	↓ 0920		↓	(31.5 hr)			
15	6/27/08 900		6/28/08 1220	(29.25 hr)			
16	950		1220	(26.5 hr)			
17	1130		1220	(24.75 hr)			
18	830		1220	(27.75 hr)			
19	1000		1220	(26.25 hr)			↓

Margin notes: reason code (h); (recv); J/UJ/P (h)

HT.6

LDC #: 21537136
SDG #: (a cover)

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: W
2nd reviewer: [signature]

All circled dates have exceeded the technical holding time.
(Y) (N) N/A Were all samples preserved as applicable to each method ?
(Y) (N) N/A Were all cooler temperatures within validation criteria?

Method:		1xn.1		9012			
Parameters:		conductivity		CN			
Technical holding time:		28 days		14 d			
Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier (w)
1-3	6/24/08	9/25/08	(31 days)				J-/UJ/P
4-8	6/25/08	↓	(30 days)				↓
9-14,21	6/26/08	↓	(29 days)				↓
2				pH ~ 10	(pH > 12)		J/R/P (pH)
8				pH ~ 10	↓		↓
9				pH ~ 8	↓		↓
10				pH ~ 8	↓		↓
14,20,21				pH ~ 9	↓		↓

LDC #: 21257B6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: C
2nd Reviewer: Q

METHOD: Inorganics, Method See Cover
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: _____ **Associated sample units:** _____
Sampling date: 6/24/08 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: FB Associated Samples: 1,2,4-10, 12-19

Analyte	Blank ID	Sample Identification								
	3	Action Level	No samples were qualified							
Conductivity (umhos/cm)	1.96	19.6								
pH (S.U.)	5.87									

Sampling date: 6/16/08 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: Pump Blank Associated Samples: 1,2,4-10, 12-19

Analyte	Blank ID	Sample Identification								
	PB061608B	Action Level	No samples were qualified							
Total Alkalinity (mg/L)	2.90	29.0								
Bicarbonate Alkalinity (mg/L)	2.90	29.0								
Conductivity (umhos/cm)	1.65	16.5								
pH (S.U.)	6.07									

Sampling date: 6/26/08 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 9,10

Analyte	Blank ID	Sample Identification								
	11	Action Level	No samples were qualified							
Chloride (mg/L)	0.478	4.78								
Conductivity (umhos/cm)	4.95	49.5								
pH (S.U.)	6.17									

LDC #: 21757B6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Page: 1 of 1
Reviewer: W
2nd Reviewer: 9

METHOD: Inorganics, Method See cover

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

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

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125 (85-115% for Method 300.0)? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

LEVEL IV ONLY:

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

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
1	20	AQ	CN	74	12 - 16	J-/UJ/A (M)

Comments:

LDC #: 21387B4
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: MH
2nd Reviewer: Q

METHOD: Inorganics, Method See cover

#	Sample ID	Analyte	Lab Reporting Limit (units)	RDL (units)	Finding	Qualifications
1	10, 12	Surfactants			> calibration range	J det/A (e)
2	~~All~~ 1-19	NO_2-N	lab limit 0.05 mg/L	APP limit 0.01 mg/L	lab limit > APP limit	none/P
3	1	Cr^{6+}			> calibration range (10X, 0.018 mg/L) (sample was diluted, but an error was made by the lab.	J det/A (e)

Comments:

ABVCRDL.6

LDC #: 21757B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: MH
2nd Reviewer: [signature]

METHOD: Inorganics, Method See cover

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
1		10, 12	Surfactants		~~X/A~~ X/A (> calibration range)

Comments:

LDC #: 21786B6
SDG #: See cover

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See cover

The correlation coefficient (r) for the calibration of Cr6+ was recalculated. Calibration date: 7/16/08

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

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	Cr (VI)	s1	0	0	*0.999998*	0.999998	Y
		s2	0.005	156910			
		s3	0.01	347287			
		s4	0.1	3343001			
		s5	0.5	16638083			
		s6	0.7	23248396			
CCV 6/30/08 Calibration verification	Br	2.0	1.876		93.8	93.8	Y
CCV Calibration verification	Surfactants	0.3	0.3225		107.5	NR	J
CCV Calibration verification	CN	0.70	0.6576		94	J	J

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

LDC #: 47257B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MM
2nd Reviewer:

METHOD: Inorganics, Method See cover

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

%R = Found / True x 100 Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

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

RPD = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Alk	20.2	20.0	101	101	Y
20	Matrix spike sample	NH3 N	(SSR-SR) 0.482	0.500	96	96	↓
21	Duplicate sample	SO4	1433	1445	1	1	↓

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

LDC #: 21457136
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Inorganics, Method See cover

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for 1, [illegible] reported with a positive detect were recalculated and verified using the following equation:

Concentration = Recalculation:

$NO_2\text{-}N = (1.17 \times 10^{-6} \times Area + 0.04595) \times DF$

$NO_2\text{-}N = (45980 \times 1.17 \times 10^{-6} + 0.04595) \times 10 = 0.995$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	1	Al/K	79.3	79.3	Y
		Br	2.27	2.27	
		Cl	1420	1420	
		conductivity (umhos/cm)	9200	9200	
		F/pH	0.821	0.809	
		$NO_3\text{-}N$	60.0	60.0	
		$NO_2\text{-}N$	0.995	0.995	
		pH (unit)	7.50	7.50	
		SO_4	2330	2330	
		surfactants	1.17	1.17	
		CN	0.0326	0.0326	
		TDS	8310	8310	
		T-Cr (mg/L)	2.39	2.39	
		TSS	1.90	1.90	

Note:

LDC #: 31857B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 2
Reviewer: MM
2nd reviewer: [signature]

METHOD: Inorganics, Method See cover

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

(Y) N N/A Have results been reported and calculated correctly?
(Y) N N/A Are results within the calibrated range of the instruments?
(Y) N N/A Are all detection limits below the CRQL?

Compound (analyte) results for 12 reported with a positive detect were recalculated and verified using the following equation:

Concentration = Recalculation:

$$Alk = \frac{V_{titrant} \times N_{titrant} \times 50000}{Sample\ Volume}$$

$$Alk = \frac{1.85 \times 0.02 \times 50000}{15} = 114\ mg/L$$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	12	NH_3	1.90	1.90	Y
		Alk	114	114	
		Br	391	391	
		Cl	727	727	
		conductivity (umhos/cm)	6580	6580	
		COD	1.33	1.31	
		NO_3-N	7.90	7.90	
		pH (SU)	7.40	7.40	
		Sulfate	2430	2430	
		Surfactants	0.402	0.402	
		CN	0.0289	0.0289	
		TDS	5610	5610	
		TOC (Avg)	1.43	1.43	

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: June 25 through June 26, 2008

LDC Report Date: August 24, 2009

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844666

Sample Identification

SA87-0.5B
SA87-10B
SA87-20B
SA87-30B
SA87-25B
SA180-0.5B
SA180-0.5BD
SA180-10B
SA180-20B
SA180-30B
SA57-0.5B
SA57-10B
SA57-20B
SA57-30B
SA57-10BD
SA87-10BMS
SA87-10BDUP
SA87-20BDUP
SA180-10BMS
SA180-10BDUP

Introduction

This data review covers 20 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 350.1M for Ammonia as Nitrogen, EPA Method 365.1 for Total Phosphorus, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA SW 846 Method 9012 for Total Cyanide, EPA SW 846 Method 9045 for pH, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, and Sulfate, Standard Method 2320B for Alkalinity, Standard Method 5540C for Surfactants, and Lloyd/Kahn Method for Total Organic Carbon.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

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

Sample	Analyte	Total Time From Sample Extraction Until Analysis	Required Holding Time From Sample Extraction Until Analysis	Flag	A or P
SA87-20B	Nitrate as N	99.75 hours	48 hours	J- (all detects) R (all non-detects)	A
SA87-25B	Nitrite as N	101.25 hours	48 hours	J- (all detects) R (all non-detects)	A

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

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

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

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
SA87-10BMS (SA87-0.5B SA87-10B)	Chloride	149 (75-125)	J+ (all detects)	A

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
SA87-10BMS (SA87-10B SA87-30B)	Sulfate	54 (75-125)	J- (all detects) UJ (all non-detects)	A
SA87-10BMS (SA87-0.5B SA87-10B SA87-25B)	Total alkalinity	23 (75-125)	J- (all detects) R (all non-detects)	A

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
SA87-10BDUP (SA87-0.5B SA87-10B SA87-20B SA87-25B)	Total organic carbon	-	380 mg/Kg (≤300)	J (all detects) UJ (all non-detects)	A

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

The QAPP PQLs were met with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
All samples in SDG R2844666	Alkalinity	Laboratory reporting limit reported at 200 mg/Kg.	PQL should be reported at 2 mg/Kg per the QAPP.	None	P
All samples in SDG R2844666	Nitrite as N	Laboratory reporting limit reported at 5.0 mg/Kg.	PQL should be reported at 0.1 mg/Kg per the QAPP.	None	P

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R2844666	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

The overall assessment of data was acceptable with the following exceptions:

Sample	Compound	Flag	A or P
SA87-25B SA180-30B SA57-20B	Sulfate	R	A

The Sulfate results for the samples listed above were overdiluted.

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

IX. Field Duplicates

Samples SA180-0.5B and SA180-0.5BD and samples SA57-10B and SA57-10BD were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA180-0.5B	SA180-0.5BD				
Bicarbonate alkalinity	399 mg/Kg	200 mg/Kg	-	199 (≤243)	-	-
Total alkalinity	421 mg/Kg	348 mg/Kg	-	73 (≤243)	-	-
Hexavalent chromium	0.463U mg/Kg	0.664 mg/Kg	-	0.201 (≤0.487)	-	-
Hexavalent chromium	0.463U mg/Kg	0.645 mg/Kg	-	0.182 (≤0.487)	-	-
pH	9.18 S.U.	9.37 S.U.	2 (≤50)	-	-	-
Sulfate	74.7 mg/Kg	95.5 mg/Kg	24 (≤50)	-	-	-
Total organic carbon	7900 mg/Kg	9550 mg/Kg	19 (≤50)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA180-0.5B	SA180-0.5BD				
Total phosphorus	891 mg/Kg	1090 mg/Kg	20 (≤50)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA57-10B	SA57-10BD				
Bicarbonate alkalinity	232 mg/Kg	216U mg/Kg	-	16 (≤218)	-	-
Total alkalinity	257 mg/Kg	240 mg/Kg	-	17 (≤218)	-	-
Chloride	21.8U mg/Kg	22.0 mg/Kg	-	0.2 (≤21.8)	-	-
pH	8.71 S.U.	8.65 S.U.	1 (≤50)	-	-	-
Sulfate	324 mg/Kg	311 mg/Kg	4 (≤50)	-	-	-
Total organic carbon	372 mg/Kg	463 mg/Kg	-	91 (≤300)	-	-
Total phosphorus	855 mg/Kg	841 mg/Kg	2 (≤50)	-	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R2844666

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2844666	SA87-20B	Nitrate as N	J- (all detects) R (all non-detects)	A	Technical holding times (h)
R2844666	SA87-25B	Nitrite as N	J- (all detects) R (all non-detects)	A	Technical holding times (h)
R2844666	SA87-0.5B SA87-10B	Chloride	J+ (all detects)	A	Matrix spike analysis (%R) (m)
R2844666	SA87-10B SA87-30B	Sulfate	J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
R2844666	SA87-0.5B SA87-10B SA87-25B	Total alkalinity	J- (all detects) R (all non-detects)	A	Matrix spike analysis (%R) (m)
R2844666	SA87-0.5B SA87-10B SA87-20B SA87-25B	Total organic carbon	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (Difference) (ld)
R2844666	SA87-0.5B SA87-10B SA87-20B SA87-30B SA87-25B SA180-0.5B SA180-0.5BD SA180-10B SA180-20B SA180-30B SA57-0.5B SA57-10B SA57-20B SA57-30B SA57-10BD	Alkalinity Nitrite as N	None None	P	Sample result verification

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2844666	SA87-0.5B SA87-10B SA87-20B SA87-30B SA87-25B SA180-0.5B SA180-0.5BD SA180-10B SA180-20B SA180-30B SA57-0.5B SA57-10B SA57-20B SA57-30B SA57-10BD	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
R2844666	SA87-25B SA180-30B SA57-20B	Sulfate	R	A	Overall assessment of data (o)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R2844666

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R2844666

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257C6
SDG #: R2844666
Laboratory: Columbia Analytical Services

Date: 8/14/09
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1M), Bromide, Chloride, Nitrate-N, Nitrite-N, Sulfate (EPA SW846 Method 9056), Cyanide (EPA SW846 Method 9012), Hexavalent Chromium (EPA SW846 Method 7199), pH (EPA SW846 Method 9045), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), TOC (Lloyd/Kahn)

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 6/25/08, 6/26/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	SW	3 MS/MSD
V	Duplicates	SW	
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	SW	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	(6,7), (12,15)
X	Field blanks	N	

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

Validated Samples: Soil

1	SA87-0.5B	11	SA57-0.5B	21	MB	31	
2	SA87-10B	12	SA57-10B	22		32	
3	SA87-20B	13	SA57-20B	23		33	
4	SA87-30B	14	SA57-30B	24		34	
5	SA87-25B	15	SA57-10BD	25		35	
6	SA180-0.5B	16	SA87-10BMS	26		36	
7	SA180-0.5BD	17	SA87-10BDUP	27		37	
8	SA180-10B	18	SA87-20BDUP	28		38	
9	SA180-20B	19	SA180-10BMS	29		39	
10	SA180-30B	20	SA180-10BDUP	30		40	

Notes:

LDC #: 21597C6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: [illegible]
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-15	soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
~16,17	soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
18	↓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
19,20	↓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
17,20		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 21259C6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled dates have exceeded the technical holding time.

Y N (N/A) Were all samples preserved as applicable to each method ?
(Y) N N/A Were all cooler temperatures within validation criteria?

Method:		9056		9056			
Parameters:		NO_2-N		NO_3-N			
Technical holding time: *		48 hrs		48 hrs			
Sample ID	Sampling date	~~Analysis~~ Extraction date	Analysis date	~~Analysis~~ Extraction date	Analysis date	Analysis date	Qualifier
3	6/25/08	6/26/08 1215		6/26/08/1215	6/30/08 1707	(99.75 hrs)	J/R/A chs
5	↓	↓	6/30/08 1832	(101.25 hrs)			↓

HT.6

* from extraction to analysis

LDC #: 21257C6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

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

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

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125 (85-115% for Method 300.0)? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

LEVEL IV ONLY:

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

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
1	16	Soil	Cl	149	1,2 (6/29/08)	J+ (all detects) A (m)
			SO4	54	2,4 (6/30/08)	J- (all detects) A
			Total Alk	23	1,2,5 (1 high 4)	J- (all detects) R/A (grab Total Alk)
2	19	Soil	SO4	45		No qual (>4x)
			T-P	45		J

Comments:

LDC #: 21257C6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Reviewer: MH
2nd Reviewer: [signature]

METHOD: Inorganics, Method See cover

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

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

Y (N) N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water and ~~≤ 35%~~ for soil samples (≤ 10% for Method 300.0)? If no, see qualification below. A control limit of ±CRDL (±2X CRDL for soil) was used for samples that were ≤5X the CRDL, including when only one of the duplicate sample values were ≤5X the CRDL. If field blanks were used for laboratory duplicates, see overall assessment.

LEVEL IV ONLY:

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

#	Duplicate ID	Matrix	Analyte	RPD (Limit) ~~Difference~~	Associated Samples	Qualifications
1	17	Soil	TOC	380 ~~(≤ 328)~~ (≤ 390)	1-3, 5	J/nJ/A (fd)

Comments:

LDC #: 21959C6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: MH
2nd Reviewer: [signature]

METHOD: Inorganics, Method See cover

QAPP limits

#	Sample ID	Analyte	Lab Reporting Limit (units)	RDL (units)	Finding	Qualifications
1	All	Alkalinity	200 mg/kg	2 mg/kg	Lab limit > QAPP limit	none/p
	↓	NO_2-N	5.0 ↓	0.1 ↓	↓	↓
2	5, 10, 13	SO_4			Over diluted	R (D)

Comments:

LDC#: 21257C6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: [illegible]
2nd Reviewer: [illegible]

Inorganics, Method See Cover

(Y) N NA Were field duplicate pairs identified in this SDG?
(Y) N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	6	7				
Bicarbonate Alkalinity	399	200		199	(≤243)	
Total Alkalinity	421	348		73	(≤243)	
Hexavalent Chromium	0.463U	0.664		0.201	(≤0.487)	
Hexavalent Chromium	0.463U	0.645		0.182	(≤0.487)	
pH (S.U.)	9.18	9.37	2			
Sulfate	74.7	95.5	24			
TOC	7900	9550	19			
Total Phosphorus	891	1090	20			

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	12	15				
Bicarbonate Alkalinity	232	216U		16	(≤218)	
Total Alkalinity	257	240		17	(≤218)	
Chloride	21.8U	22.0		0.2	(≤21.8)	
pH (S.U.)	8.71	8.65	1			
Sulfate	324	311	4			
TOC	372	463		91	(≤300)	
Total Phosphorus	855	841	2			

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: June 29 through June 30, 2008

LDC Report Date: August 14, 2009

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844768

Sample Identification

M-79B
M-126B
M-84B
M-14ADBF
M-14ABF

Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 120.1 for Conductivity, EPA Method 218.6 for Hexavalent Chromium, EPA Method 350.1M for Ammonia as Nitrogen, EPA Method 365.1 for Total Phosphorus, EPA SW 846 Method 9012 for Total Cyanide, EPA SW 846 Method 9040 for pH, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, and Sulfate, EPA SW 846 Method 9060 for Total Organic Carbon, Standard Method 2320B for Alkalinity, Standard Method 2540C for Total Dissolved Solids, Standard Method 2540D for Total Suspended Solids, and Standard Method 5540C for Surfactants.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

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

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
M-126B	Nitrite as N	49.5 hours	48 hours	J- (all detects) UJ (all non-detects)	A

All samples were received in good condition with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
M-126B	Total cyanide	Sample pH reported at approximately 8 upon receipt by the laboratory.	Sample must be preserved at pH >12.	J- (all detects) R (all non-detects)	P

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

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

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

Sample FB062408GWAREA1 (from SDG R2844650) was identified as a field blank. No contaminant concentrations were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB062408GWAREA1	6/24/08	Conductivity pH	1.96 umhos/cm 5.87 S.U.	All samples in SDG R2844768

Sample PB061608B (from SDG R2844538) was identified as a pump blank. No contaminant concentrations were found in this blank with the following exceptions:

Pump Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
PB061608B	6/16/08	Total alkalinity Bicarbonate alkalinity Conductivity pH	2.90 mg/L 2.90 mg/L 1.65 umhos/cm 6.07 S.U.	All samples in SDG R2844768

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

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

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

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

The QAPP PQLs were met with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
All samples in SDG R2844768	Nitrite as N	Laboratory reporting limit reported at 0.05 mg/L.	PQL should be reported at 0.01 mg/L per the QAPP.	None	P

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R2844768	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

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

IX. Field Duplicates

Samples M-14ADBF and M-14ABF were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-14ADBF	M-14ABF				
Bicarbonate alkalinity	107 mg/L	104 mg/L	3 (≤30)	-	-	-
Total alkalinity	107 mg/L	104 mg/L	3 (≤30)	-	-	-
Bromide	1.66 mg/L	1.57 mg/L	6 (≤30)	-	-	-
Chloride	661 mg/L	652 mg/L	1 (≤30)	-	-	-
Conductivity	3980 umhos/cm	3920 umhos/cm	2 (≤30)	-	-	-
Nitrate as N	7.88 mg/L	7.72 mg/L	2 (≤30)	-	-	-
pH	7.63 S.U.	7.58 S.U.	1 (≤30)	-	-	-
Sulfate	1180 mg/L	1150 mg/L	3 (≤30)	-	-	-
Surfactants	0.208 mg/L	0.180 mg/L	14 (≤30)	-	-	-
Total dissolved solids	3210 mg/L	3110 mg/L	3 (≤30)	-	-	-
Total organic carbon (AVG)	1.12 mg/L	1.05 mg/L	-	0.07 (≤1.00)	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R2844768

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2844768	M-126B	Nitrite as N	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
R2844768	M-126B	Total cyanide	J- (all detects) R (all non-detects)	P	Sample condition (preservation) (pH)
R2844768	M-79B M-126B M-84B M-14ADBF M-14ABF	Nitrite as N	None	P	Sample result verification
R2844768	M-79B M-126B M-84B M-14ADBF M-14ABF	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R2844768

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R2844768

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257D6
SDG #: R2844768
Laboratory: Columbia Analytical Services

Date: 8/12/09
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1M), Bromide, Chloride, Nitrate-N, Nitrite-N, Sulfate (EPA SW846 Method 9056), Conductivity (EPA Method 120.1), Total Cyanide (EPA SW846 Method 9012), Hexavalent Chromium (EPA Method 218.6), pH (EPA SW846 Method 9040), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), TDS (SM2540C), TSS (SM2540D), TOC (EPA SW846 Method 9060)

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 6/29/08, 6/30/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	N	Client specified
V	Duplicates	N	
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	SW	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	(4,5)
X.	Field blanks	SW	Pump Blank = PB061608FB (R2844538) FB = FB061708GWARZA1 (R2844650)

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: A2

1	M-79B	11		21	MB	31	
2	M-126B	12		22		32	
3	M-84B	13		23		33	
4	M-14ADBF	14		24		34	
5	M-14ABF	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 21757 06
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer:
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-5	Aq	(Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond) ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 21575J6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: M
2nd reviewer: C

All circled dates have exceeded the technical holding time.
(Y) N N/A Were all samples preserved as applicable to each method ?
(Y) N N/A Were all cooler temperatures within validation criteria?

Method:		9056		9012			
Parameters:		NO3-N		CN			
Technical holding time:		48hr		14dy			
Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
2	6/29/08 1444	7/01/08 1618	(49.5hr)				J-/UB/A (reran)
2				pH = 8 (pH 7/12)			J-/R/P (pH)

LDC #: 21257D6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

METHOD: Inorganics, Method See Cover
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: _____ **Associated sample units:** _____
Sampling date: 6/24/08 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: FB Associated Samples: All

Analyte	Blank ID	Sample Identification								
	FB062408GW AREA1	Action Level	No samples were qualified							
Conductivity (umhos/cm)	1.96	19.6								
pH (S.U.)	5.87									

Sampling date: 6/16/08 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: Pump Blank Associated Samples: All

Analyte	Blank ID	Sample Identification								
	PB061608B	Action Level	No samples were qualified							
Total Alkalinity (mg/L)	2.90	29.0								
Bicarbonate Alkalinity (mg/L)	2.90	29.0								
Conductivity (umhos/cm)	1.65	16.5								
pH (S.U.)	6.07									

LDC #: 21457D0

SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: MH

2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

#	Sample ID	Analyte	Lab Reporting Limit (units)	~~RDL (units)~~ APP limits	Finding	Qualifications
1		NO_2-N	0.05 mg/L	0.01 mg/L	lab limit > APP limit	none/p

Comments:

ABVCRDL.6

LDC#: 21257D6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: [illegible]
2nd Reviewer: [illegible]

Inorganics, Method See Cover

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

Analyte	Concentration (mg/L)		RPD (≤30)	Difference	Limits	Qualification (Parent only)
	4	5				
Bicarbonate Alkalinity	107	104	3			
Total Alkalinity	107	104	3			
Bromide	1.66	1.57	6			
Chloride	661	652	1			
Conductivity (umhos/cm)	3980	3920	2			
Nitrate as N	7.88	7.72	2			
pH (S.U.)	7.63	7.58	1			
Sulfate	1180	1150	3			
Surfactants	0.208	0.180	14			
TDS	3210	3110	3			
TOC AVG	1.12	1.05		0.07	(≤1.00)	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: June 30 through July 2, 2008

LDC Report Date: August 17, 2009

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844797

Sample Identification

SA207-0.5B
SA207-10B
SA207-20B
SA207-30B
SA207-40B
SA181-0.5B
SA181-10B
SA181-20B
SA181-30B
SA181-35B
SA207-30BMS
SA207-30BDUP

Introduction

This data review covers 12 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 350.1M for Ammonia as Nitrogen, EPA Method 365.1 for Total Phosphorus, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA SW 846 Method 9012 for Total Cyanide, EPA SW 846 Method 9045 for pH, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, and Sulfate, Standard Method 2320B for Alkalinity, Standard Method 5540C for Surfactants, and Lloyd/Kahn Method for Total Organic Carbon.

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

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

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 with the following exceptions:

Sample	Analyte	Total Time From Sample Extraction Until Analysis	Required Holding Time From Sample Extraction Until Analysis	Flag	A or P
SA207-0.5B	Nitrite as N	6 days	48 hours	J- (all detects) R (all non-detects)	A
SA207-10B	Nitrite as N	6 days	48 hours	J- (all detects) R (all non-detects)	A
	Nitrate as N	6 days	48 hours	J- (all detects) R (all non-detects)	
SA207-30B SA207-30BMS SA207-30BDUP	Nitrite as N	10 days	48 hours	J- (all detects) R (all non-detects)	A
	Nitrate as N	10 days	48 hours	J- (all detects) R (all non-detects)	

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

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

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

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
SA207-30BMS (SA207-30B)	Chloride	53 (75-125)	J- (all detects) UJ (all non-detects)	A

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

All sample result verifications were acceptable.

The QAPP PQLs were met with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
All samples in SDG R2844797	Alkalinity	Laboratory reporting limit reported at 200 mg/Kg.	PQL should be reported at 2 mg/Kg per the QAPP.	None	P
All samples in SDG R2844797	Nitrite as N	Laboratory reporting limit reported at 5.0 mg/Kg.	PQL should be reported at 0.1 mg/Kg per the QAPP.	None	P

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R2844797	All analytes reported below the PQL.	J (all detects)	A

VIII. Overall Assessment of Data

The overall assessment of data was acceptable with the following exceptions:

Sample	Compound	Flag	A or P
SA207-30B SA181-20B	Sulfate	R	A
SA207-40B	Chloride	R	A

The Chloride and Sulfate results for the samples listed above were overdiluted.

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, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R2844797

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2844797	SA207-0.5B	Nitrite as N	J- (all detects) R (all non-detects)	A	Technical holding times (h)
R2844797	SA207-10B SA207-30B	Nitrite as N Nitrate as N	J- (all detects) R (all non-detects) J- (all detects) R (all non-detects)	A	Technical holding times (h)
R2844797	SA207-30B	Chloride	J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
R2844797	SA207-0.5B SA207-10B SA207-20B SA207-30B SA207-40B SA181-0.5B SA181-10B SA181-20B SA181-30B SA181-35B	Alkalinity Nitrite as N	None None	P	Sample result verification
R2844797	SA207-0.5B SA207-10B SA207-20B SA207-30B SA207-40B SA181-0.5B SA181-10B SA181-20B SA181-30B SA181-35B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
R2844797	SA207-30B SA181-20B	Sulfate	R	A	Overall assessment of data (o)
R2844797	SA207-40B	Chloride	R	A	Overall assessment of data (o)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R2844797

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R2844797

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 21257E6
SDG #: R2844797
Laboratory: Columbia Analytical Services

Date: 8/15/09
Page: 1 of 1
Reviewer: W
2nd Reviewer: W

METHOD: (Analyte) Alkalinity (Total) (SM2320B), Ammonia-N (EPA Method 350.1M), Bromide, Chloride, Nitrate-N, Nitrite-N, Sulfate (EPA SW846 Method 9056), Cyanide (EPA SW846 Method 9012), Hexavalent Chromium (EPA SW846 Method 7199), pH (EPA SW846 Method 9045), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), ~~Percent Solids (EPA Method 160.3)~~, TOC (Lloyd/Kahn)

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 6/30/08 - 7/2/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	SW	3 MS/Dup
V	Duplicates	A	
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	SW	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	N	

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

Validated Samples: Soil

1	SA207-0.5B	11	SA207-30BMS	21	MB	31	
2	SA207-10B	12	SA207-30BDUP	22		32	
3	SA207-20B	13		23		33	
4	SA207-30B	14		24		34	
5	SA207-40B	15		25		35	
6	SA181-0.5B	16		26		36	
7	SA181-10B	17		27		37	
8	SA181-20B	18		28		38	
9	SA181-30B	19		29		39	
10	SA181-35B	20		30		40	

Notes: _____

LDC #: 21376b
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JM
2nd Reviewer: [illegible]

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.		✓		
Cooler temperature criteria was met.	✓			
II. ICP/MA Instrument QC and Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)	✓			
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix Spike/Matrix Spike Duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory Control Samples				
Was an LCS anaytzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Performance Evaluation and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 21576
SDG #: full cover

VALIDATION FINDINGS CHECKLIST

Reviewer: MM
2nd Reviewer: [signature]

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
Overall assessment of data was found to be acceptable.	✓			
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 2157B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: [signature]
2nd reviewer: [signature]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-10	Soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
QC11,12	Soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
↓ 12	↓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 21756b6
SDG #: [illegible]

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled dates have exceeded the technical holding time.
X N N/A Were all samples preserved as applicable to each method ?
(Y) N N/A Were all cooler temperatures within validation criteria?

Method:	~~9056~~	9056	9056			
Parameters:	NO_2-N	NO_2-N	NO_3-N			
Technical holding time: #	~~48hr~~	48hr	48hr			

Sample ID	Sampling date	Extraction Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
1	6/30/08	7/2/08 1230	7/8/08 1708	(6 days)			J-/R/A (lw)
2	↓	↓	7/8/08 1819	7/8/08 1804	(6 days)		↓
4,11,12	↓	↓	7/10/08 637	7/10/08 637	(10 days)		↓

HT.6

from extraction to analysis

LDC #: 21257B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

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

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

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125 (85-115% for Method 300.0)? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

LEVEL IV ONLY:

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

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
1	11	Soil	Cl	53	4	J-/UJ/A (all)
			SO4	190 * +	—	ND qual *
			Alk	230 * +	—	J

Comments: Parent Sample was reported ND. + Spike levels at RL or 1/2 RL.

SO4 from raw data 3813 - 1941 / 2000 = 93.6%

Alk from raw data 23.0 - 14.1 / 10 = 89%

LDC #: 21254C6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: MM
2nd Reviewer

METHOD: Inorganics, Method See cover

QAPP limits

#	Sample ID	Analyte	Lab Reporting Limit (units)	RDL (units)	Finding	Qualifications
1	All	Alkalinity	200 mg/kg	2 mg/kg	Lab limit > QAPP limit	none/p
	↓	NO_2-N	5.0 ↓	0.1 ↓	↓	↓
2	4, 8	SO4			over diluted	R/A (o)
					↓	↓
3	5	Cl				

Comments:

LDC #: 21757b6
SDG #: See cover

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer: L
2nd Reviewer: Q

Method: Inorganics, Method See cover

The correlation coefficient (r) for the calibration of CN was recalculated. Calibration date: 7/10/2008

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

%R = Found X 100 / True

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Response	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	CN	s1	0	0.00424	*0.999985*	0.999985	Y
		s2	0.01	0.01326			
		s3	0.02	0.02168			
		s4	0.05	0.04724			
		s5	0.1	0.09358			
		s6	0.2	0.18346			
		s7	0.5	0.44546			
		s8	1	0.8858			
CCV Calibration verification	NH3N	1.50	1.69		94	NR	Y
CCV Calibration verification	CN6T	0.50	0.49>		99	NR	Y
CCV Calibration verification	Surfactant	0.300	0.3075		1025	1025	Y

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

LDC #: 21876b
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: MM
2nd Reviewer: [signature]

METHOD: Inorganics, Method See cover

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

$$\%R = \frac{Found}{True} \times 100$$

Where,
Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

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

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$

Where,
S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	CN	19.1	20	95.5	96	Y
11	Matrix spike sample	BY	(SSR-SR) 18.6	22.4	83	83	↓
12	Duplicate sample	TOC	96.4	86.2	11	11	↓

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

LDC #: 21576b
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Inorganics, Method See cover

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for 7 reported with a positive detect were recalculated and verified using the following equation:

Concentration = Recalculation:

$SO_4 = (0.0201616 \times Area - 0.0215664) \times DF$

$H_2SO_4 = (0.0201616 \times 107.528 - 0.0215664) \times 100 = 214.64 mg/L$

$Final = \frac{214.64 \times 250}{5 \times 0.994} = 1355 mg/kg$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	2	Bicarbonate Alk	868	868	Y
		Carbonate Alk	2260	2260	
		Cl	63700	63700	
		pH (S.U.)	9.99	9.99	
		SO4	2760	2760	
		Surfactants	4.88	4.88	
		Total Alk	3130	7130	
		TOC	96700	96700	
		T-P	78.2	78.1	

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: July 1 through July 2, 2008

LDC Report Date: August 14, 2009

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844803

Sample Identification

M-55B
M-55DB
M-78B
M-65B
EB070208GW1
M-55BDL1
M-55BDL2
M-55DBDL1
M-55DBDL2
M-78BDL1
M-78BDL2
M-78BMS
M-78BDUP
M-78BMSDL1
M-78BDUPDL1
M-78BMSDL2
M-78BDUPDL2

Introduction

This data review covers 17 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 120.1 for Conductivity, EPA Method 218.6 for Hexavalent Chromium, EPA Method 350.1M for Ammonia as Nitrogen, EPA Method 365.1 for Total Phosphorus, EPA SW 846 Method 9012 for Total Cyanide, EPA SW 846 Method 9040 for pH, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, and Sulfate, EPA SW 846 Method 9060 for Total Organic Carbon, Standard Method 2320B for Alkalinity, Standard Method 2540C for Total Dissolved Solids, Standard Method 2540D for Total Suspended Solids, and Standard Method 5540C for Surfactants.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

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

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
M-55B M-78B M-78BMS M-78BDUP	Total organic carbon	30 days	28 days	J- (all detects) UJ (all non-detects)	P
M-55DB	Total organic carbon	31 days	28 days	J- (all detects) UJ (all non-detects)	P
M-65B EB070208GW1	Total organic carbon	29 days	28 days	J- (all detects) UJ (all non-detects)	P

All samples were received in good condition with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
M-55DB M-78B M-65B M-78BMS M-78BDUP M-78BMSDL1 M-78BDUPDL1 M-78BMSDL2 M-78BDUPDL2 M-55DBDL1 M-55DBDL2 M-78BDL1 M-78BDL2	Total cyanide	Sample pH reported at approximately 10 upon receipt by the laboratory.	Sample must be preserved at pH >12.	J- (all detects) R (all non-detects)	P

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

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

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

Sample EB070208GW1 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB070208GW1	7/2/08	Conductivity pH	3.2 umhos/cm 6.09 S.U.	M-65B

Sample FB062408GWAREA1 (from SDG R2844650) was identified as a field blank. No contaminant concentrations were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB062408GWAREA1	6/24/08	Conductivity pH	1.96 umhos/cm 5.87 S.U.	M-55B M-55DB M-78B M-65B

Sample PB061608B (from SDG R2844538) was identified as a pump blank. No contaminant concentrations were found in this blank with the following exceptions:

Pump Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
PB061608B	6/16/08	Total alkalinity Bicarbonate alkalinity Conductivity pH	2.90 mg/L 2.90 mg/L 1.65 umhos/cm 6.07 S.U.	M-55B M-55DB M-78B M-65B

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

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) samples were reviewed for each matrix as applicable. Percent recoveries (%R) were not within QC limits. Since the sample concentration was greater than the spiked concentration, no data were qualified.

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

The QAPP PQLs were met with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
M-55B M-55DB M-78B M-65B EB070208GW1	Nitrite as N	Laboratory reporting limit reported at 0.05 mg/L.	PQL should be reported at 0.01 mg/L per the QAPP.	None	P

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R2844803	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

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

Sample	Analyte	Flag	A or P
M-55B M-55DB M-55BDL2 M-55DBDL2 M-78BDL1 M-78BDL2	Total cyanide	X	A

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

IX. Field Duplicates

Samples M-55B and M-55DB, samples M-55BDL1 and M-55DBDL1, and samples M-55BDL2 and M-55DBDL2 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-55B	M-55DB				
Ammonia as N	1.88 mg/L	1.95 mg/L	4 (≤30)	-	-	-
Bicarbonate alkalinity	153 mg/L	152 mg/L	1 (≤30)	-	-	-
Total alkalinity	153 mg/L	152 mg/L	1 (≤30)	-	-	-
Bromide	2880 mg/L	2780 mg/L	4 (≤30)	-	-	-
Chloride	1810 mg/L	1710 mg/L	6 (≤30)	-	-	-
Conductivity	10700 umhos/cm	10300 umhos/cm	4 (≤30)	-	-	-
Hexavalent chromium	11.7 mg/L	12.6 mg/L	7 (≤30)	-	-	-
Nitrate as N	27.1 mg/L	27.5 mg/L	1 (≤30)	-	-	-
pH	7.11 S.U.	7.14 S.U.	0 (≤30)	-	-	-
Sulfate	1210 mg/L	1160 mg/L	4 (≤30)	-	-	-
Surfactants	1.71 mg/L	1.56 mg/L	9 (≤30)	-	-	-
Total cyanide	2.64 mg/L	3.14 mg/L	17 (≤30)	-	-	-
Total dissolved solids	9520 mg/L	9410 mg/L	1 (≤30)	-	-	-
Total organic carbon (AVG)	1.86 mg/L	1.00U mg/L	-	0.86 (≤1.00)	-	-

Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-55BDL1	M-55DBDL1				
Total cyanide	0.466	0.459	2 (≤30)	-	-	-

Analyte	Concentration (mg/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-55BDL2	M-55DBDL2				
Total cyanide	2.64	3.14	17 (≤30)	-	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R2844803

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2844803	M-55B M-78B M-55DB M-65B EB070208GW1	Total organic carbon	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
R2844803	M-55DB M-78B M-65B M-55DBDL1 M-55DBDL2 M-78BDL1 M-78BDL2	Total cyanide	J- (all detects) R (all non-detects)	P	Sample condition (preservation) (pH)
R2844803	M-55B M-55DB M-78B M-65B EB070208GW1	Nitrite as N	None	P	Sample result verification
R2844803	M-55B M-55DB M-78B M-65B EB070208GW1 M-55BDL1 M-55BDL2 M-55DBDL1 M-55DBDL2 M-78BDL1 M-78BDL2	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
R2844803	M-55B M-55DB M-55BDL2 M-55DBDL2 M-78BDL1 M-78BDL2	Total cyanide	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R2844803

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R2844803

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257F6
SDG #: R2844803
Laboratory: Columbia Analytical Services

Date: 8/13/08
Page: 1 of 1
Reviewer: K
2nd Reviewer: C

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1M), Bromide, Chloride, Nitrate-N, Nitrite-N, Sulfate (EPA SW846 Method 9056), Conductivity (EPA Method 120.1), Total Cyanide (EPA SW846 Method 9012), Hexavalent Chromium (EPA Method 218.6), pH (EPA SW846 Method 9040), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), TDS (SM2540C), TSS (SM2540D), TOC (EPA SW846 Method 9060)

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 7/1/08, 7/2/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	SW	3 MS/Dup
V	Duplicates	A	
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	SW	
VIII.	Overall assessment of data	SW	
IX.	Field duplicates	SW	(1,2) (6,8) (7,9)
X.	Field blanks	SW	EB=5, Pump Blank=PB061608B (R2844538), FB=FB062408GWAREA1(R2844650)

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: All

1	M-55B	11	M-78BDL2	21	MB	31	
2	M-55DB	12	M-78BMS	22		32	
3	M-78B	13	M-78BDUP	23		33	
4	M-65B	14	M-78BMSDL1	24		34	
5	EB070208GW1	15	↓ DUPDL1	25		35	
6	M-55BDL1	16	MSDL2	26		36	
7	M-55BDL2	17	↓ DUPDL2	27		37	
8	M-55DBDL1	18		28		38	
9	M-55DBDL2	19		29		39	
10	M-78BDL1	20		30		40	

Notes: _____

LDC #: 215776
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: [signature]
2nd reviewer: [signature]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-5	Aq	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
6-11	✓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
M12,13	Aq	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
✓ 13	✓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
14-17	✓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 21257F6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: VT
2nd reviewer: [illegible]

All circled dates have exceeded the technical holding time.
Y (N) N/A Were all samples preserved as applicable to each method ?
(Y) N N/A Were all cooler temperatures within validation criteria?

Method:		9060		9012			
Parameters:		TOC		CN			
Technical holding time:		28 dy		14 dy			
Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
1, 3, 12, 13	7/1/08	7/24/08	(30 days)				J-/UJ/P (W)
2	↓	8/1/08	(31 days)				↓
4, 5	7/2/08	7/31/08	(29 days)				↓
2-4, 8-17				pH=10 (pH 7 12)			J-/R/P (pH)

LDC #: 21257F6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: W
2nd Reviewer: 9

METHOD: Inorganics, Method See Cover
(Y) N N/A Were field blanks identified in this SDG?
(Y) N N/A Were target analytes detected in the field blanks?
Blank units: _____ **Associated sample units:** _____
Sampling date: 6/24/08 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: FB Associated Samples: 1-4

Analyte	Blank ID	Sample Identification								
	FB062408GW AREA1	Action Level	No samples were qualified							
Conductivity (umhos/cm)	1.96	19.6								
pH (S.U.)	5.87									

Sampling date: 6/16/08 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: Pump Blank Associated Samples: 1-4

Analyte	Blank ID	Sample Identification								
	PB061608B	Action Level	No samples were qualified							
Total Alkalinity (mg/L)	2.90	29.0								
Bicarbonate Alkalinity (mg/L)	2.90	29.0								
Conductivity (umhos/cm)	1.65	16.5								
pH (S.U.)	6.07									

Sampling date: 7/2/08 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 4

Analyte	Blank ID	Sample Identification								
	5	Action Level	No samples were qualified							
Conductivity (umhos/cm)	3.2	32.0								
pH (S.U.)	6.09									

LDC #: 2175976
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

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

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

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125 (85-115% for Method 300.0)? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

LEVEL IV ONLY:

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

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
1	12	Aq	Surfactants	73	1-3	No qual (>4X)

Comments:

MS.6

LDC #: 21857F6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: MH
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

#	Sample ID	Analyte	Lab Reporting Limit (units)	~~RDL (units)~~ APP limits	Finding	Qualifications
1	~~All~~ 1-5	NO_3-N	0.05 mg/L	0.01 mg/L	lab limit > APP limit	none/p

Comments:

LDC #: 21257F6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: MH
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
1		1,2	CN		X/A (the too negative)
					↓ (too detected)
2		7,9-11	CN		

Comments: # 3. Abs > 0 in raw data.

LDC#: 21257F6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: W
2nd Reviewer: W

Inorganics, Method See Cover

(Y) N NA Were field duplicate pairs identified in this SDG?
(Y) N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (mg/L)		RPD (≤30)	Difference	Limits	Qualification (Parent only)
	1	2				
Ammonia as N	1.88	1.95	4			
Bicarbonate Alkalinity	153	152	1			
Total Alkalinity	153	152	1			
Bromide	2880	2780	4			
Chloride	1810	1710	6			
Conductivity (umhos/cm)	10700	10300	4			
Hexavalent Chromium	11.7	12.6	7			
Nitrate as N	27.1	27.5	1			
pH (S.U.)	7.11	7.14	0			
Sulfate	1210	1160	4			
Surfactants	1.71	1.56	9			
Total Cyanide	2.64	3.14	17			
TDS	9520	9410	1			
TOC AVG	1.86	1.00U		0.86	(≤1.00)	

Analyte	Concentration (mg/L)		RPD (≤30)	Difference	Limits	Qualification (Parent only)
	6	8				
Cyanide	0.466	0.459	2			

LDC#: 21257F6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer:
2nd Reviewer:

Inorganics, Method See Cover

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

Analyte	Concentration (mg/L)		RPD (≤30)	Difference	Limits	Qualification (Parent only)
	7	9				
Cyanide	2.64	3.14	17			

V:\FIELD DUPLICATES\FD_inorganic\21257F6.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: July 7 through July 8, 2008

LDC Report Date: August 17, 2009

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844862

Sample Identification

SA47-0.5B
SA47-10B
SA47-20B
SA47-30B
SA47-35B
SA183-0.5B
SA67-0.5B
SA67-10B
SA67-20B
SA67-30B
SA67-35B
RSAN2-0.5B
RSAN2-10B
RSAN2-20B

Introduction

This data review covers 14 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per ~~EPA Method 160.3 for Percent Solids~~, EPA Method 350.1M for Ammonia as Nitrogen, EPA Method 365.1 for Total Phosphorus, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA SW 846 Method 9012 for Total Cyanide, EPA SW 846 Method 9045 for pH, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, and Sulfate, Standard Method 2320B for Alkalinity, Standard Method 5540C for Surfactants, and Lloyd/Kahn Method for Total Organic Carbon.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

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

Sample	Analyte	Total Time From Sample Extraction Until Analysis	Required Holding Time From Sample Extraction Until Analysis	Flag	A or P
SA67-30B	Nitrite as N	49 hours	48 hours	J- (all detects) UJ (all non-detects)	A
SA67-35B	Nitrite as N	49.25 hours	48 hours	J- (all detects) UJ (all non-detects)	A
RSAN2-10B	Nitrite as N	49.5 hours	48 hours	J- (all detects) UJ (all non-detects)	A
RSAN2-20B	Nitrite as N	49.75 hours	48 hours	J- (all detects) UJ (all non-detects)	A

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

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

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

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

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

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

The QAPP PQLs were met with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
All samples in SDG R2844862	Alkalinity	Laboratory reporting limit reported at 200 mg/Kg.	PQL should be reported at 2 mg/Kg per the QAPP.	None	P
All samples in SDG R2844862	Nitrite as N	Laboratory reporting limit reported at 5.0 mg/Kg.	PQL should be reported at 0.1 mg/Kg per the QAPP.	None	P

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R2844862	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

The overall assessment of data was acceptable with the following exceptions:

Sample	Compound	Flag	A or P
RSAN2-20B	Sulfate	X	A
SA47-0.5B SA67-0.5B SA67-35B RSAN2-0.5B RSAN2-10B	Chloride	X	A

The Chloride and Sulfate results for the samples listed above were overdiluted.

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, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R2844862

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2844862	SA67-30B SA67-35B RSAN2-10B RSAN2-20B	Nitrite as N	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
R2844862	SA47-0.5B SA47-10B SA47-20B SA47-30B SA47-35B SA183-0.5B SA67-0.5B SA67-10B SA67-20B SA67-30B SA67-35B RSAN2-0.5B RSAN2-10B RSAN2-20B	Alkalinity Nitrite as N	None None	P	Sample result verification
R2844862	SA47-0.5B SA47-10B SA47-20B SA47-30B SA47-35B SA183-0.5B SA67-0.5B SA67-10B SA67-20B SA67-30B SA67-35B RSAN2-0.5B RSAN2-10B RSAN2-20B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
R2844862	RSAN2-20B	Sulfate	X	A	Overall assessment of data (o)
R2844862	SA47-0.5B SA67-0.5B SA67-35B RSAN2-0.5B RSAN2-10B	Chloride	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R2844862

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R2844862

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257G6
SDG #: R2844862
Laboratory: Columbia Analytical Services

Date: 8/13/09
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1M), Bromide, Chloride, Nitrate-N, Nitrite-N, Sulfate (EPA SW846 Method 9056), Cyanide (EPA SW846 Method 9012), Hexavalent Chromium (EPA SW846 Method 7199), pH (EPA SW846 Method 9045), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), ~~Percent Solids (EPA Method 160.3)~~, TOC (Lloyd/Kahn)

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 7/7/08, 7/8/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	N	client specified.
V	Duplicates	N	
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	SW	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	N	

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

Validated Samples: Soil

1	SA47-0.5B	11	SA67-35B	21	MB	31	
2	SA47-10B	12	RSAN2-0.5B	22		32	
3	SA47-20B	13	RSAN2-10B	23		33	
4	SA47-30B	14	RSAN2-20B	24		34	
5	SA47-35B	15		25		35	
6	SA183-0.5B	16		26		36	
7	SA67-0.5B	17		27		37	
8	SA67-10B	18		28		38	
9	SA67-20B	19		29		39	
10	SA67-30B	20		30		40	

Notes:

LDC #: 21157G6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-14	soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 21257G6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled dates have exceeded the technical holding time.

Y N N/A (N/A circled) Were all samples preserved as applicable to each method ?
Y N N/A (Y circled) Were all cooler temperatures within validation criteria?

Method:			9056				
Parameters:			NO2-N				
Technical holding time: *			48hrs				
Sample ID	**Sampling date**	**Extraction date** (~~Analysis~~)	**Analysis date**	**Analysis date**	**Analysis date**	**Analysis date**	**Qualifier**
10	7/8/08	7/9/08 1500	7/11/08 1603	(~~49 hrs~~)	(49 hrs)		J/UJ/A (review)
11	↓	↓	7/11/08 1617		(49.25 hrs)		↓
13			1632		(49.5 hrs)		
14	↓	↓	↓ 1646		(49.75 hrs)		↓

* from extraction to analysis

LDC #: 21959G6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: MM
2nd Reviewer

METHOD: Inorganics, Method See cover

QAPP limits

#	Sample ID	Analyte	Lab Reporting Limit (units)	RDL (units)	Finding	Qualifications
1	All	Alkalinity	200 mg/kg	2 mg/kg	Lab limit > QAPP limit	none/p
	↓	NO_2-N	5.0 ↓	0.1 ↓	↓	↓
2	14	SO4			over limited	R/A (0)
					↓	↓
3	1, 7, 11, 12, 13,	Cl				

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: July 8 through July 11, 2008

LDC Report Date: August 14, 2009

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844866

Sample Identification

M-39B
TR-2B
M-69B
I-BB
M-96BF
M-48B
TR-4B
CLD3-RB
CLD1-RB
M-124B
M-123B
I-BBMS
I-BBDUP
M-96BFMS
M-96BFDUP

Introduction

This data review covers 15 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 120.1 for Conductivity, EPA Method 218.6 for Hexavalent Chromium, EPA Method 350.1M for Ammonia as Nitrogen, EPA Method 365.1 for Total Phosphorus, EPA SW 846 Method 9012 for Total Cyanide, EPA SW 846 Method 9040 for pH, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, and Sulfate, EPA SW 846 Method 9060 for Total Organic Carbon, Standard Method 2320B for Alkalinity, Standard Method 2540C for Total Dissolved Solids, Standard Method 2540D for Total Suspended Solids, and Standard Method 5540C for Surfactants.

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

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

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

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

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

Sample FB062408GWAREA1 (from SDG R2844650) was identified as a field blank. No contaminant concentrations were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB062408GWAREA1	6/24/08	Conductivity pH	1.96 umhos/cm 5.87 S.U.	All samples in SDG R2844866

Sample PB061608B (from SDG R2844538) was identified as a pump blank. No contaminant concentrations were found in this blank with the following exceptions:

Pump Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
PB061608B	6/16/08	Total alkalinity Bicarbonate alkalinity Conductivity pH	2.90 mg/L 2.90 mg/L 1.65 umhos/cm 6.07 S.U.	M-39B TR-2B M-69B I-BB M-96BF M-48B CLD1-RB M-124B M-123B

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

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
M-96BFMS (M-96BF M-48B TR-4B)	Total cyanide	0 (75-125)	J- (all detects) R (all non-detects)	A

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

The QAPP PQLs were met with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
All samples in SDG R2844866	Nitrite as N	Laboratory reporting limit reported at 0.05 mg/L.	PQL should be reported at 0.01 mg/L per the QAPP.	None	P

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R2844866	All analytes reported below the PQL.	J (all detects)	A

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, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R2844866

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2844866	M-96BF M-48B TR-4B	Total cyanide	J- (all detects) R (all non-detects)	A	Matrix spike analysis (%R) (m)
R2844866	M-39B TR-2B M-69B I-BB M-96BF M-48B TR-4B CLD3-RB CLD1-RB M-124B M-123B	Nitrite as N	None	P	Sample result verification
R2844866	M-39B TR-2B M-69B I-BB M-96BF M-48B TR-4B CLD3-RB CLD1-RB M-124B M-123B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R2844866

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R2844866

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257H6
SDG #: R2844866
Laboratory: Columbia Analytical Services

Date: 8/13/09
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1M), Bromide, Chloride, Nitrate-N, Nitrite-N, Sulfate (EPA SW846 Method 9056), Conductivity (EPA Method 120.1), Cyanide (EPA SW846 Method 9012), Hexavalent Chromium (EPA Method 218.6), pH (EPA SW846 Method 9040), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), TDS (SM2540C), TSS (SM2540D), TOC (EPA SW846 Method 9060)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/8/08 - 7/11/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	SW	3 MS/MSD
V	Duplicates	A	
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	SW	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	SW	Pump Blank = PB061608B3 (R2844538) FB = FB061408 GW AREA 1 (R2844650)

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: All

1	M-39B	11	M-123B	21	MB	31	
2	TR-2B	12	I-BBMS	22		32	
3	M-69B	13	I-BBDUP	23		33	
4	I-BB	14	M-96BFMS	24		34	
5	M-96BF	15	M-96BFDUP	25		35	
6	M-48B	16		26		36	
7	TR-4B	17		27		37	
8	CLD3-RB	18		28		38	
9	CLD1-RB	19		29		39	
10	M-124B	20		30		40	

Notes:

LDC #: 21257H6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: [signature]
2nd reviewer: [signature]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-11	AQ	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
~12,13	AQ	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
14,15	↓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
15	↓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 21257H6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: LW
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Blank units: _____ **Associated sample units:** _____

Sampling date: 6/24/08 Soil factor applied _____

Field blank type: (circle one) Field Blank / Rinsate / Other: FB Associated Samples: All

Analyte	Blank ID	Sample Identification								
	FB062408GW AREA1	Action Level	No samples were qualified							
Conductivity (umhos/cm)	1.96	19.6								
pH (S.U.)	5.87									

Sampling date: 6/16/08 Soil factor applied _____

Field blank type: (circle one) Field Blank / Rinsate / Other: Pump Blank Associated Samples: 1-6, 9-11

Analyte	Blank ID	Sample Identification								
	PB061608B	Action Level	No samples were qualified							
Total Alkalinity (mg/L)	2.90	29.0								
Bicarbonate Alkalinity (mg/L)	2.90	29.0								
Conductivity (umhos/cm)	1.65	16.5								
pH (S.U.)	6.07									

LDC #: 21957H6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

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

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

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125 (85-115% for Method 300.0)? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

LEVEL IV ONLY:

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

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
1	14	Aq	CN	0	5-7	J-/R/A (m)

Comments:

LDC #: 21547H6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: MH
2nd Reviewer: Q

METHOD: Inorganics, Method See cover

#	Sample ID	Analyte	Lab Reporting Limit (units)	~~RDL (units)~~ APP limits	Finding	Qualifications
1	All	NO2-N	0.05 mg/L	0.01 mg/L	lab limit > APP limit	none/p

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: July 8 through July 9, 2008

LDC Report Date: August 17, 2009

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844885

Sample Identification

RSAN2-30B
RSAN2-30BD
RSAN2-35B
RSAO2-0.5B
RSAO2-10B
RSAO2-20B
RSAO2-20BD
RSAO2-30B
RSAO2-33B
SA183-10B
SA183-10BD
SA183-20B
SA183-30B
SA183-33B
RSA04-0.5B
RSA04-10B
RSA04-20B
RSA04-30B
RSA04-36B

Introduction

This data review covers 19 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 350.1M for Ammonia as Nitrogen, EPA Method 365.1 for Total Phosphorus, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA SW 846 Method 9012 for Total Cyanide, EPA SW 846 Method 9045 for pH, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, and Sulfate, Standard Method 2320B for Alkalinity, Standard Method 5540C for Surfactants, and Lloyd/Kahn Method for Total Organic Carbon.

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

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

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

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

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

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

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

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

The QAPP PQLs were met with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
All samples in SDG R2844885	Alkalinity	Laboratory reporting limit reported at 200 mg/Kg.	PQL should be reported at 2 mg/Kg per the QAPP.	None	P
All samples in SDG R2844885	Nitrite as N	Laboratory reporting limit reported at 5.0 mg/Kg.	PQL should be reported at 0.1 mg/Kg per the QAPP.	None	P

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R2844885	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

The overall assessment of data was acceptable with the following exceptions:

Sample	Compound	Flag	A or P
RSAN2-30B RSAN2-30BD RSAN2-35B RSAO2-30B	Chloride Sulfate	R R	A
RSAO2-0.5B RSAO2-33B	Chloride	R	A
RSAO2-20B RSAO2-20BD SA183-20B SA183-30B RSA04-20B RSA04-30B RSA04-36B	Sulfate	R	A

The Chloride and Sulfate results for the samples listed above were overdiluted.

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

IX. Field Duplicates

Samples RSAN2-30B and RSAN2-30BD, samples RSAO2-20B and RSAO2-20BD, and samples SA183-10B and SA183-10BD were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAN2-30B	RSAN2-30BD				
Bicarbonate alkalinity	756 mg/Kg	392 mg/Kg	-	364 (≤333)	J (all detects)	A
Total alkalinity	888 mg/Kg	392 mg/Kg	-	496 (≤333)	J (all detects)	A
pH	8.42 S.U.	8.24 S.U.	2 (≤50)	-	-	-
Total organic carbon	300U mg/Kg	310 mg/Kg	-	10 (≤300)	-	-
Total phosphorus	799 mg/Kg	838 mg/Kg	5 (≤50)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAO2-20B	RSAO2-20BD				
Bicarbonate alkalinity	412 mg/Kg	273U mg/Kg	-	139 (≤273)	-	-
Total alkalinity	433 mg/Kg	276 mg/Kg	-	157 (≤273)	-	-
Chloride	142 mg/Kg	74.8 mg/Kg	-	67.2 (≤27.3)	J (all detects)	A
pH	8.44 S.U.	8.25 S.U.	2 (≤50)	-	-	-
Total organic carbon	300U mg/Kg	618 mg/Kg	-	318 (≤300)	J (all detects) UJ (all non-detects)	A
Total phosphorus	544 mg/Kg	659 mg/Kg	19 (≤50)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA183-10B	SA183-10BD				
Bicarbonate alkalinity	268 mg/Kg	262 mg/Kg	-	6 (≤227)	-	-
Total alkalinity	331 mg/Kg	375 mg/Kg	-	44 (≤227)	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA183-10B	SA183-10BD				
pH	9.11 S.U.	8.91 S.U.	2 (≤50)	-	-	-
Sulfate	73.5 mg/Kg	69.6 mg/Kg	-	3.9 (≤22.7)	-	-
Total organic carbon	806 mg/Kg	862 mg/Kg	-	56 (≤300)	-	-
Total phosphorus	885 mg/Kg	851 mg/Kg	4 (≤50)	-	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R2844885

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2844885	RSAN2-30B RSAN2-30BD RSAN2-35B RSAO2-0.5B RSAO2-10B RSAO2-20B RSAO2-20BD RSAO2-30B RSAO2-33B SA183-10B SA183-10BD SA183-20B SA183-30B SA183-33B RSA04-0.5B RSA04-10B RSA04-20B RSA04-30B RSA04-36B	Alkalinity Nitrite as N	None None	P	Sample result verification
R2844885	RSAN2-30B RSAN2-30BD RSAN2-35B RSAO2-0.5B RSAO2-10B RSAO2-20B RSAO2-20BD RSAO2-30B RSAO2-33B SA183-10B SA183-10BD SA183-20B SA183-30B SA183-33B RSA04-0.5B RSA04-10B RSA04-20B RSA04-30B RSA04-36B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
R2844885	RSAN2-30B RSAN2-30BD RSAN2-35B RSAO2-30B	Chloride Sulfate	R R	A	Overall assessment of data (o)
R2844885	RSAO2-0.5B RSAO2-33B	Chloride	R	A	Overall assessment of data (o)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2844885	RSAO2-20B RSAO2-20BD SA183-20B SA183-30B RSA04-20B RSA04-30B RSA04-36B	Sulfate	R	A	Overall assessment of data (o)
R2844885	RSAN2-30B RSAN2-30BD	Bicarbonate alkalinity Total alkalinity	J (all detects) J (all detects)	A	Field duplicates (Difference) (fd)
R2844885	RSAO2-20B RSAO2-20BD	Chloride	J (all detects)	A	Field duplicates (Difference) (fd)
R2844885	RSAO2-20B RSAO2-20BD	Total organic carbon	J (all detects) UJ (all non-detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R2844885

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R2844885

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257I6
SDG #: R2844885
Laboratory: Columbia Analytical Services

Date: 8/14/09
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1M), Bromide, Chloride, Nitrate-N, Nitrite-N, Sulfate (EPA SW846 Method 9056), Cyanide (EPA SW846 Method 9012), Hexavalent Chromium (EPA SW846 Method 7199), pH (EPA SW846 Method 9045), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), ~~Percent Solids (EPA Method 160.3)~~, TOC (Lloyd/Kahn)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/8/08, 7/9/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	N	Client specified
V	Duplicates	N	
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	SW	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	(1,2), (6,7), (10,11)
X	Field blanks	N	

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

Validated Samples: Soil

1	RSAN2-30B	11	SA183-10BD	21	MB	31	
2	RSAN2-30BD	12	SA183-20B	22		32	
3	RSAN2-35B	13	SA183-30B	23		33	
4	RSAO2-0.5B	14	SA183-33B	24		34	
5	RSAO2-10B	15	RSA04-0.5B	25		35	
6	RSAO2-20B	16	RSA04-10B	26		36	
7	RSAO2-20BD	17	RSA04-20B	27		37	
8	RSAO2-30B	18	RSA04-30B	28		38	
9	RSAO2-33B	19	RSA04-36B	29		39	
10	SA183-10B	20		30		40	

Notes:

LDC #: 21597 3C
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: [signature]
2nd reviewer: [signature]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-19	soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 21254J6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 1 of 1
Reviewer: MH
2nd Reviewer: [signature]

METHOD: Inorganics, Method See cover

QAPP limits

#	Sample ID	Analyte	Lab Reporting Limit (units)	RDL (units)	Finding	Qualifications
1	All	Alkalinity NO_2-N	200 mg/kg 5.0	2 mg/kg 0.1	Lab limit > QAPP limit	none/p
2	1, 2, 3, 8,	Cl, SO4			~~SO~~ over diluted	R (A (o)
3	4, 9	Cl				
4	6, 7, 12, 13, 17, 18, 19	SO4				

Comments:

ABVCRDL.6

LDC#: 21257I6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: 1
2nd Reviewer:

Inorganics, Method See Cover

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

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	1	2				
Bicarbonate Alkalinity	756	392		364	(≤333)	J det / A (fd)
Total Alkalinity	888	392		496	(≤333)	J det / A (fd)
pH (S.U.)	8.42	8.24	2			
TOC	300U	310		10	(≤300)	
Total Phosphorus	799	838	5			

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	6	7				
Bicarbonate Alkalinity	412	273U		139	(≤273)	
Total Alkalinity	433	276		157	(≤273)	
Chloride	142	74.8		67.2	(≤27.3)	J det / A (fd)
pH (S.U.)	8.44	8.25	2			
TOC	300U	618		318	(≤300)	J / UJ / A (fd)
Total Phosphorus	544	659	19			

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	10	11				
Bicarbonate Alkalinity	268	262		6	(≤227)	
Total Alkalinity	331	375		44	(≤227)	
pH (S.U.)	9.11	8.91	2			
Sulfate	73.5	69.6		3.9	(≤22.7)	

LDC#: 21257I6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer:
2nd Reviewer:

Inorganics, Method See Cover

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

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	10	11				
TOC	806	862		56	(≤300)	
Total Phosphorus	885	851	4			

V:\FIELD DUPLICATES\FD_inorganic\21257I6.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: July 9 through July 10, 2008

LDC Report Date: August 17, 2009

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844902

Sample Identification

SA46-0.5B
SA46-10B
SA46-20B
SA46-30B
SA46-30BD
SA48-0.5B
SA48-10B
SA48-20B
SA48-30B
SA48-35B
RSAJ7-0.5B
RSAJ7-10B
RSAJ7-20B
RSAK7-0.5B
RSAK7-10B
RSAK7-10BD
RSAK7-20B
RSAK7-27B

Introduction

This data review covers 18 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 350.1M for Ammonia as Nitrogen, EPA Method 365.1 for Total Phosphorus, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA SW 846 Method 9012 for Total Cyanide, EPA SW 846 Method 9045 for pH, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, and Sulfate, Standard Method 2320B for Alkalinity, Standard Method 5540C for Surfactants, and Lloyd/Kahn Method for Total Organic Carbon.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

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

Sample	Analyte	Total Time From Sample Extraction Until Analysis	Required Holding Time From Sample Extraction Until Analysis	Flag	A or P
SA46-30B	Nitrite as N	54 hours	48 hours	J- (all detects) UJ (all non-detects)	A
SA46-30BD	Nitrite as N	54.25 hours	48 hours	J- (all detects) UJ (all non-detects)	A
SA48-0.5B	Nitrite as N	54.5 hours	48 hours	J- (all detects) UJ (all non-detects)	A

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

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

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

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

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

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

The QAPP PQLs were met with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
All samples in SDG R2844902	Alkalinity	Laboratory reporting limit reported at 200 mg/Kg.	PQL should be reported at 2 mg/Kg per the QAPP.	None	P
All samples in SDG R2844902	Nitrite as N	Laboratory reporting limit reported at 5.0 mg/Kg.	PQL should be reported at 0.1 mg/Kg per the QAPP.	None	P

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R2844902	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

The overall assessment of data was acceptable with the following exceptions:

Sample	Compound	Flag	A or P
SA46-30BD SA48-35B	Chloride Sulfate	R R	A

The Chloride and Sulfate results for the samples listed above were overdiluted.

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

IX. Field Duplicates

Samples SA46-30B and SA46-30BD and samples RSAK7-10B and RSAK7-10BD were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA46-30B	SA46-30BD				
Bicarbonate alkalinity	469 mg/Kg	435 mg/Kg	-	34 (≤300)	-	-
Total alkalinity	637 mg/Kg	645 mg/Kg	-	8 (≤300)	-	-
Chloride	1390 mg/Kg	3000U mg/Kg	-	1610 (≤3000)	-	-
Nitrate as N	34.4 mg/Kg	34.7 mg/Kg	1 (≤50)	-	-	-
pH	8.08 S.U.	7.93 S.U.	2 (≤50)	-	-	-
Sulfate	1200 mg/Kg	3000U mg/Kg	-	1800 (≤3000)	-	-
Total Phosphorus	928 mg/Kg	870 mg/Kg	6 (≤50)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAK7-10B	RSAK7-10BD				
Bicarbonate alkalinity	273 mg/Kg	234 mg/Kg	-	39 (≤219)	-	-
Total alkalinity	419 mg/Kg	286 mg/Kg	-	133 (≤219)	-	-
Chloride	43.5 mg/Kg	109 mg/Kg	-	65.5 (≤21.9)	J (all detects)	A
pH	8.61 S.U.	8.83 S.U	3 (≤50)	-	-	-
Sulfate	172 mg/Kg	324 mg/Kg	61 (≤50)	-	J (all detects)	A
TOC	554 mg/Kg	362 mg/Kg	-	192 (≤300)	-	-
Total phosphorus	1100 mg/Kg	888 mg/Kg	21 (≤50)	-	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R2844902

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2844902	SA46-30B SA46-30BD SA48-0.5B	Nitrite as N	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
R2844902	SA46-0.5B SA46-10B SA46-20B SA46-30B SA46-30BD SA48-0.5B SA48-10B SA48-20B SA48-30B SA48-35B RSAJ7-0.5B RSAJ7-10B RSAJ7-20B RSAK7-0.5B RSAK7-10B RSAK7-10BD RSAK7-20B RSAK7-27B	Alkalinity Nitrite as N	None None	P	Sample result verification

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2844902	SA46-0.5B SA46-10B SA46-20B SA46-30B SA46-30BD SA48-0.5B SA48-10B SA48-20B SA48-30B SA48-35B RSAJ7-0.5B RSAJ7-10B RSAJ7-20B RSAK7-0.5B RSAK7-10B RSAK7-10BD RSAK7-20B RSAK7-27B SA46-0.5B SA46-10B SA46-20B SA46-30B SA46-30BD SA48-0.5B SA48-10B SA48-20B SA48-30B SA48-35B RSAJ7-0.5B RSAJ7-10B RSAJ7-20B RSAK7-0.5B RSAK7-10B RSAK7-10BD RSAK7-20B RSAK7-27B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
R2844902	SA46-30BD SA48-35B	Chloride Sulfate	R R	A	Overall assessment of data (o)
R2844902	RSAK7-10B RSAK7-10BD	Chloride	J (all detects)	A	Field duplicates (Difference) (fd)
R2844902	RSAK7-10B RSAK7-10BD	Sulfate	J (all detects)	A	Field duplicates (RPD) (fd)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R2844902

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R2844902

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257J6
SDG #: R2844902
Laboratory: Columbia Analytical Services

Date: 8/16/09
Page: 1 of 1
Reviewer: [signature]
2nd Reviewer: [signature]

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1M), Bromide, Chloride, Nitrate-N, Nitrite-N, Sulfate (EPA SW846 Method 9056), Cyanide (EPA SW846 Method 9012), Hexavalent Chromium (EPA SW846 Method 7199), pH (EPA SW846 Method 9045), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), ~~Percent Solids (EPA Method 160.3)~~, TOC (Lloyd/Kahn)

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 7/9/08, 7/10/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	N	3 client specified.
V	Duplicates	N	
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	SW	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	(4,5) (15,16)
X	Field blanks	N	

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

Validated Samples: soil

1	SA46-0.5B	11	RSAJ7-0.5B	21	MB	31	
2	SA46-10B	12	RSAJ7-10B	22		32	
3	SA46-20B	13	RSAJ7-20B	23		33	
4	SA46-30B	14	RSAK7-0.5B	24		34	
5	SA46-30BD	15	RSAK7-10B	25		35	
6	SA48-0.5B	16	RSAK7-10BD	26		36	
7	SA48-10B	17	RSAK7-20B	27		37	
8	SA48-20B	18	RSAK7-27B	28		38	
9	SA48-30B	19		29		39	
10	SA48-35B	20		30		40	

Notes: _____

LDC #: 21457J6

SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer:

2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-18	Soil	**Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS** TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 21957J6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: MV
2nd reviewer: [illegible]

All circled dates have exceeded the technical holding time.
N N N/A Were all samples preserved as applicable to each method ?
(Y) N N/A Were all cooler temperatures within validation criteria?

Method:			9056				
Parameters:			NO_3-N				
Technical holding time: #			48hr				

Sample ID	Sampling date	Extraction/Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
4	7/9/08	7/14/08 0915	7/16/08 1510	(54hr)			J-/UJ/A (hr)
5	↓	↓	7/16/08 1524	(54.25 hr)			↓
6	7/10/08	↓	7/16/08 1538	(54.5 hr)			↓

from extraction to analysis

LDC #: 21257B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: MH
2nd Reviewer

METHOD: Inorganics, Method See cover

QAPP limits

#	Sample ID	Analyte	Lab Reporting Limit (units)	RDL (units)	Finding	Qualifications
1	All	Alkalinity	200 mg/kg	2 mg/kg	Lab limit > QAPP limit	none/p
		NO_2-N	5.0 U	0.1 U	J	J
2	5,10,	Cl, SO_4			~~det~~ over diluted	R/A (o)

Comments:

LDC#: 21257J6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer:
2nd Reviewer:

Inorganics, Method See Cover

(Y) N NA Were field duplicate pairs identified in this SDG?
(Y) N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	4	5				
Bicarbonate Alkalinity	469	435		34	(≤300)	
Total Alkalinity	637	645		8	(≤300)	
Chloride	1390	3000U		1610	(≤3000)	
Nitrate as N	34.4	34.7	1			
pH (S.U.)	8.08	7.93	2	~~0.15~~	~~(≤)~~	
Sulfate	1200	3000U		1800	(≤3000)	
Total Phosphorus	928	870	6			

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	15	16				
Bicarbonate Alkalinity	273	234		39	(≤219)	
Total Alkalinity	419	286		133	(≤219)	
Chloride	43.5	109		65.5	(≤21.9)	J det / A (fd)
pH (S.U.)	8.61	8.83	3			
Sulfate	172	324	61			J det / A (fd)
TOC	554	362		192	(≤300)	
Total Phosphorus	1100	888	21			

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: July 10 through July 11, 2008

LDC Report Date: August 17, 2009

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844922

Sample Identification

RSAJ8-0.5B
RSAJ8-10B
RSAJ8-20B
RSAJ8-30B
RSAJ8-33B
RSAI7-0.5B
RSAI7-10B
RSAI7-20B
RSAI7-30B
RSAL2-0.5B
RSAL2-10B
RSAL2-20B
RSAL2-20BD
RSAL2-30B
RSAL2-37B
RSAL2-40B
RSAK2-0.5B
RSAK2-10B
RSAK2-20B
RSAK2-20BD
RSAK2-30B
RSAK2-35B
RSA17-32B
RSAL2-0.5BMS
RSAL2-0.5BDUP

Introduction

This data review covers 25 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 350.1M for Ammonia as Nitrogen, EPA Method 365.1 for Total Phosphorus, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA SW 846 Method 9012 for Total Cyanide, EPA SW 846 Method 9045 for pH, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, and Sulfate, Standard Method 2320B for Alkalinity, Standard Method 5540C for Surfactants, and Lloyd/Kahn Method for Total Organic Carbon.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

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

Sample	Analyte	Total Time From Sample Extraction Until Analysis	Required Holding Time From Sample Extraction Until Analysis	Flag	A or P
RSAL2-0.5B RSAL2-0.5BMS RSAL2-0.5BDUP	Nitrite as N	8 days	48 hours	J- (all detects) R (all non-detects)	A
RSAL2-10B	Nitrite as N	63 hours	48 hours	J- (all detects) UJ (all non-detects)	A
RSAL2-30B	Nitrite as N	63.25 hours	48 hours	J- (all detects) UJ (all non-detects)	A
RSAL2-37B	Nitrite as N	63.5 hours	48 hours	J- (all detects) UJ (all non-detects)	A
RSAL2-40B	Nitrite as N	63.75 hours	48 hours	J- (all detects) UJ (all non-detects)	A
RSAK2-30B	Nitrite as N	64 hours	48 hours	J- (all detects) UJ (all non-detects)	A
RSAK2-35B	Nitrite as N	64.25 hours	48 hours	J- (all detects) UJ (all non-detects)	A

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

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
7/21/08	CCV (#27)	Total organic carbon	88 (90-110)	RSAI7-30B RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-30B RSAK2-35B RSA17-32B	J- (all detects) UJ (all non-detects)	P
7/21/08	CCV (#39)	Total organic carbon	86.5 (90-110)	RSAK2-20B RSAK2-20BD RSAK2-30B RSAK2-35B RSA17-32B	J- (all detects) UJ (all non-detects)	P

III. Blanks

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

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
RSAL2-0.5BMS (RSAJ8-0.5B RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B RSAI7-20B RSAI7-30B RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B)	Bromide	26 (75-125)	J- (all detects) R (all non-detects)	A
RSAL2-0.5BMS (RSAJ8-0.5B RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B RSAI7-20B RSAI7-30B RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B)	Nitrate as N	318 (75-125)	J+ (all detects)	A

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

The QAPP PQLs were met with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
All samples in SDG R2844922	Alkalinity	Laboratory reporting limit reported at 200 mg/Kg.	PQL should be reported at 2 mg/Kg per the QAPP.	None	P
All samples in SDG R2844922	Nitrite as N	Laboratory reporting limit reported at 5.0 mg/Kg.	PQL should be reported at 0.1 mg/Kg per the QAPP.	None	P

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R2844922	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

The overall assessment of data was acceptable with the following exceptions:

Sample	Compound	Flag	A or P
RSAL2-37B RSAK2-20BD	Sulfate	R	A

The Sulfate results for the samples listed above were overdiluted.

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

IX. Field Duplicates

Samples RSAL2-20B and RSAL2-20BD and samples RSAK2-20B and RSAK2-20BD were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAL2-20B	RSAL2-20BD				
Chloride	316 mg/Kg	213 mg/Kg	39 (≤50)	-	-	-
pH	8.13 S.U.	8.17 S.U.	0 (≤50)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAL2-20B	RSAL2-20BD				
Sulfate	7000 mg/Kg	6040 mg/Kg	15 (≤50)	-	-	-
Total organic carbon	849 mg/Kg	740 mg/Kg	-	109 (≤300)	-	-
Total phosphorus	579 mg/Kg	448 mg/Kg	26 (≤50)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAK2-20B	RSAK2-20BD				
Bicarbonate alkalinity	321 mg/Kg	413 mg/Kg	-	92 (≤216)	-	-
Total alkalinity	472 mg/Kg	586 mg/Kg	-	114 (≤216)	-	-
Chloride	77.2 mg/Kg	114 mg/Kg	38 (≤50)	-	-	-
pH	9.00 S.U.	9.06 S.U.	1 (≤50)	-	-	-
Sulfate	68.8 mg/Kg	86.5U mg/Kg	-	17.7 (≤86.5)	-	-
Surfactants	2.16U mg/Kg	3.04 mg/Kg	-	0.88 (≤2.16)	-	-
Total organic carbon	548 mg/Kg	654 mg/Kg	-	106 (≤300)	-	-
Total Phosphorus	585 mg/Kg	662 mg/Kg	12 (≤50)	-	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R2844922

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2844922	RSAL2-0.5B	Nitrite as N	J- (all detects) R (all non-detects)	A	Technical holding times (h)
R2844922	RSAL2-10B RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-30B RSAK2-35B	Nitrite as N	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
R2844922	RSAI7-30B RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-30B RSAK2-35B RSA17-32B	Total organic carbon	J- (all detects) UJ (all non-detects)	P	Calibration (CCV %R) (c)
R2844922	RSAJ8-0.5B RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B RSAI7-20B RSAI7-30B RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B	Bromide	J- (all detects) R (all non-detects)	A	Matrix spike analysis (%R) (m)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2844922	RSAJ8-0.5B RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B RSAI7-20B RSAI7-30B RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B	Nitrate as N	J+ (all detects)	A	Matrix spike analysis (%R) (m)
R2844922	RSAJ8-0.5B RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B RSAI7-20B RSAI7-30B RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-30B RSAK2-35B RSA17-32B	Alkalinity Nitrite as N	None None	P	Sample result verification

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2844922	RSAJ8-0.5B RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B RSAI7-20B RSAI7-30B RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-30B RSAK2-35B RSA17-32B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
R2844922	RSAL2-37B RSAK2-20BD	Sulfate	R	A	Overall assessment of data (o)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R2844922

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R2844922

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257K6
SDG #: R2844922
Laboratory: Columbia Analytical Services

Date: 8/16/09
Page: 1 of 1
Reviewer: ~
2nd Reviewer: ~

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1M), Bromide, Chloride, Nitrate-N, Nitrite-N, Sulfate (EPA SW846 Method 9056), Cyanide (EPA SW846 Method 9012), Hexavalent Chromium (EPA SW846 Method 7199), pH (EPA SW846 Method 9045), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1); ~~Percent Solids (EPA Method 160.3)~~, TOC (Lloyd/Kahn)

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 7/10/08, 7/11/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	SW	MS/Dup
V	Duplicates	A	
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	SW	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	(12, 13) (19, 20)
X	Field blanks	N	

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

Validated Samples: Soil

1	RSAJ8-0.5B	11	RSAL2-10B	21	RSAK2-30B	31	MS
2	RSAJ8-10B	12	RSAL2-20B	22	RSAK2-35B	32	
3	RSAJ8-20B	13	RSAL2-20BD	23	RSA17-32B	33	
4	RSAJ8-30B	14	RSAL2-30B	24	RSAL2-0.5BMS	34	
5	RSAJ8-33B	15	RSAL2-37B	25	RSAL2-0.5BDUP	35	
6	RSAI7-0.5B	16	RSAL2-40B	26		36	
7	RSAI7-10B	17	RSAK2-0.5B	27		37	
8	RSAI7-20B	18	RSAK2-10B	28		38	
9	RSAI7-30B	19	RSAK2-20B	29		39	
10	RSAL2-0.5B	20	RSAK2-20BD	30		40	

Notes: _____

LDC #: 21557B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer:
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-23	Soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
~24, 25	Soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
1-25	↓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 21057B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled dates have exceeded the technical holding time.
Y N N/A Were all samples preserved as applicable to each method ? (N/A circled)
Y N N/A Were all cooler temperatures within validation criteria? (Y circled)

Method:		9056				
Parameters:		NO_2-N				
Technical holding time: *		48hr				

Sample ID	Sampling date	~~Analysis~~ Extraction date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
10	7/10/08	7/15/08 1105	7/23/08 389	(8 days)			J-/R/A
11	7/11/08	↓	7/18/08 0204	(63hr)			J-/UJ/A
14	↓	↓	7/18/08 0218	(63.25hr)			↓
15	↓	↓	7/18/08 0232	(63.5hr)			↓
16	↓	↓	7/18/08 0247	(63.75hr)			↓
21	↓	↓	7/18/08 0301	(64 hr)			↓
22	↓	↓	7/18/08 0315	(64.25hr)			↓
24	7/10/08	7/15/08 1105	7/23/08	(8 days)			J-/R/A
25	↓	↓	↓	↓			↓

(new hr) (hr)

* from extraction to analysis

LDC #: 21259k6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Calibration

Reviewer: MH
2nd Reviewer: ✓

METHOD: Inorganics, EPA Method See cover

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

Y (N) N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?
Y (N) N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% ?
(Y) N N/A Are all correlation coefficients ≥0.995 ?

LEVEL IV/D ONLY:

Y N (N/A) Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recaluculation Worksheet for recalulations.
Y N (N/A) Was a balance check conducted prior to the TDS analysis.?
Y N (N/A) Was the titrant normality checked?

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
1	7/21/08	CCV (#21)	TOC	88	9-23	J-/UJ/P (C)
2	↓	CCV (#39)	TOC	86.5	19-23	↓

Comments:

LDC #: 21759k6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

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

METHOD: Inorganics, Method See cover

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

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

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125 (85-115% for Method 300.0)? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

LEVEL IV ONLY:

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

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
1	24	Soil	Br	26	1-16	J-/R/A (ms)
			NO_3-N	318	↓	J+/A/A (ms)

Comments:

LDC #: 21254K6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: MH
2nd Reviewer

METHOD: Inorganics, Method See cover

QAPP limit

#	Sample ID	Analyte	Lab Reporting Limit (units)	RDL (units)	Finding	Qualifications
1	All	Alkalinity	200 mg/kg	2 mg/kg	Lab limit > QAPP limit	none/p
		NO_2-N	5.0 U	0.1 U		
2	15, 20	SO_4			over diluted	R/A (0)

Comments:

LDC#: 21257K6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer:
2nd Reviewer:

Inorganics, Method See Cover

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

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	12	13				
Chloride	316	213	39			
pH (S.U.)	8.13	8.17	0			
Sulfate	7000	6040	15			
TOC	849	740		109	(≤300)	
Total Phosphorus	579	448	26			

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	19	20				
Bicarbonate Alkalinity	321	413		92	(≤216)	
Total Alkalinity	472	586		114	(≤216)	
Chloride	77.2	114	38			
pH (S.U.)	9.00	9.06	1			
Sulfate	68.8	86.5U		17.7	(≤86.5)	
Surfactants	2.16U	3.04		0.88	(≤2.16)	
TOC	548	654		106	(≤300)	
Total Phosphorus	585	662	12			

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: July 11, 2008

LDC Report Date: August 17, 2009

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2845025

Sample Identification

RSAI7-10B(119156)
RSAI7-10B(119157)
RSAI7-10B(119157)RE

Samples in this SDG underwent SPLP extraction

Introduction

This data review covers 3 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 120.1 for Conductivity, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 350.1M for Ammonia as Nitrogen, EPA Method 365.1 for Total Phosphorus, EPA SW 846 Method 9012 for Total Cyanide, EPA SW 846 Method 9040 for pH, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, and Sulfate, EPA SW 846 Method 9060 for Total Organic Carbon, Standard Method 2320B for Alkalinity, Standard Method 2540C for Total Dissolved Solids, and Standard Method 5540C for Surfactants.

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

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

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

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

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

Method Blank ID	Analyte	Concentration	Associated Samples
SPLP BLK #2	Chloride Nitrate as N Total alkalinity	0.276 mg/L 0.113 mg/L 2.50 mg/L	RSAI7-10B(119156)
SPLP BLK #3	Chloride Nitrate as N Total alkalinity	0.328 mg/L 0.060 mg/L 8.80 mg/L	RSAI7-10B(119157)
SPLP BLK #3RE	Total alkalinity	8.00 mg/L	RSAI7-10B(119157)RE

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAI7-10B(119156)	Nitrate as N	0.335 mg/L	0.335J+ mg/L

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

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

VI. Laboratory Control Samples

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

VII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R2845025	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

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

Sample	Analyte	Flag	A or P
RSAI7-10B(119157)	Carbonate alkalinity Bicarbonate alkalinity	X X	A

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R2845025

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R2845025	RSAI7-10B(119156) RSAI7-10B(119157) RSAI7-10B(119157)RE	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
R2845025	RSAI7-10B(119157)	Carbonate alkalinity Bicarbonate alkalinity	X X	A	Overall assessment of data (o)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R2845025

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R2845025	RSAI7-10B(119156)	Nitrate as N	0.335J+ mg/L	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R2845025

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257L6
SDG #: R2845025
Laboratory: Columbia Analytical Services

Date: 8/16/09
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1M), Bromide, Chloride, Nitrate-N, Nitrite-N, Sulfate (EPA SW846 Method 9056), Conductivity (EPA Method 120.1), Cyanide (EPA SW846 Method 9012), Hexavalent Chromium (EPA Method ~~218.6~~), pH (EPA SW846 Method 9040), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), TDS (SM2540C), TOC (EPA SW846 Method 9060)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/11/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	SW	
IV	Matrix Spike/Matrix Spike Duplicates	N	3 client specified
V	Duplicates	N	
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	N	
VIII.	Overall assessment of data	SW	
IX.	Field duplicates	N	
X	Field blanks	N	

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

Validated Samples: Soil

1	RSAI7-10B(119156)	11	MB SPLP Blank #2	21		31	
2	RSAI7-10B(119157)	12	↓ #3	22		32	
3	↓ RE	13	MB	23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: Samples in this SDG underwent SPLP extraction

LDC #: 21857L6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: [signature]
2nd reviewer: [signature]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1,2	Soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
3	↓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 21257L6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
(Y) N N/A Were all samples associated with a given method blank?
(Y) N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below. b1

Conc. units: mg/L **Associated Samples:** 1

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
[redacted]	SPLP BLK #2			1									
Cl	0.276		2.76										
NO3-N	0.113		1.13	0.335 J+									
Total Alk	2.50		25.0										

Conc. units: mg/L **Associated Samples:** 2 (7 10X)

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
[redacted]	SPLP BLK #3												
Cl	0.328		3.28										
NO3-N	0.060		0.60										
Total Alk	8.80		88.0										

Conc. units: mg/L **Associated Samples:** 3 (>10X)

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
[redacted]	SPLP BLK #3 RE												
Total Alk	8.00		80.0										

* SPLP BLK results were from raw data, not provided by the lab.

LDC #: 21876
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: MH
2nd Reviewer: [signature]

METHOD: Inorganics, Method see cover

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
1		~~2~~	~~Alk~~ Carbonate Alk		X/A (o)
			Bicarbonate Alk		
			~~Total Alk was not reported for this sample~~		
			(original run RC failed for carbonate Alk + Bicarbonate		
			Total Alk from the original run	within control limits) ~~for~~	

Comments: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: June 16 through June 24, 2008

LDC Report Date: August 14, 2009

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K0805394

Sample Identification

PB061608B
PC-40B
H-48B
MC-66B
MC-66BD
MC-65B
PC-37B
M-44B
M-94BX
MC-62B
PC-72B
PC-40BMS
PC-40BDUP

Introduction

This data review covers 13 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 300.1 for Chlorate and EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section X.

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

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

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

Sample FB062408GWarea1 (K0805722) was identified as a field blank. No contaminant concentrations were found in this blank.

Sample PB061608B was identified as a pump blank. No contaminant concentrations were found in this blank.

IV. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

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

VIII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG K0805394	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

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

X. Field Duplicates

Samples MC-66B and MC-66BD were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	MC-66B	MC-66BD				
Chlorate	470000	523000	11 (≤30)	-	-	-
Perchlorate	364000	406000	11 (≤30)	-	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG K0805394

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0805394	PB061608B PC-40B H-48B MC-66B MC-66BD MC-65B PC-37B M-44B M-94BX MC-62B PC-72B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG K0805394

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG K0805394

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257W6
SDG #: K0805394
Laboratory: Columbia Analytical Services

Date: 8-14-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: V

METHOD: Chlorate (EPA Method 300.1), Perchlorate (EPA Method 314.0)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/16/08 - 6/24/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Surrogate Spikes	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates	A	Dup
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(4,5)
XI	Field blanks	ND	PB=1, FB=FB062408GWarea7(SDG# K0805722)

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
PB = Rmp blank

Validated Samples: water

1	PB061608B	11	PC-72B	21	PBW1	31	
2	PC-40B	12	PC-40BMS	22	PBW2	32	
3	H-48B	13	PC-40BDUP	23		33	
4	MC-66B	14		24		34	
5	MC-66BD	15		25		35	
6	MC-65B	16		26		36	
7	PC-37B	17		27		37	
8	M-44B	18		28		38	
9	M-94BX	19		29		39	
10	MC-62B	20		30		40	

Notes:

LDC #: 21257W6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
1-11	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} (ClO_3) (ClO_4) ____
QC:12,13	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} (ClO_3) (ClO_4) ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}

Comments:____

LDC#: 21257W6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer:

Inorganics, Method See Cover

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

Analyte	Concentration (ug/L)		RPD (≤30)	Difference	Limits	Qualification (Parent only)
	4	5				
Chlorate	470000	523000	11			
Perchlorate	364000	406000	11			

V:\FIELD DUPLICATES\FD_inorganic\21257W6.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: June 24 through June 26, 2008

LDC Report Date: August 14, 2009

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K0805722

Sample Identification

H-49AB
FB062408GWarea1
M-23B
MC-53B
MC-97B
MC-45B
M-7BB
M-88BB
M-61B
MC-94B
M-5AB
MW-16B
EB062608GW3
M-6AB
M-67B
M-68B
M-95B
M-57AB
M-7BBMS
M-7BBDUP

Introduction

This data review covers 20 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 300.1 for Chlorate and EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section X.

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

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

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

Sample EB062608GW3 was identified as an equipment blank. No contaminant concentrations were found in this blank.

Sample FB062408GWarea1 was identified as a field blank. No contaminant concentrations were found in this blank.

Sample PB061608B (from SDG K0805394) was identified as a pump blank. No contaminant concentrations were found in this blank.

IV. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

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

VIII. Sample Result Verification and Project Quantitation Limit

All sample result verifications were acceptable.

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG K0805722	All analytes reported below the PQL.	J (all detects)	A

IX. Overall Assessment of Data

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

X. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG K0805722

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0805722	H-49AB FB062408GWarea1 M-23B MC-53B MC-97B MC-45B M-7BB M-88BB M-61B MC-94B M-5AB MW-16B EB062608GW3 M-6AB M-67B M-68B M-95B M-57AB	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG K0805722

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG K0805722

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 21257X6
SDG #: K0805722
Laboratory: Columbia Analytical Services

Date: 8-14-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

METHOD: Chlorate (EPA Method 300.1), Perchlorate (EPA Method 314.0)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/24/08 - 6/26/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Surrogate Spikes	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates	A	Dup
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	ND	FB=2, EB=13, PB=PB061608B(SDG# K0805394)

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

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

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: water

1	H-49AB	11	M-5AB	21	PBW1	31	
2	FB062408GWarea1	12	MW-16B	22		32	
3	M-23B	13	EB062608GW3	23		33	
4	MC-53B	14	M-6AB	24		34	
5	MC-97B	15	M-67B	25		35	
6	MC-45B	16	M-68B	26		36	
7	M-7BB	17	M-95B	27		37	
8	M-88BB	18	M-57AB	28		38	
9	M-61B	19	M-7BBMS	29		39	
10	MC-94B	20	M-7BBDUP	30		40	

Notes: _____

LDC #: 21757K6
SDG #: see cover

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Method: Inorganics (EPA Method see cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix Spike/Matrix Spike Duplicates and Duplicate				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 21257X6
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

LDC #: 21257X6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
1-18	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} (ClO_3) (ClO_4)
QC:19,20	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} (ClO_3) (ClO_4)
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}

Comments:

LDC #: 42576
SDG #: seecover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: CR
2nd Reviewer:

METHOD: Inorganics, Method seecover

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

%R = Found / True x 100 Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

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

RPD = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units) ug/L	True / D (units) ug/L	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	ClO_3	119	123	97	97	Y
19	Matrix spike sample	ClO_4	(SSR-SR) 94300	100000	94	94	↓
20	Duplicate sample	ClO_3	11400	11100	3	3	↓

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

LDC #: 21257X6
SDG #: see cover

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd Reviewer: LC

Method: Inorganics, Method 300.1 / 314.0

The correlation coefficient (r) for the calibration of ClO3 was recalculated. Calibration date: 6/20/08

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

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (ug/l)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	ClO3	s1	10	0.001	*0.999398*	0.999882	Y
		s2	20	0.002			
		s3	50	0.004			
		s4	100	0.009			
		s5	200	0.019			
		s6	500	0.051			
Calibration verification	ClO3	ICV	123	Found (ug/L) 119	97%	97%	
Calibration verification	ClO4	CCV	10.0	10.1	101%	101%	
Calibration verification	ClO3	CCV	100	92	92%	92%	

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

LDC #: 21257X6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of
Reviewer: CE
2nd reviewer:

METHOD: Inorganics, Method see cover

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for ClO3 reported with a positive detect were recalculated and verified using the following equation:

Concentration = $\left(\frac{Area}{Slope}\right)DF$

Recalculation:

1. $\left(\frac{0.029}{0.0001}\right)1000 = 290{,}000$ ug/L

7. $\left(\frac{0.023}{0.0001}\right)50 = 11500$ ug/L

#	Sample ID	Analyte	Reported Concentration (ug/L)	Calculated Concentration (ug/L)	Acceptable (Y/N)
	1	ClO3	293000	290000	Y
		ClO4	210000	208000	J
	7	ClO3	11400	11500	Y
		ClO4	55700	54000	J

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Collection Date:	June 25 through June 26, 2008
LDC Report Date:	August 14, 2009
Matrix:	Soil
Parameters:	Wet Chemistry
Validation Level:	Stage 2B
Laboratory:	Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K0805780

Sample Identification

SA87-0.5B
SA87-10B
SA87-20B
SA87-30B
SA87-25B
SA180-0.5B
SA180-10B
SA180-20B
SA180-30B
SA57-0.5B
SA57-10B
SA57-20B
SA57-30B
SA87-10BMS
SA87-10BDUP
SA180-10BMS
SA180-10BDUP

Introduction

This data review covers 17 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 300.1 for Chlorate and EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section X.

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

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

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

No field blanks were identified in this SDG.

IV. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

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

VIII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG K0805780	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

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

X. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG K0805780

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0805780	SA87-0.5B SA87-10B SA87-20B SA87-30B SA87-25B SA180-0.5B SA180-10B SA180-20B SA180-30B SA57-0.5B SA57-10B SA57-20B SA57-30B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG K0805780

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG K0805780

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257Y6
SDG #: K0805780
Laboratory: Columbia Analytical Services

Date: 8-14-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [signature]

METHOD: Chlorate (EPA Method 300.1), Perchlorate (EPA Method 314.0)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/25/08 - 6/26/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Surrogate Spikes	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS
VI.	Duplicates	A	Dup
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	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: Soils

1	SA87-0.5B	11	SA57-10B	21	PBS1	31	
2	SA87-10B	12	SA57-20B	22		32	
3	SA87-20B	13	SA57-30B	23		33	
4	SA87-30B	14	SA87-10BMS	24		34	
5	SA87-25B	15	SA87-10BDUP	25		35	
6	SA180-0.5B	16	SA180-10BMS	26		36	
7	SA180-10B	17	SA180-10BDUP	27		37	
8	SA180-20B	18		28		38	
9	SA180-30B	19		29		39	
10	SA57-0.5B	20		30		40	

Notes: _____

LDC #: 2125746

SDG #: See cover

VALIDATION FINDINGS WORKSHEET

Sample Specific Analysis Reference

Page: 1 of 1

Reviewer: CR

2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Parameter
1-13	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} (ClO_3) (ClO_4) ___
QC: 14, 15	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} (ClO_3) (ClO_4) ___
QC: 16, 17	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} (ClO_3) (ClO_4) ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ___ ___ ___ ___
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}

Comments: ______________________

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: June 29 through June 30, 2008

LDC Report Date: August 14, 2009

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K0805919

Sample Identification

M-79B
M-84B
M-126B
M-14ABF
M-14ADBF

Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 300.1 for Chlorate and EPA Method 314.0 for Perchlorate.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section X.

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

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

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

Sample FB062408GWarea1 (K0805722) was identified as a field blank. No contaminant concentrations were found in this blank.

Sample PB061608B (from SDG K0805394) was identified as a pump blank. No contaminant concentrations were found in this blank.

IV. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples

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

VIII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG K0805919	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

IX. Overall Assessment of Data

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

X. Field Duplicates

Samples M-14ABF and M-14ADBF were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-14ABF	M-14ADBF				
Chlorate	19500	19500	0 (≤30)	-	-	-
Perchlorate	26700	26600	0 (≤30)	-	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG K0805919

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0805919	M-79B M-84B M-126B M-14ABF M-14ADBF	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG K0805919

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG K0805919

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257Z6
SDG #: K0805919
Laboratory: Columbia Analytical Services

Date: 8-14-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [signature]

METHOD: Chlorate (EPA Method 300.1), Perchlorate (EPA Method 314.0)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/29/08 - 6/30/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Surrogate Spikes	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS (SDG# K0805394, K0805722)
VI.	Duplicates	A	Dup ✓
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(4,5)
XI	Field blanks	ND	PB=PB061608B (SDG#: K0805394), FB=FB062408GWarea1 (SDG# K0805722)

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
PB=Pump Blank

Validated Samples: water

1	M-79B	11	PBW1	21		31	
2	M-84B	12		22		32	
3	M-126B	13		23		33	
4	M-14ABF	14		24		34	
5	M-14ADBF	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 2125726
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: ✓

All circled methods are applicable to each sample.

Sample ID	Parameter
1-5	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} (ClO_3) (ClO_4) ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ____ ____ ____ ____
	pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+}

Comments: ____________________

LDC#: 21257Z6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer:

Inorganics, Method See Cover

(Y) N NA Were field duplicate pairs identified in this SDG?
Y (N) NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (ug/L)		RPD (≤30)	Difference	Limits	Qualification (Parent only)
	4	5				
Chlorate	19500	19500	0			
Perchlorate	26700	26600	0			

V:\FIELD DUPLICATES\FD_inorganic\21257Z6.wpd