

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

Wet Chemistry

**LDC**

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

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

**Collection Date:** August 3 through August 4, 2009

**LDC Report Date:** December 8, 2009

**Matrix:** Water

**Parameters:** Wet Chemistry

**Validation Level:** Stage 2B

**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** R0904290

**Sample Identification**

M-31AB  
M-50B  
M-21B  
FB080409-GW

## Introduction

This data review covers 4 water samples listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA Method 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA Method 218.6 for Dissolved Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Method 9040B for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, EPA SW 846 Method 9060 for Total Organic Carbon, and EPA Method 120.1 for Conductivity.

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 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-31AB	Hexavalent chromium	29 hours	24 hours	J- (all detects) UJ (all non-detects)	P
M-50B	Hexavalent chromium	26 hours	24 hours	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-50B	Cyanide	Sample pH reported at approximately 7 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 with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate	1.0 mg/L 1.0 mg/L	M-31AB M-50B

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate	0.9 mg/L 0.9 mg/L	M-21B FB080409-GW
PB (prep blank)	Total phosphorus	0.008 mg/L	All samples in SDG R0904290
ICB/CCB	Alkalinity, total	1.0 mg/L	All samples in SDG R0904290
PB (prep blank)	Ammonia as N	0.015 mg/L	M-50B M-21B FB080409-GW
ICB/CCB	Ammonia as N Bromide	0.0448 mg/L 0.061 mg/L	M-50B M-21B FB080409-GW
PB (prep blank)	Chloride Ammonia as N	0.12 mg/L 0.008 mg/L	M-31AB
ICB/CCB	Chloride Ammonia as N	0.130 mg/L 0.0251 mg/L	M-31AB
ICB/CCB	Total phosphorus	0.008 mg/L	M-31AB M-50B M-21B
PB (prep blank)	Chloride	0.13 mg/L	FB080409-GW
ICB/CCB	Chloride Total phosphorus	0.127 mg/L 0.0166 mg/L	FB080409-GW
PB (prep blank)	Chloride	0.15 mg/L	M-50B M-21B
ICB/CCB	Chloride	0.157 mg/L	M-50B M-21B
PB (prep blank)	Sulfate	0.17 mg/L	M-21B
ICB/CCB	Sulfate	0.166 mg/L	M-21B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
M-31AB	Total phosphorus	0.046 mg/L	0.050U mg/L
M-50B	Total phosphorus (2X)	0.05 mg/L	0.10U mg/L
M-21B	Total phosphorus	0.018 mg/L	0.050U mg/L
FB080409-GW	Total phosphorus Ammonia as N Alkalinity, total Alkalinity, bicarbonate Chloride	0.014 mg/L 0.035 mg/L 1.9 mg/L 1.9 mg/L 1.3 mg/L	0.050U mg/L 0.050U mg/L 2.0U mg/L 2.0U mg/L 2.0U mg/L

Sample FB080409-GW 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
FB080409-GW	8/4/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride pH Total phosphorus Sulfate	1.9 mg/L 1.9 mg/L 0.035 mg/L 0.2 mg/L 1.3 mg/L 5.89 units 0.014 mg/L 0.9 mg/L	M-21B

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
M-21B	Total phosphorus	0.018 mg/L	0.050U mg/L

Sample MC-3B-FILT (from SDG R0902886) was identified as a filter blank. No contaminant concentrations were found in this blank.

#### 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. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate 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 R0904290	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

## IX. Overall Assessment

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, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Data Qualification Summary - SDG R0904290**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0904290	M-31AB M-50B	Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0904290	M-50B	Cyanide	J- (all detects) R (all non-detects)	A	Sample condition (preservation) (pH)
R0904290	M-31AB M-50B M-21B FB080409-GW	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0904290**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0904290	M-31AB	Total phosphorus	0.050U mg/L	A	bl
R0904290	M-50B	Total phosphorus (2X)	0.10U mg/L	A	bl
R0904290	M-21B	Total phosphorus	0.050U mg/L	A	bl
R0904290	FB080409-GW	Total phosphorus Ammonia as N Alkalinity, total Alkalinity, bicarbonate Chloride	0.050U mg/L 0.050U mg/L 2.0U mg/L 2.0U mg/L 2.0U mg/L	A	bl

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0904290**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0904290	M-21B	Total phosphorus	0.050U mg/L	A	bf

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Filter Blank Data Qualification Summary - SDG R0904290**

No Sample Data Qualified in this SDG

**Tronox Northgate Henderson**

**VALIDATION COMPLETENESS WORKSHEET**

LDC #: 21991A6

SDG #: R0904290

Laboratory: Columbia Analytical Services

Stage 2B

Date: 11/18/09

Page: 1 of 1

Reviewer: CR

2nd Reviewer: W

**METHOD: (Analyte)** Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), ~~Chlorate (EPA Method 300.1)~~, ~~Cyanide (EPA SW846 Method 9012A)~~, Dissolved Hexavalent Chromium (EPA Method 218.6), Nitrite-N (EPA Method 353.2), pH (EPA SW846 Method 9040B), Surfactants (SM5540C), Perchlorate (EPA Method 314.0), Total Phosphorus (EPA Method 365.1), TOC (EPA SW846 Method 9060), Conductivity (no. 1)

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: <u>8/3/09 - 8/4/09</u>
IIa.	Initial calibration	A	
lib.	Calibration verification	A	
III.	Blanks	SW	
IV.	Surrogate Spikes	<del>AA</del>	<u>Not required CR</u>
V.	Matrix Spike/Matrix Spike Duplicates	<del>N</del>	<u>Client specified</u>
VI.	Duplicates	<del>N</del>	<u>LCS</u>
VII.	Laboratory control samples	A	
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	<del>N</del>	
XI.	Field blanks	SW	<u>FB=4, Filter Blank=MC-3B-FILT</u>

*(SDG# R0902886)*

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

Validated Samples: water

1	M-31AB	11	<u>PBW</u>	21		31	
2	M-50B	12		22		32	
3	M-21B	13		23		33	
4	FB080409-GW	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_







**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

**METHOD:** Inorganics, Method See Cover

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

**Conc. units:** mg/L **Associated Samples:** 1, 2

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification	
				No Qualifiers	
Alk., Total	MB				
Alk., Bicarb	1.0				
	1.0				

**Conc. units:** mg/L **Associated Samples:** 3, 4

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification	
Alk., Total	MB			4	
Alk., Bicarb	0.9			1.9 / 2.0	
	0.9			1.9 / 2.0	

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

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification	
Alk., Total	MB			1	2 (2x) 3 4
T-P	0.008	1.0		0.046 / 0.050	0.05 / 0.10 0.018 / 0.050 0.014 / 0.050

**Conc. units:** mg/L **Associated Samples:** 2-4

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification	
NH3-N	MB			4	
Br	0.015	0.0448		0.035 / 0.050	
		0.061			

**VALIDATION FINDINGS WORKSHEET**

**Blanks**

**METHOD:** Inorganics, Method See Cover

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

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

Analyte	Blank ID	Maximum ICB/CBB (mg/L)	Blank Action Limit	Sample Identification
	MB			No Qualifiers
Cl	0.12	0.130		
NH3-N	0.008	0.0251		

**Conc. units:** mg/L **Associated Samples:** 1-3

Analyte	Blank ID	Maximum ICB/CBB (mg/L)	Blank Action Limit	Sample Identification
	MB			1 2 3
T.P		0.008		See PB See PB See PB

**Conc. units:** mg/L **Associated Samples:** 4

Analyte	Blank ID	Maximum ICB/CBB (mg/L)	Blank Action Limit	Sample Identification
	MB			4
Cl	0.13	0.127		1.3 / 2.0
T.P		0.0166		See PB

**Conc. units:** mg/L **Associated Samples:** 2, 3

Analyte	Blank ID	Maximum ICB/CBB (mg/L)	Blank Action Limit	Sample Identification
	MB			No Qualifiers
Cl	0.15	0.157		

**Conc. units:** mg/L **Associated Samples:** 3

Analyte	Blank ID	Maximum ICB/CBB (mg/L)	Blank Action Limit	Sample Identification
	MB			No Qualifiers
SO4	0.17	0.166		

LDC #: 21495C6  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

Page: 1 of 1  
 Reviewer: GB  
 2nd Reviewer: bf

**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:** mg/L **Associated sample units:** mg/L

**Sampling date:** 8/4/09 Soil factor applied NA

**Field blank type:** (circle one) Field Blank / Rinsate / Other **FB**

Reason Code: bf

Associated Samples: 3

Analyte	Blank ID	Action Level	3	Sample Identification			
Total Alkalinity	4						
Bicarbonate Alkalinity	1.9						
Ammonia as N	1.9						
TOC (average)	0.035						
Chloride	0.2						
pH (pH Units)	1.3						
Total Phosphorus	5.89						
Sulfate	0.014		0.018 / 0.050				
	0.9						

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** September 8, 2009

**LDC Report Date:** November 19, 2009

**Matrix:** Soil/Water

**Parameters:** Wet Chemistry

**Validation Level:** Stage 2B

**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** R0905115

### Sample Identification

EB090809-SO1  
SA54-10B  
SA54-20B  
SA54-31B  
SA50-12B  
SA50009-12B  
SA50-25B  
SA50-36B  
SA170-20B  
SA170-31B  
SA170-0.5B  
SA170-10B  
SA135-0.5B  
SA135-10B  
SA135009-10B  
SA135-25B  
SA135-37B  
SA54-31BMS  
SA54-31BMDS  
SA54-31BDUP

## Introduction

This data review covers 19 soil samples and one water sample listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA Method 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Methods 9040B and 9045C for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, and Lloyd/Kahn Method and EPA SW 846 Method 9060 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.

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- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UU 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 with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
9/9/09	CCV	Surfactants	115 (90-110)	All water samples in SDG R0905115	J+ (all 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 with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride Total phosphorus Sulfate	1.0 mg/L 1.0 mg/L 0.16 mg/L 0.008 mg/L 01 mg/L	All water samples in SDG R0905115
ICB/CCB	Alkalinity, total Chloride Total phosphorus Sulfate Ammonia as N	1.8 mg/L 0.166 mg/L 0.0076 mg/L 0.099 mg/L 0.0284 mg/L	All water samples in SDG R0905115
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride Sulfate	18 mg/Kg 18 mg/Kg 1 mg/Kg 0.9 mg/Kg	SA54-10B SA54-20B SA54-31B

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate	12 mg/Kg 12 mg/Kg	SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B SA135-0.5B SA135-10B SA135009-10B SA135-25B SA135-37B
PB (prep blank)	Chloride	0.5 mg/Kg	SA170-31B SA170-0.5B SA170-10B SA135-0.5B SA135-10B SA135009-10B SA135-25B SA135-37B
PB (prep blank)	Total organic carbon	40 mg/Kg	All soil samples in SDG R0905115
ICB/CCB	Total organic carbon	116.0 mg/Kg	All soil samples in SDG R0905115
PB (prep blank)	Total phosphorus	1.3 mg/Kg	SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B SA135-0.5B SA135-10B SA135009-10B SA135-25B SA135-37B
PB (prep blank)	Total phosphorus	1.0 mg/Kg	SA54-10B SA54-20B SA54-31B SA50-12B SA50009-12B SA50-25B
ICB/CCB	Chloride Sulfate	0.073 mg/L 0.061 mg/L	SA54-31BDUP



Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Chloride	0.136 mg/L	SA54-20B SA54-31B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B SA135-0.5B SA135-10B SA135009-10B
ICB/CCB	Chloride Sulfate	0.104 mg/L 0.109 mg/L	SA135-25B SA135-37B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB090809-SO1	Total phosphorus	0.012 mg/L	0.050U mg/L
SA54-10B	Chloride	1.5 mg/Kg	2.1U mg/Kg
SA54-31B	Total organic carbon	190 mg/Kg	290U mg/Kg
SA170-31B	Total organic carbon	180 mg/Kg	300U mg/Kg
SA135-37B	Total organic carbon	200 mg/Kg	300U mg/Kg

Sample EB090809-SO1 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
EB090809-SO1	9/8/09	Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Sulfate Surfactants	0.100 mg/L 0.2 mg/L 2.8 mg/L 0.93 mg/L 4.36 units 0.012 mg/L 3.8 mg/L 0.031 mg/L	SA54-10B SA54-20B SA54-31B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA54-10B	Chloride Nitrate as N Sulfate	1.5 mg/Kg 1.16 mg/Kg 17.5 mg/Kg	2.1U mg/Kg 1.16J+ mg/Kg 17.5J+ mg/Kg
SA54-20B	Nitrate as N	2.14 mg/Kg	2.14J+ mg/Kg
SA54-31B	Total organic carbon Nitrate as N	190 mg/Kg 3.26 mg/Kg	290U mg/Kg 3.26J+ mg/Kg
SA50-12B	Nitrate as N Surfactants	22.1 mg/Kg 1.3 mg/Kg	22.1J+ mg/Kg 2.1U mg/Kg
SA50009-12B	Nitrate as N Surfactants	21.7 mg/Kg 1.4 mg/Kg	21.7J+ mg/Kg 2.1U mg/Kg
SA50-25B	Nitrate as N Sulfate Surfactants	2.52 mg/Kg 267 mg/Kg 0.9 mg/Kg	2.52J+ mg/Kg 267J+ mg/Kg 2.1U mg/Kg
SA50-36B	Chloride Nitrate as N	184 mg/Kg 1.67 mg/Kg	184J+ mg/Kg 1.67J+ mg/Kg
SA170-20B	Nitrate as N Surfactants	5.06 mg/Kg 1.3 mg/Kg	5.06J+ mg/Kg 2.6U mg/Kg
SA170-31B	Total organic carbon Chloride Nitrate as N	180 mg/Kg 202 mg/Kg 2.39 mg/Kg	300U mg/Kg 202J+ mg/Kg 2.39J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA170-0.5B	Nitrate as N Sulfate Surfactants	1.82 mg/Kg 258 mg/Kg 1.8 mg/Kg	1.82J+ mg/Kg 258J+ mg/Kg 2.2U mg/Kg
SA170-10B	Chloride Nitrate as N Sulfate	169 mg/Kg 1.32 mg/Kg 261 mg/Kg	169J+ mg/Kg 1.32J+ mg/Kg 261J+ mg/Kg

Samples FB072909-SO (from SDG R0904226) and FB080309-SO (from SDG R0904279) were identified as field blanks. No contaminant concentrations were found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB072909-SO	7/29/09	Perchlorate Ammonia as N Total organic carbon Chloride Nitrate as N Sulfate Surfactants Total phosphorus pH	0.5 ug/L 1.71 mg/L 0.5 mg/L 6.2 mg/L 1.02 mg/L 8.0 mg/L 0.168 mg/L 0.007 mg/L 3.48 units	SA54-10B SA54-20B SA54-31B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B
FB080309-SO	8/3/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Total dissolved solids Sulfate Surfactants	3.0 mg/L 3.0 mg/L 0.113 mg/L 1.2 mg/L 3.9 mg/L 0.65 mg/L 6.48 units 0.015 mg/L 22 mg/L 1.6 mg/L 0.043 mg/L	SA135-0.5B SA135-10B SA135009-10B SA135-25B SA135-37B

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
SA54-10B	Chloride Nitrate as N Sulfate	1.5 mg/Kg 1.16 mg/Kg 17.5 mg/Kg	2.1U mg/Kg 1.16J+ mg/Kg 17.5J+ mg/Kg
SA54-20B	Chloride Nitrate as N	283 mg/Kg 2.14 mg/Kg	283J+ mg/Kg 2.14J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA54-31B	Total organic carbon Chloride Nitrate as N	190 mg/Kg 286 mg/Kg 3.26 mg/Kg	290U mg/Kg 286J+ mg/Kg 3.26J+ mg/Kg
SA50-12B	Nitrate as N Surfactants	22.1 mg/Kg 1.3 mg/Kg	22.1J+ mg/Kg 2.1U mg/Kg
SA50009-12B	Nitrate as N Surfactants	21.7 mg/Kg 1.4 mg/Kg	21.7J+ mg/Kg 2.1U mg/Kg
SA50-25B	Chloride Nitrate as N Sulfate Surfactants	374 mg/Kg 2.52 mg/Kg 267 mg/Kg 0.9 mg/Kg	374J+ mg/Kg 2.52J+ mg/Kg 267J+ mg/Kg 2.1U mg/Kg
SA50-36B	Chloride Nitrate as N	184 mg/Kg 1.67 mg/Kg	184J+ mg/Kg 1.67J+ mg/Kg
SA170-20B	Chloride Nitrate as N Surfactants	406 mg/Kg 5.06 mg/Kg 1.3 mg/Kg	406J+ mg/Kg 5.06J+ mg/Kg 2.6U mg/Kg
SA170-31B	Total organic carbon Chloride Nitrate as N	180 mg/Kg 202 mg/Kg 2.39 mg/Kg	300U mg/Kg 202J+ mg/Kg 2.39J+ mg/Kg
SA170-0.5B	Chloride Nitrate as N Sulfate Surfactants	315 mg/Kg 1.82 mg/Kg 258 mg/Kg 1.8 mg/Kg	315J+ mg/Kg 1.82J+ mg/Kg 258J+ mg/Kg 2.2U mg/Kg
SA170-10B	Chloride Nitrate as N Sulfate	169 mg/Kg 1.32 mg/Kg 261 mg/Kg	169J+ mg/Kg 1.32J+ mg/Kg 261J+ mg/Kg
SA135-0.5B	Chloride Nitrate as N Surfactants	289 mg/Kg 3.77 mg/Kg 1.3 mg/Kg	289J+ mg/Kg 3.77J+ mg/Kg 2.1U mg/Kg
SA135-10B	Ammonia as N Chloride Nitrate as N	0.24 mg/Kg 215 mg/Kg 2.00 mg/Kg	0.53U mg/Kg 215J+ mg/Kg 2.00J+ mg/Kg
SA135009-10B	Chloride Nitrate as N	224 mg/Kg 2.61 mg/Kg	224J+ mg/Kg 2.61J+ mg/Kg
SA135-25B	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Nitrate as N	138 mg/Kg 138 mg/Kg 0.19 mg/Kg 6.29 mg/Kg	138J+ mg/Kg 138J+ mg/Kg 0.67U mg/Kg 6.29J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA135-37B	Total organic carbon Chloride Nitrate as N	200 mg/Kg 252 mg/Kg 2.21 mg/Kg	300U mg/Kg 252J+ mg/Kg 2.21J+ mg/Kg

#### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SA54-31BMS (SA54-10B SA54-20B SA54-31B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B)	Total phosphorus	219 (75-125)	-	-	J+ (all detects)	A
SA54-31BMS (SA54-10B SA54-20B SA54-31B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B)	Surfactants	51 (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 with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
SA54-31BDUP (SA54-10B SA54-20B SA54-31B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B)	Total phosphorus	30 ( $\leq 20$ )	-	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) and relative percent differences (RPD) were within QC limits.

## VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate 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 R0905115	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

## IX. Overall Assessment

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

## X. Field Duplicates

Samples SA50-12B and SA50009-12B and samples SA135-10B and SA135009-10B 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
	SA50-12B	SA50009-12B				
Alkalinity, total	329 mg/Kg	307 mg/Kg	7 ( $\leq 50$ )	-	-	-
Alkalinity, bicarbonate	320 mg/Kg	290 mg/Kg	10 ( $\leq 50$ )	-	-	-
Alkalinity, carbonate	9 mg/Kg	17 mg/Kg	-	8 ( $\leq 21$ )	-	-
Bromide	0.9 mg/Kg	0.9 mg/Kg	-	0 ( $\leq 1.1$ )	-	-
Chloride	909 mg/Kg	902 mg/Kg	1 ( $\leq 50$ )	-	-	-
Hexavalent chromium	2.86 mg/Kg	3.13 mg/Kg	9 ( $\leq 50$ )	-	-	-
Hexavalent chromium	2.88 mg/Kg	3.11 mg/Kg	8 ( $\leq 50$ )	-	-	-
Nitrate as N	22.1 mg/Kg	21.7 mg/Kg	2 ( $\leq 50$ )	-	-	-
pH	9.62 units	9.69 units	1 ( $\leq 50$ )	-	-	-
Sulfate	1500 mg/Kg	1720 mg/Kg	14 ( $\leq 50$ )	-	-	-
Surfactants	1.3 mg/Kg	1.4 mg/Kg	-	0.1 ( $\leq 2.1$ )	-	-
Total organic carbon	2100 mg/Kg	2240 mg/Kg	6 ( $\leq 50$ )	-	-	-
Total phosphorus	843 mg/Kg	721 mg/Kg	16 ( $\leq 50$ )	-	-	-
Chlorate	2540000 ug/Kg	2500000 ug/Kg	2 ( $\leq 50$ )	-	-	-
Perchlorate	191000 ug/Kg	213000 ug/Kg	11 ( $\leq 50$ )	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA135-10B	SA135009-10B				
Alkalinity, total	1190 mg/Kg	1100 mg/Kg	8 ( $\leq 50$ )	-	-	-
Alkalinity, bicarbonate	1090 mg/Kg	1010 mg/Kg	8 ( $\leq 50$ )	-	-	-
Alkalinity, carbonate	101 mg/Kg	84 mg/Kg	-	17 ( $\leq 21$ )	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA135-10B	SA135009-10B				
Chloride	215 mg/Kg	224 mg/Kg	4 ( $\leq 50$ )	-	-	-
Nitrate as N	2.00 mg/Kg	2.61 mg/Kg	-	0.61 ( $\leq 0.53$ )	J (all detects)	A
Nitrite as N	0.11 mg/Kg	0.10 mg/Kg	-	0.01 ( $\leq 0.11$ )	-	-
pH	9.85 units	9.79 units	1 ( $\leq 50$ )	-	-	-
Sulfate	293 mg/Kg	439 mg/Kg	40 ( $\leq 50$ )	-	-	-
Total organic carbon	1150 mg/Kg	900 mg/Kg	24 ( $\leq 50$ )	-	-	-
Total phosphorus	961 mg/Kg	907 mg/Kg	6 ( $\leq 50$ )	-	-	-
Chlorate	170000 ug/Kg	177000 ug/Kg	4 ( $\leq 50$ )	-	-	-
Perchlorate	8850 ug/Kg	9360 ug/Kg	6 ( $\leq 50$ )	-	-	-



**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Data Qualification Summary - SDG R0905115**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905115	EB090809-SO1	Surfactants	J+ (all detects)	P	Calibration (CCV %R) (c)
R0905115	SA54-10B SA54-20B SA54-31B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B	Total phosphorus	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0905115	SA54-10B SA54-20B SA54-31B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B	Surfactants	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0905115	SA54-10B SA54-20B SA54-31B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B	Total phosphorus	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905115	EB090809-SO1 SA54-10B SA54-20B SA54-31B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B SA135-0.5B SA135-10B SA135009-10B SA135-25B SA135-37B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0905115	SA135-10B SA135009-10B	Nitrate as N	J (all detects)	A	Field duplicates (Difference) (fd)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0905115**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905115	EB090809-SO1	Total phosphorus	0.050U mg/L	A	bl
R0905115	SA54-10B	Chloride	2.1U mg/Kg	A	bl
R0905115	SA54-31B	Total organic carbon	290U mg/Kg	A	bl
R0905115	SA170-31B	Total organic carbon	300U mg/Kg	A	bl
R0905115	SA135-37B	Total organic carbon	300U mg/Kg	A	bl

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Equipment Blank Data Qualification Summary - SDG R0905115**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905115	SA54-10B	Chloride Nitrate as N Sulfate	2.1U mg/Kg 1.16J+ mg/Kg 17.5J+ mg/Kg	A	be
R0905115	SA54-20B	Nitrate as N	2.14J+ mg/Kg	A	be

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905115	SA54-31B	Total organic carbon Nitrate as N	290U mg/Kg 3.26J+ mg/Kg	A	be
R0905115	SA50-12B	Nitrate as N Surfactants	22.1J+ mg/Kg 2.1U mg/Kg	A	be
R0905115	SA50009-12B	Nitrate as N Surfactants	21.7J+ mg/Kg 2.1U mg/Kg	A	be
R0905115	SA50-25B	Nitrate as N Sulfate Surfactants	2.52J+ mg/Kg 267J+ mg/Kg 2.1U mg/Kg	A	be
R0905115	SA50-36B	Chloride Nitrate as N	184J+ mg/Kg 1.67J+ mg/Kg	A	be
R0905115	SA170-20B	Nitrate as N Surfactants	5.06J+ mg/Kg 2.6U mg/Kg	A	be
R0905115	SA170-31B	Total organic carbon Chloride Nitrate as N	300U mg/Kg 202J+ mg/Kg 2.39J+ mg/Kg	A	be
R0905115	SA170-0.5B	Nitrate as N Sulfate Surfactants	1.82J+ mg/Kg 258J+ mg/Kg 2.2U mg/Kg	A	be
R0905115	SA170-10B	Chloride Nitrate as N Sulfate	169J+ mg/Kg 1.32J+ mg/Kg 261J+ mg/Kg	A	be

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0905115**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905115	SA54-10B	Chloride Nitrate as N Sulfate	2.1U mg/Kg 1.16J+ mg/Kg 17.5J+ mg/Kg	A	bf
R0905115	SA54-20B	Chloride Nitrate as N	283J+ mg/Kg 2.14J+ mg/Kg	A	bf
R0905115	SA54-31B	Total organic carbon Chloride Nitrate as N	290U mg/Kg 286J+ mg/Kg 3.26J+ mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905115	SA50-12B	Nitrate as N Surfactants	22.1J+ mg/Kg 2.1U mg/Kg	A	bf
R0905115	SA50009-12B	Nitrate as N Surfactants	21.7J+ mg/Kg 2.1U mg/Kg	A	bf
R0905115	SA50-25B	Chloride Nitrate as N Sulfate Surfactants	374J+ mg/Kg 2.52J+ mg/Kg 267J+ mg/Kg 2.1U mg/Kg	A	bf
R0905115	SA50-36B	Chloride Nitrate as N	184J+ mg/Kg 1.67J+ mg/Kg	A	bf
R0905115	SA170-20B	Chloride Nitrate as N Surfactants	406J+ mg/Kg 5.06J+ mg/Kg 2.6U mg/Kg	A	bf
R0905115	SA170-31B	Total organic carbon Chloride Nitrate as N	300U mg/Kg 202J+ mg/Kg 2.39J+ mg/Kg	A	bf
R0905115	SA170-0.5B	Chloride Nitrate as N Sulfate Surfactants	315J+ mg/Kg 1.82J+ mg/Kg 258J+ mg/Kg 2.2U mg/Kg	A	bf
R0905115	SA170-10B	Chloride Nitrate as N Sulfate	169J+ mg/Kg 1.32J+ mg/Kg 261J+ mg/Kg	A	bf
R0905115	SA135-0.5B	Chloride Nitrate as N Surfactants	289J+ mg/Kg 3.77J+ mg/Kg 2.1U mg/Kg	A	bf
R0905115	SA135-10B	Ammonia as N Chloride Nitrate as N	0.53U mg/Kg 215J+ mg/Kg 2.00J+ mg/Kg	A	bf
R0905115	SA135009-10B	Chloride Nitrate as N	224J+ mg/Kg 2.61J+ mg/Kg	A	bf
R0905115	SA135-25B	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Nitrate as N	138J+ mg/Kg 138J+ mg/Kg 0.67U mg/Kg 6.29J+ mg/Kg	A	bf
R0905115	SA135-37B	Total organic carbon Chloride Nitrate as N	300U mg/Kg 252J+ mg/Kg 2.21J+ mg/Kg	A	bf

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET

LDC #: 21991B6

SDG #: R0905115

Laboratory: Columbia Analytical Services

Stage 2B

Date: 11-18-09

Page: 1 of 1

Reviewer: [Signature]

2nd Reviewer: [Signature]

**METHOD: (Analyte)** Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Chlorate (EPA Method 300.1), Cyanide (EPA SW846 Method 9012A), ~~Dissolved Hexavalent Chromium (EPA Method 218.6)~~, Hexavalent Chromium (EPA SW846 Method 7199), Nitrite-N (EPA Method 353.2), pH (EPA SW846 Method 9040B/9045D), Surfactants (SM5540C), Perchlorate (EPA Method 314.0), Total Phosphorus (EPA Method 365.1), TOC (Lloyd/Kahn / 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: 9/8/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW	
III.	Blanks	SW	
IV	Surrogate Spikes	A	
V	Matrix Spike/Matrix Spike Duplicates	SW	MS/D
VI.	Duplicates	SW	Dup
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(5,6), (14,15)
XI.	Field blanks	SW	EB=1, FB=FB072909-SO, FB080309-SO (506W R0904226) (506W R0904279)

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

Validated Samples:  
 All ~~water~~ soil except 1 = water

1	EB090809-SO1	11	SA170-0.5B	21		31	PBW
2	SA54-10B	12	SA170-10B	22		32	PBS (2-4)
3	SA54-20B	13	SA135-0.5B	23		33	PBS (5-9)
4	SA54-31B	14	SA135-10B	24		34	PBS (10-17)
5	SA50-12B	15	SA135009-10B	25		35	
6	SA50009-12B	16	SA135-25B	26		36	
7	SA50-25B	17	SA135-37B	27		37	
8	SA50-36B	18	SA54-31BMS	28		38	
9	SA170-20B	19	SA54-31BMSD	29		39	
10	SA170-31B	20	SA54-31BDUP	30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_





**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

Page: 3 of 3  
 Reviewer: CE  
 2nd Reviewer: la

LDC #: 21991B6  
 SDG #: See Cover

Reason Code: bl

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.

Conc. units: mg/L Associated Samples: All Water

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				1			
Alk., Total	PB (mg/L)	1.8					
Alk., Bicarb	1.0						
Cl	0.16	0.166					
T-P	0.008	0.0076					
SO4	0.1	0.099					
NH3-N		0.0284					

Conc. units: mg/Kg Associated Samples: 2-4

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				2			
Alk., Total	PB (mg/Kg)						
Alk., Bicarb.	18						
Cl	1						
SO4	0.9						



**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

METHOD: Inorganics, Method See Cover

Reason Code: bl

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

Conc. units: **mg/Kg** Associated Samples: **5-17**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
PB (mg/Kg)						
Alk., Total	12					
Alk., Bicarb.	12					

Conc. units: **mg/Kg** Associated Samples: **10-17**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
PB (mg/Kg)						
Cl	0.5					

Conc. units: **mg/Kg** Associated Samples: **All Soil**

Analyte	Blank ID	Maximum ICB/CCB (mg/Kg)	Blank Action Limit	Sample Identification		
				4	10	17
PB (mg/Kg)						
TOC	40	116.0		190 / 290	180 / 300	200 / 300

Conc. units: **mg/Kg** Associated Samples: **8-17**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
PB (mg/Kg)						
T-P	1.3					

**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

METHOD: Inorganics, Method See Cover

Reason Code: bl

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.

Conc. units: **mg/Kg** Associated Samples: **2, 4-7**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
T.P	PB (mg/Kg) 1.0					

Conc. units: **mg/Kg** Associated Samples: **20**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
Cl	PB (mg/Kg)	0.073				
SO4		0.061				

Conc. units: **mg/Kg** Associated Samples: **3-15**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
Cl	PB (mg/Kg)	0.136				

Conc. units: **mg/Kg** Associated Samples: **16, 17**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
Cl	PB (mg/Kg)	0.104				
SO4		0.109				

LDC #: 21991B6  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

Page: 1 of 1  
 Reviewer: CR  
 2nd Reviewer: CR

**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:** mg/L **Associated sample units:** mg/Kg Reason Code: be  
**Sampling date:** 8/4/09 Soil factor applied 10x except TOC @ 1x  
**Field blank type:** (circle one) Field Blank / Rinsate / Other EB Associated Samples: 2-12

Analyte	Blank ID	Sample Identification															
		2	3	4	5	6	7	8	9	10	11	12					
Ammônia as N	1	Action Level															
	0.100	10.0															
TOC (average)	0.2			190 / 290										180 / 300			
Chloride	2.8	280					184 J+										
Nitrate as N	0.93	93	J+	3.26 J+	22.1 J+	21.7 J+	1.67 J+	5.06 J+	2.39 J+	2.52 J+	1.82 J+	1.32 J+					
			2.14 J+														
pH (pH Units)	4.36																
Total Phosphorus	0.012																
Sulfate	3.8	380	17.5 J+				267 J+										258 J+
Surfactants	0.031	3.1			1.3 / 2.1	1.4 / 2.1	0.9 / 2.1	1.3 / 2.6									1.8 / 2.2

# VALIDATION FINDINGS WORKSHEET

## Field Blanks

**METHOD:** Inorganics, EPA Method See Cover  
 Reason Code: bf  
 Associated Samples: 2-12

N N/A Were field blanks identified in this SDG?  
 N N/A Were target analytes detected in the field blanks?  
 Blank units: mg/L Associated sample units: mg/Kg  
 Sampling date: 7/29/09 Soil factor applied 10x  
 Field blank type: (circle one) Field Blank / Rinsate / Other:

Analyte	Blank ID	Action Limit	Sample Identification											
			2	3	4	5	6	7	8	9	10	11	12	
Perchlorate (ug/L)	0.5													
NH3-N	1.71	17.1												
TOC	0.5				190 / 290						180 / 300			
Cl	6.2	620	1.5 / 2.1	283 J+	286 J+			374 J+	184 J+	406 J+	202 J+	315 J+	169 J+	
NO3-N	1.02	102	1.16 J+	2.14 J+	3.26 J+	22.1 J+	21.7 J+	2.52 J+	1.67 J+	5.06 J+	2.39 J+	1.82 J+	1.32 J+	
SO4	8.0	800	17.5 J+					267 J+				258 J+	261 J+	
Surfactants	0.168	16.8				1.3 / 2.1	1.4 / 2.1	0.9 / 2.1		1.3 / 2.6		1.8 / 2.2		
T-Phosphorus	0.007													
pH (pH units)	3.48													

LDC #: 21991B6  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

Page: 1 of 1  
 Reviewer: GR  
 2nd Reviewer: LR

**METHOD: Inorganics, Method** See Cover Reason Code: bf  
 **Y** N N/A Were field blanks identified in this SDG?  
 **N** N/A Were target analytes detected in the field blanks?  
**Blank units:** mg/L **Associated sample units:** mg/Kg  
**Sampling date:** 8/3/09 **Safety factor applied:** 10X except TOC 1X  
**Field blank type:** (circle one) Field Blank / Rinsate / Other: FB Associated Samples: 13-17

Analyte	Blank ID	Sample Identification																		
		13	14	15	16	17														
	FB080309-SO (SDG# R0904279)																			
Total alkalinity	3.0						138 J+													
Bicarbonate alkalinity	3.0						138 J+													
Ammonia as N	0.113		0.24 / 0.53				0.19 / 0.67													
TOC (average)	1.2												200 / 300							
Cl	3.9	289 J+	215 J+	224 J+									252 J+							
Nitrate as N	0.65	65	3.77 J+	2.61 J+	6.29 J+															
pH (pH Units)	6.48																			
Total Phosphorus	0.015																			
TDS	22																			
Sulfate	1.6																			
Surfactants	0.043	4.3	1.3 / 2.1																	









LDC#: 21991B6  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 1 of 2  
 Reviewer: CZ  
 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/Kg)		RPD (<50)	Difference	Limits	Qualification (Parent only)
	5	6				
Total Alkalinity	329	307	7			
Bicarbonate Alkalinity	320	290	10			
Carbonate Alkalinity	9	17		8	(- 21)	
Bromide	0.9	0.9		0	(< 1.1)	
Chloride	909	902	1			
Hexavalent Chromium	2.86	3.13	9			
Hexavalent Chromium	2.88	3.11	8			
Nitrate as N	22.1	21.7	2			
pH (pH Units)	9.62	9.69	1			
Sulfate	1500	1720	14			
Surfactants	1.3	1.4		0.1	(≤2.1)	
TOC	2100	2240	6			
Total Phosphorus	843	721	16			
Chlorate (ug/Kg)	2540000	2500000	2			
Perchlorate (ug/Kg)	191000	213000	11			

LDC#: 21991B6

SDG#: See call

**VALIDATION FINDINGS WORKSHEET**

**Field Duplicates**

Page: 2 of 2

Reviewer: CF

2nd Reviewer: [Signature]

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 ( $\leq 50$ )	Difference	Limits	Qualification (Parent only)
	14	15				
Total Alkalinity	1190	1100	8			
Bicarbonate Alkalinity	1090	1010	8			
Carbonate Alkalinity	101	84		17	( $\leq 21$ )	
Chloride	215	224	4			
Nitrate as N	2.00	2.61		0.61	( $\leq 0.53$ )	Jdet/A (fd)
Nitrite as N	0.11	0.10		0.01	( $\leq 0.11$ )	
pH, pH Units	9.85	9.79	1			
Sulfate	293	439	40			
TOC	1150	900	24			
Total Phosphorus	961	907	6			
Chlorate (ug/Kg)	170000	177000	4			
Perchlorate (ug/Kg)	8850	9360	6			

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** September 3, 2009

**LDC Report Date:** November 19, 2009

**Matrix:** Soil/Water

**Parameters:** Wet Chemistry

**Validation Level:** Stage 2B

**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** R0905072

### Sample Identification

SA58-0.5B	SA204-45B
SA58-10B	EB090309-SO2
SA58009-28B	SA58-0.5BMS
SA58-28B	SA58-0.5BMSD
SA53-10B	SA58-0.5BDUP
SA53-25B	
SA53-32B	
SA106-12B	
SA106-20B	
SA106-35B	
RSAU7-0.5B	
RSAU7009-0.5B	
RSAU7-10B	
RSAU7-25B	
RSAU7-40B	
RSAU7-54B	
SA204-0.5B	
SA204-10B	
SA204009-10B	
SA204-30B	

## Introduction

This data review covers 24 soil samples and one water sample listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA Method 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Methods 9040B and 9045D for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, and Lloyd/Kahn Method and EPA SW 846 Method 9060 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 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.
- UU 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 with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
9/18/09	CCV	Surfactants	112 (90-110)	RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B SA204009-10B SA204-30B SA204-45B	J+ (all 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 with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Total phosphorus Sulfate	0.9 mg/L 0.9 mg/L 0.008 mg/L 0.17 mg/L	All water samples in SDG R0905072
ICB/CCB	Alkalinity, total Total phosphorus Sulfate Ammonia as N	0.9 mg/L 0.0076 mg/L 0.171 mg/L 0.0492 mg/L	All water samples in SDG R0905072

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride Sulfate	10 mg/Kg 10 mg/Kg 1.6 mg/Kg 0.6 mg/Kg	SA58-0.5B SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B SA53-32B SA106-12B SA106-20B SA106-35B RSAU7-0.5B RSAU7009-0.5B RSAU7-10B RSAU7-25B
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride Sulfate	18 mg/Kg 18 mg/Kg 1 mg/Kg 0.9 mg/Kg	RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B SA204009-10B SA204-30B SA204-45B
PB (prep blank)	Total organic carbon	60 mg/Kg	SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B SA53-32B SA106-12B SA106-20B SA106-35B RSAU7-0.5B RSAU7009-0.5B RSAU7-10B RSAU7-25B RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B
PB (prep blank)	Total organic carbon	100 mg/Kg	SA58-0.5B
ICB/CCB	Total phosphorus	0.0082 mg/L	SA58-0.5B
ICB/CCB	Total organic carbon	116.0 mg/Kg	All soil samples in SDG R0905072

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Total phosphorus	1.0 mg/Kg	SA106-12B SA106-20B SA106-35B RSAU7-0.5B RSAU7009-0.5B RSAU7-10B RSAU7-25B RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B SA204009-10B SA204-30B SA204-45B
PB (prep blank)	Total phosphorus	1.5 mg/Kg	SA58-0.5B SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B SA53-32B
ICB/CCB	Total phosphorus	0.0058 mg/L	SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B
ICB/CCB	Sulfate	0.070 mg/L	RSAU7-0.5B RSAU7009-0.5B
ICB/CCB	Chloride	0.043 mg/L	SA106-12B SA106-20B
ICB/CCB	Chloride	0.136 mg/L	SA58-0.5B SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B SA53-32B SA106-35B RSAU7-0.5B RSAU7009-0.5B RSAU7-10B RSAU7-25B RSAU7-40B SA204-45B
ICB/CCB	Sulfate	0.167 mg/L	SA58-0.5B SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B



Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Sulfate	0.200 mg/L	SA53-32B SA106-35B RSAU7-10B RSAU7-25B RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB090309-SO2	Total phosphorus Sulfate	0.0015 mg/L 1.4 mg/L	0.050U mg/L 2.0U mg/L
SA106-20B	Total organic carbon	240 mg/Kg	300U mg/Kg
SA106-35B	Total organic carbon	180 mg/Kg	290U mg/Kg
RSAU7-54B	Total organic carbon	300 mg/Kg	300U mg/Kg

Sample EB090309-SO2 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
EB090309-SO2	9/3/09	Ammonia as N Total organic carbon pH Total phosphorus Sulfate Surfactants	0.624 mg/L 0.3 mg/L 6.18 units 0.015 mg/L 1.4 mg/L 0.103 mg/L	RSAU7-0.5B RSAU7009-0.5B RSAU7-10B RSAU7-25B RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B SA204009-10B SA204-30B SA204-45B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAU7009-0.5B	Surfactants	0.9 mg/Kg	2.1U mg/Kg
RSAU7-10B	Surfactants	0.8 mg/Kg	2.1U mg/Kg
RSAU7-40B	Surfactants	1.3 mg/Kg	2.6U mg/Kg
RSAU7-54B	Total organic carbon	300 mg/Kg	300U mg/Kg
SA204-0.5B	Surfactants	1.5 mg/Kg	2.1U mg/Kg
SA204-10B	Surfactants	0.9 mg/Kg	2.1U mg/Kg
SA204009-10B	Surfactants	1.2 mg/Kg	2.1U mg/Kg

Samples FB072909-SO (from SDG R0904226) and FB080309-SO (from SDG R0904279) were identified as field blanks. No contaminant concentrations were found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB072909-SO	7/29/09	Perchlorate Ammonia as N Total organic carbon Chloride Nitrate as N Sulfate Surfactants Total phosphorus pH	0.5 ug/L 1.71 mg/L 0.5 mg/L 6.2 mg/L 1.02 mg/L 8.0 mg/L 0.168 mg/L 0.007 mg/L 3.48 units	SA58-0.5B SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B SA53-32B SA106-12B SA106-20B SA106-35B
FB080309-SO	8/3/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Total dissolved solids Sulfate Surfactants	3.0 mg/L 3.0 mg/L 0.113 mg/L 1.2 mg/L 3.9 mg/L 0.65 mg/L 6.48 units 0.015 mg/L 22 mg/L 1.6 mg/L 0.043 mg/L	RSAU7-0.5B RSAU7009-0.5B RSAU7-10B RSAU7-25B RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B SA204009-10B SA204-30B SA204-45B

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
SA58-0.5B	Chloride Nitrate as N Sulfate	394 mg/Kg 20.5 mg/Kg 186 mg/Kg	394J+ mg/Kg 20.5J+ mg/Kg 186J+ mg/Kg
SA58-10B	Chloride Nitrate as N Sulfate	530 mg/Kg 25.0 mg/Kg 236 mg/Kg	530J+ mg/Kg 25.0J+ mg/Kg 236J+ mg/Kg
SA58009-28B	Chloride Nitrate as N Surfactants	605 mg/Kg 23.0 mg/Kg 0.9 mg/Kg	605J+ mg/Kg 23.0J+ mg/Kg 2.3U mg/Kg
SA58-28B	Chloride Nitrate as N Sulfate Surfactants	601 mg/Kg 22.8 mg/Kg 601 mg/Kg 1.0 mg/Kg	601J+ mg/Kg 22.8J+ mg/Kg 601J+ mg/Kg 2.3U mg/Kg
SA53-10B	Chloride Nitrate as N Sulfate Surfactants	402 mg/Kg 6.64 mg/Kg 170 mg/Kg 0.7 mg/Kg	402J+ mg/Kg 6.64J+ mg/Kg 170J+ mg/Kg 2.2U mg/Kg
SA53-25B	Chloride Nitrate as N Surfactants	138 mg/Kg 7.10 mg/Kg 0.6 mg/Kg	138J+ mg/Kg 7.10J+ mg/Kg 2.4U mg/Kg
SA53-32B	Chloride Nitrate as N Sulfate Surfactants	188 mg/Kg 5.01 mg/Kg 553 mg/Kg 1.2 mg/Kg	188J+ mg/Kg 5.01J+ mg/Kg 553J+ mg/Kg 2.5U mg/Kg
SA106-12B	Nitrate as N Sulfate Surfactants	71.5 mg/Kg 363 mg/Kg 1.8 mg/Kg	71.5J+ mg/Kg 363J+ mg/Kg 2.1U mg/Kg
SA106-20B	Total organic carbon Nitrate as N Surfactants	240 mg/Kg 34.6 mg/Kg 1.3 mg/Kg	300U mg/Kg 34.6J+ mg/Kg 2.1U mg/Kg
SA106-35B	Total organic carbon Chloride Nitrate as N Sulfate Surfactants	180 mg/Kg 243 mg/Kg 3.38 mg/Kg 513 mg/Kg 2.0 mg/Kg	290U mg/Kg 243J+ mg/Kg 3.38J+ mg/Kg 513J+ mg/Kg 3.3U mg/Kg
RSAU7-0.5B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	261 mg/Kg 254 mg/Kg 27.8 mg/Kg 4.73 mg/Kg	261J+ mg/Kg 254J+ mg/Kg 27.8J+ mg/Kg 4.73J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAU7009-0.5B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	291 mg/Kg 288 mg/Kg 16.9 mg/Kg 3.19 mg/Kg 0.9 mg/Kg	291J+ mg/Kg 288J+ mg/Kg 16.9J+ mg/Kg 3.19J+ mg/Kg 2.1U mg/Kg
RSAU7-10B	Chloride Nitrate as N Surfactants	44.9 mg/Kg 5.28 mg/Kg 0.8 mg/Kg	44.9J+ mg/Kg 5.28J+ mg/Kg 2.1U mg/Kg
RSAU7-25B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	110 mg/Kg 110 mg/Kg 270 mg/Kg 4.34 mg/Kg	110J+ mg/Kg 110J+ mg/Kg 270J+ mg/Kg 4.34J+ mg/Kg
RSAU7-40B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	262 mg/Kg 262 mg/Kg 178 mg/Kg 4.01 mg/Kg 1.3 mg/Kg	262J+ mg/Kg 262J+ mg/Kg 178J+ mg/Kg 4.01J+ mg/Kg 2.6U mg/Kg
RSAU7-54B	Total organic carbon Chloride Nitrate as N	300 mg/Kg 106 mg/Kg 2.36 mg/Kg	300U mg/Kg 106J+ mg/Kg 2.36J+ mg/Kg
SA204-0.5B	Chloride Nitrate as N Surfactants	20.9 mg/Kg 3.51 mg/Kg 1.5 mg/Kg	20.9J+ mg/Kg 3.51J+ mg/Kg 2.1U mg/Kg
SA204-10B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	245 mg/Kg 240 mg/Kg 82.3 mg/Kg 4.03 mg/Kg 0.9 mg/Kg	245J+ mg/Kg 240J+ mg/Kg 82.3J+ mg/Kg 4.03J+ mg/Kg 2.1U mg/Kg
SA204009-10B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	252 mg/Kg 252 mg/Kg 81.2 mg/Kg 4.06 mg/Kg 1.2 mg/Kg	252J+ mg/Kg 252J+ mg/Kg 81.2J+ mg/Kg 4.06J+ mg/Kg 2.1U mg/Kg
SA204-30B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	136 mg/Kg 136 mg/Kg 31.4 mg/Kg 2.44 mg/Kg	136J+ mg/Kg 136J+ mg/Kg 31.4J+ mg/Kg 2.44J+ mg/Kg
SA204-45B	Chloride Nitrate as N	249 mg/Kg 3.45 mg/Kg	249J+ mg/Kg 3.45J+ mg/Kg

#### IV. Matrix Spike/Matrix Spike Duplicates

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

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

#### VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate 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 R0905072	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

#### IX. Overall Assessment

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

#### X. Field Duplicates

Samples SA58009-28B and SA58-28B, samples RSAU7-0.5B and RSAU7009-0.5B, and samples SA204-10B and SA204009-10B 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
	SA58009-28B	SA58-28B				
Alkalinity, total	300 mg/Kg	306 mg/Kg	2 ( $\leq 50$ )	-	-	-
Alkalinity, bicarbonate	294 mg/Kg	301 mg/Kg	2 ( $\leq 50$ )	-	-	-
Alkalinity, carbonate	6 mg/Kg	5 mg/Kg	-	1 ( $\leq 23$ )	-	-
Bromide	0.6 mg/Kg	0.6 mg/Kg	-	0 ( $\leq 1.1$ )	-	-
Chloride	605 mg/Kg	601 mg/Kg	1 ( $\leq 50$ )	-	-	-
Nitrate as N	23.0 mg/Kg	22.8 mg/Kg	1 ( $\leq 50$ )	-	-	-
pH	8.48 units	8.50 units	0 ( $\leq 50$ )	-	-	-
Sulfate	820 mg/Kg	601 mg/Kg	31 ( $\leq 50$ )	-	-	-
Surfactants	0.9 mg/Kg	1.0 mg/Kg	-	0.1 ( $\leq 2.3$ )	-	-
Total organic carbon	830 mg/Kg	710 mg/Kg	-	120 ( $\leq 290$ )	-	-
Total phosphorus	547 mg/Kg	527 mg/Kg	4 ( $\leq 50$ )	-	-	-
Chlorate	7670 ug/Kg	8030 ug/Kg	5 ( $\leq 50$ )	-	-	-
Perchlorate	300000 ug/Kg	323000 ug/Kg	7 ( $\leq 50$ )	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAU7-0.5B	RSAU7009-0.5B				
Alkalinity, total	261 mg/Kg	291 mg/Kg	11 ( $\leq 50$ )	-	-	-
Alkalinity, bicarbonate	254 mg/Kg	288 mg/Kg	13 ( $\leq 50$ )	-	-	-
Alkalinity, carbonate	7 mg/Kg	3 mg/Kg	-	4 ( $\leq 21$ )	-	-
Chloride	27.8 mg/Kg	16.9 mg/Kg	49 ( $\leq 50$ )	-	-	-
Nitrate as N	4.73 mg/Kg	3.19 mg/Kg	39 ( $\leq 50$ )	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAU7-0.5B	RSAU7009-0.5B				
pH	8.86 units	9.02 units	2 ( $\leq 50$ )	-	-	-
Sulfate	74.7 mg/Kg	46.9 mg/Kg	46 ( $\leq 50$ )	-	-	-
Surfactants	0.6U mg/Kg	0.9 mg/Kg	-	0.3 ( $\leq 2.1$ )	-	-
Total organic carbon	670 mg/Kg	670 mg/Kg	-	0 ( $\leq 290$ )	-	-
Total phosphorus	1070 mg/Kg	1120 mg/Kg	5 ( $\leq 50$ )	-	-	-
Chlorate	464 ug/Kg	419 ug/Kg	-	45 ( $\leq 210$ )	-	-
Perchlorate	806 ug/Kg	1020 ug/Kg	-	214 ( $\leq 530$ )	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA204-10B	SA204009-10B				
Alkalinity, total	245 mg/Kg	252 mg/Kg	3 ( $\leq 50$ )	-	-	-
Alkalinity, bicarbonate	240 mg/Kg	252 mg/Kg	5 ( $\leq 50$ )	-	-	-
Alkalinity, carbonate	4 mg/Kg	3U mg/Kg	-	1 ( $\leq 21$ )	-	-
Chloride	82.3 mg/Kg	81.2 mg/Kg	1 ( $\leq 50$ )	-	-	-
Hexavalent chromium	0.50 mg/Kg	0.45 mg/Kg	-	0.05 ( $\leq 0.41$ )	-	-
Hexavalent chromium	0.51 mg/Kg	0.37 mg/Kg	-	0.14 ( $\leq 0.41$ )	-	-
Nitrate as N	4.03 mg/Kg	4.06 mg/Kg	1 ( $\leq 50$ )	-	-	-
pH	8.58 units	8.79 units	2 ( $\leq 50$ )	-	-	-
Sulfate	584 mg/Kg	604 mg/Kg	3 ( $\leq 50$ )	-	-	-
Surfactants	0.9 mg/Kg	1.2 mg/Kg	-	0.3 ( $\leq 2.1$ )	-	-
Total organic carbon	990 mg/Kg	970 mg/Kg	-	20 ( $\leq 290$ )	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA204-10B	SA204009-10B				
Total phosphorus	762 mg/Kg	923 mg/Kg	19 ( $\leq 50$ )	-	-	-
Chlorate	19900 ug/Kg	14000 ug/Kg	35 ( $\leq 50$ )	-	-	-
Perchlorate	12700 ug/Kg	122000 ug/Kg	162 ( $\leq 50$ )	-	J (all detects)	A



**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Data Qualification Summary - SDG R0905072**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905072	RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B SA204009-10B SA204-30B SA204-45B	Surfactants	J+ (all detects)	P	Calibration (CCV %R) (c)
R0905072	SA58-0.5B SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B SA53-32B SA106-12B SA106-20B SA106-35B RSAU7-0.5B RSAU7009-0.5B RSAU7-10B RSAU7-25B RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B SA204009-10B SA204-30B SA204-45B EB090309-SO2	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0905072	SA204-10B SA204009-10B	Perchlorate	J (all detects)	A	Field duplicates (RPD) (fd)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0905072**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905072	EB090309-SO2	Total phosphorus Sulfate	0.050U mg/L 2.0U mg/L	A	bl
R0905072	SA106-20B	Total organic carbon	300U mg/Kg	A	bl
R0905072	SA106-35B	Total organic carbon	290U mg/Kg	A	bl
R0905072	RSAU7-54B	Total organic carbon	300U mg/Kg	A	bl

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Equipment Blank Data Qualification Summary - SDG R0905072**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905072	RSAU7009-0.5B	Surfactants	2.1U mg/Kg	A	be
R0905072	RSAU7-10B	Surfactants	2.1U mg/Kg	A	be
R0905072	RSAU7-40B	Surfactants	2.6U mg/Kg	A	be
R0905072	RSAU7-54B	Total organic carbon	300U mg/Kg	A	be
R0905072	SA204-0.5B	Surfactants	2.1U mg/Kg	A	be
R0905072	SA204-10B	Surfactants	2.1U mg/Kg	A	be
R0905072	SA204009-10B	Surfactants	2.1U mg/Kg	A	be

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0905072**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905072	SA58-0.5B	Chloride Nitrate as N Sulfate	394J+ mg/Kg 20.5J+ mg/Kg 186J+ mg/Kg	A	bf
R0905072	SA58-10B	Chloride Nitrate as N Sulfate	530J+ mg/Kg 25.0J+ mg/Kg 236J+ mg/Kg	A	bf
R0905072	SA58009-28B	Chloride Nitrate as N Surfactants	605J+ mg/Kg 23.0J+ mg/Kg 2.3U mg/Kg	A	bf
R0905072	SA58-28B	Chloride Nitrate as N Sulfate Surfactants	601J+ mg/Kg 22.8J+ mg/Kg 601J+ mg/Kg 2.3U mg/Kg	A	bf
R0905072	SA53-10B	Chloride Nitrate as N Sulfate Surfactants	402J+ mg/Kg 6.64J+ mg/Kg 170J+ mg/Kg 2.2U mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905072	SA53-25B	Chloride Nitrate as N Surfactants	138J+ mg/Kg 7.10J+ mg/Kg 2.4U mg/Kg	A	bf
R0905072	SA53-32B	Chloride Nitrate as N Sulfate Surfactants	188J+ mg/Kg 5.01J+ mg/Kg 553J+ mg/Kg 2.5U mg/Kg	A	bf
R0905072	SA106-12B	Nitrate as N Sulfate Surfactants	71.5J+ mg/Kg 363J+ mg/Kg 2.1U mg/Kg	A	bf
R0905072	SA106-20B	Total organic carbon Nitrate as N Surfactants	300U mg/Kg 34.6J+ mg/Kg 2.1U mg/Kg	A	bf
R0905072	SA106-35B	Total organic carbon Chloride Nitrate as N Sulfate Surfactants	290U mg/Kg 243J+ mg/Kg 3.38J+ mg/Kg 513J+ mg/Kg 3.3U mg/Kg	A	bf
R0905072	RSAU7-0.5B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	261J+ mg/Kg 254J+ mg/Kg 27.8J+ mg/Kg 4.73J+ mg/Kg	A	bf
R0905072	RSAU7009-0.5B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	291J+ mg/Kg 288J+ mg/Kg 16.9J+ mg/Kg 3.19J+ mg/Kg 2.1U mg/Kg	A	bf
R0905072	RSAU7-10B	Chloride Nitrate as N Surfactants	44.9J+ mg/Kg 5.28J+ mg/Kg 2.1U mg/Kg	A	bf
R0905072	RSAU7-25B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	110J+ mg/Kg 110J+ mg/Kg 270J+ mg/Kg 4.34J+ mg/Kg	A	bf
R0905072	RSAU7-40B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	262J+ mg/Kg 262J+ mg/Kg 178J+ mg/Kg 4.01J+ mg/Kg 2.6U mg/Kg	A	bf
R0905072	RSAU7-54B	Total organic carbon Chloride Nitrate as N	300U mg/Kg 106J+ mg/Kg 2.36J+ mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905072	SA204-0.5B	Chloride Nitrate as N Surfactants	20.9J+ mg/Kg 3.51J+ mg/Kg 2.1U mg/Kg	A	bf
R0905072	SA204-10B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	245J+ mg/Kg 240J+ mg/Kg 82.3J+ mg/Kg 4.03J+ mg/Kg 2.1U mg/Kg	A	bf
R0905072	SA204009-10B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	252J+ mg/Kg 252J+ mg/Kg 81.2J+ mg/Kg 4.06J+ mg/Kg 2.1U mg/Kg	A	bf
R0905072	SA204-30B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	136J+ mg/Kg 136J+ mg/Kg 31.4J+ mg/Kg 2.44J+ mg/Kg	A	bf
R0905072	SA204-45B	Chloride Nitrate as N	249J+ mg/Kg 3.45J+ mg/Kg	A	bf

## Tronox Northgate Henderson

### VALIDATION COMPLETENESS WORKSHEET

LDC #: 21991C6  
 SDG #: R0905072  
 Laboratory: Columbia Analytical Services

Stage 2B

Date: 11-18-09  
 Page: 1 of 1  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**METHOD: (Analyte)** Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Chlorate (EPA Method 300.1), Cyanide (EPA SW846 Method 9012A), ~~Dissolved Hexavalent Chromium (EPA Method 218.6)~~, Hexavalent Chromium (EPA SW846 Method 7199), Nitrite-N (EPA Method 353.2), pH (EPA SW846 Method 9040B/9045D), Surfactants (SM5540C), Perchlorate (EPA Method 314.0), Total Phosphorus (EPA Method 365.1), TOC (Lloyd/Kahn / 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: <u>9/3/09</u>
Ia.	Initial calibration	A	
Iib.	Calibration verification	SW	
III.	Blanks	SW	
IV	Surrogate Spikes	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS/D
VI.	Duplicates	A	DUP
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(3,4), (11,12), (18,19)
XI.	Field blanks	SW	EB=22, FB=FB0729001-SO, FB080309-SO (506# R0904226) (506# R0904279)

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

Validated Samples: A "soil except 22 = water

1	SA58-0.5B	11	RSAU7-0.5B	21	SA204-45B	31	PPBW
2	SA58-10B	12	RSAU7009-0.5B	22	EB090309-SO2	32	PPS (1-14)
3	SA58009-28B	13	RSAU7-10B	23	SA58-0.5BMS	33	PPS (15-21)
4	SA58-28B	14	RSAU7-25B	24	SA58-0.5BMSD	34	
5	SA53-10B	15	RSAU7-40B	25	SA58-0.5BDUP	35	
6	SA53-25B	16	RSAU7-54B	26		36	
7	SA53-32B	17	SA204-0.5B	27		37	
8	SA106-12B	18	SA204-10B	28		38	
9	SA106-20B	19	SA204009-10B	29		39	
10	SA106-35B	20	SA204-30B	30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_





**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

**METHOD:** Inorganics, Method See Cover

Reason Code: bl

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

**Conc. units: mg/L**      **Associated Samples: All Water**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
Alk., Total	PB (mg/L) 0.9	0.9		22			
Alk., Bicarb	0.9						
T-P	0.008	0.0076					
SO4	0.17	0.171					
NH3-N		0.0492					

**Conc. units: mg/Kg**      **Associated Samples: 1-14**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
Alk., Total	PB (mg/Kg) 10			No Qualifiers			
Alk., Bicarb	10						
Cl	1.6						
SO4	0.6						







**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

**METHOD:** Inorganics. Method See Cover

Reason Code: bl

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.

Conc. units: mg/Kg Associated Samples: 11, 12

Analyte	Blank ID PB (mg/Kg)	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
SO4		0.070				

Conc. units: mg/Kg Associated Samples: 8, 9

Analyte	Blank ID PB (mg/Kg)	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
Cl		0.043				

Conc. units: mg/Kg Associated Samples: 1-7, 10-15, 21

Analyte	Blank ID PB (mg/Kg)	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
Cl		0.136				

Conc. units: mg/Kg Associated Samples: 1-6

Analyte	Blank ID PB (mg/Kg)	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
SO4		0.167				

**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

Reason Code: bl

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.

Conc. units: mg/Kg

Associated Samples: 7, 10, 13-18

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
SO4	PB (mg/Kg)	0.200	2.00				

LDC #: 21991C6  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

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

**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:** mg/L **Associated sample units:** mg/Kg Reason Code: be  
**Sampling date:** 8/4/09 9/3/09 Soil factor applied 10x except TOC @ 1x  
**Field blank type:** (circle one) Field Blank / Rinsate / Other EB Associated Samples: 11-21

Analyte	Blank ID	Sample Identification																
		12	13	15	16	17	18	19										
Ammonia as N	22																	
TOC (average)	0.624																	
pH (pH Units)	0.3				300 / 300													
Total Phosphorus	6.18																	
Sulfate	0.015																	
Surfactants	1.4																	
	0.103	10.3	0.8 / 2.1	1.3 / 2.6		1.5 / 2.1	0.9 / 2.1	1.2 / 2.1										

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

**METHOD:** Inorganics, EPA Method. See Cover

Y N/A Were field blanks identified in this SDG?

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

**Blank units:** mg/L. **Associated sample units:** mg/Kg

**Sampling date:** 7/29/09 **Soil factor applied:** 10x

**Field blank type:** (circle one) Field Blank / Rinsate / Other:

Reason Code: bf

Associated Samples: 1-10

Analyte	Blank ID	Action Limit	Sample Identification									
			1	2	3	4	5	6	7	8	9	10
Perchlorate (ug/L)	0.5											
NH3-N	1.71	17.1										
TOC	0.5											
Cl	6.2	620	394 J+	530 J+	605 J+	601 J+	402 J+	138 J+	188 J+		240 / 300	180 / 290
NO3-N	1.02	102	20.5 J+	25.0 J+	23.0 J+	22.8 J+	6.64 J+	7.10 J+	5.01 J+	71.5 J+	34.6 J+	3.38 J+
SO4	8.0	800	130 J+	236 J+		301 J+	170 J+		553 J+	363 J+		510 J+
Surfactants	0.168	16.8			0.9 / 2.3	1.0 / 2.3	0.7 / 2.2	0.6 / 2.4	1.2 / 2.5	1.8 / 2.1	1.3 / 2.1	2.0 / 3.3
T-Phosphorus	0.007											
pH (pH units)	3.48											

LDC #: 21991C6  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

Page: 1 of 1  
 Reviewer: CE  
 2nd Reviewer: LE

**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:** mg/L **Associated sample units:** mg/Kg  
**Sampling date:** 8/3/09 **Soil factor applied:** 10X except TOC 1X  
**Field blank type:** (circle one) Field Blank / Rinsate / Other: FB Reason Code: bf  
 Associated Samples: 11-21

Analyte	Blank ID	Sample Identification																		
		11	12	13	14	15	16	17	18	19	20	21								
Total alkalinity	FB080309-SO (SDG# R0904279)	300	291 J+		110 J+	262 J+			245 J+	252 J+	136 J+									
Bicarbonate alkalinity		300	288 J+		110 J+	262 J+			240 J+	252 J+	136 J+									
Ammonia as N	0.113	11.3																		
TOC (average)	1.2					300 / 300														
Cl	3.9	390	16.9 J+	44.9 J+	270 J+	178 J+	106 J+	20.9 J+	82.3 J+	81.2 J+	31.4 J+	249 J+								
Nitrate as N	0.05	55	3.19 J+	5.28 J-	4.34 J+	4.01 J+	2.36 J+	3.51 J+	4.03 J+	4.06 J+	2.44 J+	3.45 J+								
pH (pH Units)	6.48																			
Total Phosphorus	0.015																			
TDS	22																			
Sulfate	1.6																			
Surfactants	0.043	4.3	0.9 / 2.1	0.8 / 2.1		1.3 / 2.6		1.5 / 2.1	0.9 / 2.1	1.2 / 2.1										

LDC#: 21991C6

SDG# See Cover

## VALIDATION FINDINGS WORKSHEET

## Field Duplicates

Page: 1 of 3

Reviewer: CR2nd 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/Kg)		RPD ( $\leq 50$ )	Difference	Limits	Qualification (Parent only)
	3	4				
Total Alkalinity	300	306	2			
Bicarbonate Alkalinity	294	301	2			
Carbonate Alkalinity	6	5		1	( $\leq 23$ )	
Bromide	0.6	0.6		0	( $\leq 1.1$ )	
Chloride	605	601	1			
Nitrate as N	23.0	22.8	1			
pH (pH Units)	8.48	8.50	0			
Sulfate	820	601	31			
Surfactants	0.9	1.0		0.1	( $\leq 2.3$ )	
TOC	830	710		120	( $\leq 290$ )	
Total Phosphorus	547	527	4			
Chlorate (ug/Kg)	7670	8030	5			
Perchlorate (ug/Kg)	300000	323000	7			

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LDC#: 21991C6  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 2 of 3  
 Reviewer: CR  
 2nd Reviewer: [Signature]

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)		I.P.D. (≤50)	Difference	Limits	Qualification (Parent only)
	11	12				
Total Alkalinity	261	291	11			
Bicarbonate Alkalinity	254	288	13			
Carbonate Alkalinity	7	3		4	(≤21)	
Chloride	27.8	16.9	49			
Nitrate as N	4.73	3.19	39			
pH (pH Units)	8.86	9.02	2			
Sulfate	74.7	46.9	46			
Surfactants	0.6U	0.9		0.3	(≤2.1)	
TOC	670	670		0	(≤290)	
Total Phosphorus	1070	1120	5			
Chlorate (ug/Kg)	464	419		45	(≤210)	
Perchlorate (ug/Kg)	806	1020		214	(≤530)	

LDC#: 21991C6  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
Field Duplicates

Page: 33 of 33  
 Reviewer: CR  
 2nd Reviewer: [Signature]

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)
	18	19				
Total Alkalinity	245	252	3			
Bicarbonate Alkalinity	240	252	5			
Carbonate Alkalinity	4	3U		1	(-21)	
Chloride	82.3	81.2	1			
Hexavalent Chromium	0.50	0.45		0.05	(≤0.41)	
Hexavalent Chromium	0.51	0.37		0.14	(≤0.41)	
Nitrate as N	4.03	4.06	1			
pH (pH Units)	5.58	5.75	2			
Sulfate	584	604	3			
Surfactants	0.9	1.2		0.3	(-2.1)	
TOC	990	970		20	(≤290)	
Total Phosphorus	762	923	19			
Chlorate (ug/Kg)	19900	14000	35			
Perchlorate (ug/Kg)	12700	122000	162			Jdet/A (fd)

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** September 10, 2009

**LDC Report Date:** December 17, 2009

**Matrix:** Soil/Water

**Parameters:** Wet Chemistry

**Validation Level:** Stage 2B

**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** R0905177

### Sample Identification

EB091009-SO1	EB091009-SO1MS
EB091009-SO2	EB091009-SO1MSD
SA102-10B	EB091009-SO1DUP
SA102-30B	SA109-34BMS
SA109-10B	SA109-34BMSD
SA109-25B	SA109-34BDUP
SA109-34B	SA126-40BMS
SA124009-10B	SA126-40BDUP
SA124-0.5B	
SA124-10B	
SA125-25B	
SA125-39B	
SA125009-39B	
SA125-0.5B	
SA125-10B	
SA126-0.5B	
SA126-10B	
SA126-18B	
SA126-25B	
SA126-40B	

## Introduction

This data review covers 23 soil samples and 5 water samples listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA Method 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Methods 9040B and 9045D for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, and Lloyd/Kahn Method and EPA SW 846 Method 9060 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 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 with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Chloride Total phosphorus	0.14 mg/L 0.008 mg/L	All water samples in SDG R0905177
ICB/CCB	Chloride Total phosphorus Sulfate Ammonia as N	0.164 mg/L 0.0076 mg/L 0.091 mg/L 0.0152 mg/L	All water samples in SDG R0905177
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride	11 mg/Kg 11 mg/Kg 1.1 mg/Kg	SA102-10B SA102-30B SA109-10B SA109-25B SA109-34B SA124009-10B
ICB/CCB	Alkalinity, total	0.5 mg/L	SA102-10B SA102-30B SA109-10B SA109-25B SA109-34B SA124009-10B

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate	5 mg/Kg 5 mg/Kg	SA124-0.5B SA124-10B SA125-25B SA125-39B SA125009-39B SA125-0.5B SA125-10B SA126-0.5B SA126-10B SA126-18B
PB (prep blank)	Chloride	2.7 mg/Kg	SA126-25B SA126-40B
PB (prep blank)	Total organic carbon	100 mg/Kg	SA102-10B SA102-30B SA109-10B SA109-25B SA109-34B SA124009-10B SA124-0.5B
PB (prep blank)	Total organic carbon	40 mg/Kg	SA124-10B SA125-25B SA125-39B SA125009-39B SA125-0.5B SA125-10B SA126-0.5B SA126-10B SA126-18B SA126-25B SA126-40B
ICB/CCB	Total organic carbon	116.0 mg/Kg	All soil samples in SDG R0905177
PB (prep blank)	Total phosphorus	1.0 mg/Kg	SA102-10B SA102-30B SA109-10B SA109-25B SA109-34B SA124009-10B
ICB/CCB	Ammonia as N	0.0073 mg/L	SA124-0.5B SA124-10B SA125-25B SA125-39B SA125009-39B SA125-0.5B SA125-10B
ICB/CCB	Chloride	0.136 mg/L	SA126-25B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Sulfate	0.170 mg/L	SA102-30B SA109-25B SA109-34B
ICB/CCB	Sulfate	0.182 mg/L	SA124009-10B SA124-10B SA125-25B SA125-39B SA125009-39B SA125-10B SA126-0.5B SA126-10B SA126-18B SA126-25B SA126-40B
ICB/CCB	Chloride	0.100 mg/L	EB091009-SO2 SA102-10B SA125-0.5B SA126-10B SA126-18B SA126-40B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB091009-SO1	Total phosphorus Sulfate Ammonia as N	0.012 mg/L 2.0 mg/L 0.041 mg/L	0.050U mg/L 2.0U mg/L 0.050U mg/L
EB091009-SO2	Chloride Total phosphorus Sulfate Ammonia as N	1.8 mg/L 0.011 mg/L 1.2 mg/L 0.041 mg/L	2.0U mg/L 0.050U mg/L 2.0U mg/L 0.050U mg/L
SA109-34B	Total organic carbon	170 mg/Kg	290U mg/Kg
SA124009-10B	Total organic carbon	170 mg/Kg	290U mg/Kg
SA125-39B	Total organic carbon	170 mg/Kg	290U mg/Kg
SA126-40B	Total organic carbon	180 mg/Kg	290U mg/Kg
SA125-0.5B	Ammonia as N	0.11 mg/Kg	0.55U mg/Kg



Samples EB091009-SO1 and EB091009-SO2 were identified as equipment blanks. No contaminant concentrations were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB091009-SO1	9/10/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Sulfate Surfactants	1.0 mg/L 1.0 mg/L 0.041 mg/L 0.3 mg/L 2.4 mg/L 0.90 mg/L 5.67 units 0.012 mg/L 2.0 mg/L 0.042 mg/L	All soil samples in SDG R0905177
*EB091009-SO2	9/10/09	Ammonia as N Total organic carbon Chloride pH Total phosphorus Sulfate Surfactants	0.041 mg/L 0.3 mg/L 1.8 mg/L 6.31 units 0.011 mg/L 1.2 mg/L 0.081 mg/L	All soil samples in SDG R0905177

\*Corrected units for EB091009-SO2

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA102-10B	Ammonia as N Chloride Nitrate as N	0.18 mg/Kg 118 mg/Kg 1.76 mg/Kg	0.54U mg/Kg 118J+ mg/Kg 1.76J+ mg/Kg
SA102-30B	Nitrate as N	2.36 mg/Kg	2.36J+ mg/Kg
SA109-10B	Chloride Nitrate as N	16.6 mg/Kg 1.23 mg/Kg	16.6J+ mg/Kg 1.23J+ mg/Kg
SA109-25B	Chloride Nitrate as N Surfactants	21.1 mg/Kg 1.19 mg/Kg 1.3 mg/Kg	21.1J+ mg/Kg 1.19J+ mg/Kg 2.4U mg/Kg
SA109-34B	Total organic carbon Chloride Nitrate as N	170 mg/Kg 192 mg/Kg 3.26 mg/Kg	290U mg/Kg 192J+ mg/Kg 3.26J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA124009-10B	Total organic carbon Nitrate as N Surfactants	170 mg/Kg 15.8 mg/Kg 0.9 mg/Kg	290U mg/Kg 15.8J+ mg/Kg 2.6U mg/Kg
SA124-0.5B	Chloride Nitrate as N	142 mg/Kg 3.62 mg/Kg	142J+ mg/Kg 3.62J+ mg/Kg
SA124-10B	Nitrate as N Surfactants	14.1 mg/Kg 0.7 mg/Kg	14.1J+ mg/Kg 2.2U mg/Kg
SA125-25B	Nitrate as N	5.11 mg/Kg	5.11J+ mg/Kg
SA125-39B	Total organic carbon Chloride Nitrate as N Surfactants	170 mg/Kg 211 mg/Kg 3.79 mg/Kg 0.9 mg/Kg	290J+ mg/Kg 211J+ mg/Kg 3.79J+ mg/Kg 2.5U mg/Kg
SA125009-39B	Chloride Nitrate as N Surfactants	175 mg/Kg 3.13 mg/Kg 1.1 mg/Kg	175J+ mg/Kg 3.13J+ mg/Kg 2.1U mg/Kg
SA125-0.5B	Ammonia as N Chloride Nitrate as N Surfactants	0.11 mg/Kg 9.7 mg/Kg 1.32 mg/Kg 0.9 mg/Kg	0.55U mg/Kg 9.7J+ mg/Kg 1.32J+ mg/Kg 2.2U mg/Kg
SA125-10B	Nitrate as N	4.53 mg/Kg	4.53J+ mg/Kg
SA126-0.5B	Chloride Nitrate as N	74.9 mg/Kg 3.70 mg/Kg	74.9J+ mg/Kg 3.70J+ mg/Kg
SA126-10B	Chloride Nitrate as N	6.5 mg/Kg 1.05 mg/Kg	6.5J+ mg/Kg 1.05J+ mg/Kg
SA126-18B	Chloride Nitrate as N	17.1 mg/Kg 1.75 mg/Kg	17.1J+ mg/Kg 1.75J+ mg/Kg
SA126-25B	Chloride Nitrate as N	40.5 mg/Kg 2.39 mg/Kg	40.5J+ mg/Kg 2.39J+ mg/Kg
SA126-40B	Total organic carbon Nitrate as N Surfactants	180 mg/Kg 5.33 mg/Kg 1 mg/Kg	290U mg/Kg 5.33J+ mg/Kg 2.7U mg/Kg

Sample FB072909-SO (from SDG R0904226) 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
FB072909-SO	7/29/09	Perchlorate Ammonia as N Total organic carbon Chloride Nitrate as N Sulfate Surfactants Total phosphorus pH	0.5 ug/L 1.71 mg/L 0.5 mg/L 6.2 mg/L 1.02 mg/L 8.0 mg/L 0.168 mg/L 0.007 mg/L 3.48 units	All soil samples in SDG R0905177

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA102-10B	Ammonia as N Chloride Nitrate as N Sulfate	0.18 mg/Kg 118 mg/Kg 1.76 mg/Kg 60.3 mg/Kg	0.54U mg/Kg 118J+ mg/Kg 1.76J+ mg/Kg 60.3J+ mg/Kg
SA102-30B	Chloride Nitrate as N Sulfate	295 mg/Kg 2.36 mg/Kg 326 mg/Kg	295J+ mg/Kg 2.36J+ mg/Kg 326J+ mg/Kg
SA109-10B	Chloride Nitrate as N Sulfate	16.6 mg/Kg 1.23 mg/Kg 50.8 mg/Kg	16.6J+ mg/Kg 1.23J+ mg/Kg 50.8J+ mg/Kg
SA109-25B	Perchlorate Chloride Nitrate as N Surfactants	1320 mg/Kg 21.1 mg/Kg 1.19 mg/Kg 1.3 mg/Kg	6100U mg/Kg 21.1J+ mg/Kg 1.19J+ mg/Kg 2.4U mg/Kg
SA109-34B	Total organic carbon Chloride Nitrate as N Sulfate	170 mg/Kg 192 mg/Kg 3.26 mg/Kg 601 mg/Kg	290U mg/Kg 192J+ mg/Kg 3.26J+ mg/Kg 601J+ mg/Kg
SA124009-10B	Ammonia as N Total organic carbon Nitrate as N Sulfate Surfactants	3.09 mg/Kg 170 mg/Kg 15.8 mg/Kg 164 mg/Kg 0.9 mg/Kg	3.09J+ mg/Kg 290U mg/Kg 15.8J+ mg/Kg 164J+ mg/Kg 2.6U mg/Kg
SA124-0.5B	Ammonia as N Chloride Nitrate as N Sulfate	0.67 mg/Kg 142 mg/Kg 3.62 mg/Kg 78.7 mg/Kg	0.67J+ mg/Kg 142J+ mg/Kg 3.62J+ mg/Kg 78.7J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA124-10B	Ammonia as N Nitrate as N Sulfate Surfactants	2.66 mg/Kg 14.1 mg/Kg 150 mg/Kg 0.7 mg/Kg	2.66J+ mg/Kg 14.1J+ mg/Kg 150J+ mg/Kg 2.2U mg/Kg
SA125-25B	Chloride Nitrate as N Sulfate	301 mg/Kg 5.11 mg/Kg 119 mg/Kg	301J+ mg/Kg 5.11J+ mg/Kg 119J+ mg/Kg
SA125-39B	Total organic carbon Chloride Nitrate as N Surfactants	170 mg/Kg 211 mg/Kg 3.79 mg/Kg 0.9 mg/Kg	290U mg/Kg 211J+ mg/Kg 3.79J+ mg/Kg 2.5U mg/Kg
SA125009-39B	Chloride Nitrate as N Surfactants	175 mg/Kg 3.13 mg/Kg 1.1 mg/Kg	175J+ mg/Kg 3.13J+ mg/Kg 2.1U mg/Kg
SA125-0.5B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.11 mg/Kg 9.7 mg/Kg 1.32 mg/Kg 89.1 mg/Kg 0.9 mg/Kg	0.55U mg/Kg 9.7J+ mg/Kg 1.32J+ mg/Kg 89.1J+ mg/Kg 2.2U mg/Kg
SA125-10B	Ammonia as N Chloride Nitrate as N Sulfate	4.60 mg/Kg 367 mg/Kg 4.53 mg/Kg 107 mg/Kg	4.60J+ mg/Kg 367J+ mg/Kg 4.53J+ mg/Kg 107J+ mg/Kg
SA126-0.5B	Chloride Nitrate as N	74.9 mg/Kg 3.70 mg/Kg	74.9J+ mg/Kg 3.70J+ mg/Kg
SA126-10B	Chloride Nitrate as N Sulfate	6.5 mg/Kg 1.05 mg/Kg 377 mg/Kg	6.5J+ mg/Kg 1.05J+ mg/Kg 377J+ mg/Kg
SA126-18B	Chloride Nitrate as N Sulfate	17.1 mg/Kg 1.75 mg/Kg 522 mg/Kg	17.1J+ mg/Kg 1.75J+ mg/Kg 522J+ mg/Kg
SA126-25B	Chloride Nitrate as N Sulfate	40.5 mg/Kg 2.39 mg/Kg 322 mg/Kg	40.5J+ mg/Kg 2.39J+ mg/Kg 322J+ mg/Kg
SA126-40B	Total organic carbon Chloride Nitrate as N Sulfate Surfactants	180 mg/Kg 258 mg/Kg 5.33 mg/Kg 631 mg/Kg 1 mg/Kg	290U mg/Kg 258J+ mg/Kg 5.33J+ mg/Kg 631J+ mg/Kg 2.7U mg/Kg

\*Indicates change as the result of report review.  
SDG R0905177

#### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SA126-40BMS (All soil samples in SDG R0905177)	Chloride	132 (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) and relative percent differences (RPD) were within QC limits.

#### VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate 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 R0905177	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

#### IX. Overall Assessment

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

## X. Field Duplicates

Samples SA124009-10B and SA124-10B and samples SA125-39B and SA125009-39B 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
	SA124009-10B	SA124-10B				
Ammonia as N	3.09 mg/Kg	2.66 mg/Kg	15 ( $\leq 50$ )	-	-	-
Alkalinity, total	2510 mg/Kg	2220 mg/Kg	12 ( $\leq 50$ )	-	-	-
Alkalinity, bicarbonate	2320 mg/Kg	2050 mg/Kg	12 ( $\leq 50$ )	-	-	-
Alkalinity, carbonate	195 mg/Kg	171 mg/Kg	13 ( $\leq 50$ )	-	-	-
Chloride	986 mg/Kg	859 mg/Kg	14 ( $\leq 50$ )	-	-	-
Hexavalent chromium	2.88 mg/Kg	31.2 mg/Kg	166 ( $\leq 50$ )	-	J (all detects)	A
Hexavalent chromium	2.56 mg/Kg	31.4 mg/Kg	170 ( $\leq 50$ )	-	J (all detects)	A
Nitrate as N	15.8 mg/Kg	14.1 mg/Kg	11 ( $\leq 50$ )	-	-	-
Nitrite as N	0.42 mg/Kg	0.39 mg/Kg	-	0.03 ( $\leq 0.13$ )	-	-
pH	8.46 units	9.98 units	16 ( $\leq 50$ )	-	-	-
Sulfate	164 mg/Kg	150 mg/Kg	9 ( $\leq 50$ )	-	-	-
Surfactants	0.9 mg/Kg	0.7 mg/Kg	-	0.2 ( $\leq 2.6$ )	-	-
Total organic carbon	170 mg/Kg	520 mg/Kg	-	350 ( $\leq 290$ )	J (all detects)	A
Total phosphorus	730 mg/Kg	833 mg/Kg	13 ( $\leq 50$ )	-	-	-
Chlorate	5290000 ug/Kg	6150000 ug/Kg	15 ( $\leq 50$ )	-	-	-
Perchlorate	214000 ug/Kg	212000 ug/Kg	1 ( $\leq 50$ )	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA125-39B	SA125009-39B				
Alkalinity, total	446 mg/Kg	290 mg/Kg	42 ( $\leq 50$ )	-	-	-
Alkalinity, bicarbonate	438 mg/Kg	290 mg/Kg	41 ( $\leq 50$ )	-	-	-
Alkalinity, carbonate	8 mg/Kg	3U mg/Kg	-	5 ( $\leq 25$ )	-	-
Chloride	211 mg/Kg	175 mg/Kg	19 ( $\leq 50$ )	-	-	-
Hexavalent chromium	2.90 mg/Kg	28.2 mg/Kg	163 ( $\leq 50$ )	-	J (all detects)	A
Hexavalent chromium	2.85 mg/Kg	28.1 mg/Kg	163 ( $\leq 50$ )	-	J (all detects)	A
Nitrate as N	3.79 mg/Kg	3.13 mg/Kg	19 ( $\leq 50$ )	-	-	-
Nitrite as N	0.26 mg/Kg	0.25 mg/Kg	-	0.01 ( $\leq 0.13$ )	-	-
pH	8.38 units	9.98 units	17 ( $\leq 50$ )	-	-	-
Sulfate	1700 mg/Kg	2200 mg/Kg	26 ( $\leq 50$ )	-	-	-
Surfactants	0.9 mg/Kg	1.1 mg/Kg	-	0.2 ( $\leq 2.5$ )	-	-
Total organic carbon	170 mg/Kg	630 mg/Kg	-	460 ( $\leq 290$ )	J (all detects)	A
Total phosphorus	752 mg/Kg	797 mg/Kg	6 ( $\leq 50$ )	-	-	-
Chlorate	572000 ug/Kg	436000 ug/Kg	27 ( $\leq 50$ )	-	-	-
Perchlorate	30800 ug/Kg	24400 ug/Kg	23 ( $\leq 50$ )	-	-	-

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Data Qualification Summary - SDG R0905177**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905177	SA102-10B SA102-30B SA109-10B SA109-25B SA109-34B SA124009-10B SA124-0.5B SA124-10B SA125-25B SA125-39B SA125009-39B SA125-0.5B SA125-10B SA126-0.5B SA126-10B SA126-18B SA126-25B SA126-40B	Chloride	J+ (all detects)	A	Matrix spike analysis (%R) (m)
R0905177	EB091009-SO1 EB091009-SO2 SA102-10B SA102-30B SA109-10B SA109-25B SA109-34B SA124009-10B SA124-0.5B SA124-10B SA125-25B SA125-39B SA125009-39B SA125-0.5B SA125-10B SA126-0.5B SA126-10B SA126-18B SA126-25B SA126-40B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0905177	SA124-10B SA124009-10B SA125-39B SA125009-39B	Hexavalent chromium	J (all detects)	A	Field duplicates (RPD) (fd)
R0905177	SA124-10B SA124009-10B SA125-39B SA125009-39B	Total organic carbon	J (all detects)	A	Field duplicates (Difference) (fd)



**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0905177**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905177	EB091009-SO1	Total phosphorus Sulfate Ammonia as N	0.050U mg/L 2.0U mg/L 0.050U mg/L	A	bl
R0905177	EB091009-SO2	Chloride Total phosphorus Sulfate Ammonia as N	2.0U mg/L 0.050U mg/L 2.0U mg/L 0.050U mg/L	A	bl
R0905177	SA109-34B	Total organic carbon	290U mg/Kg	A	bl
R0905177	SA124009-10B	Total organic carbon	290U mg/Kg	A	bl
R0905177	SA125-39B	Total organic carbon	290U mg/Kg	A	bl
R0905177	SA126-40B	Total organic carbon	290U mg/Kg	A	bl
R0905177	SA125-0.5B	Ammonia as N	0.55U mg/Kg	A	bl

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Equipment Blank Data Qualification Summary - SDG R0905177**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905177	SA102-10B	Ammonia as N Chloride Nitrate as N	0.54U mg/Kg 118J+ mg/Kg 1.76J+ mg/Kg	A	be
R0905177	SA102-30B	Nitrate as N	2.36J+ mg/Kg	A	be
R0905177	SA109-10B	Chloride Nitrate as N	16.6J+ mg/Kg 1.23J+ mg/Kg	A	be
R0905177	SA109-25B	Chloride Nitrate as N Surfactants	21.1J+ mg/Kg 1.19J+ mg/Kg 2.4U mg/Kg	A	be
R0905177	SA109-34B	Total organic carbon Chloride Nitrate as N	290U mg/Kg 192J+ mg/Kg 3.26J+ mg/Kg	A	be

\*Indicates change as the result of report review.  
SDG R0905177

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905177	SA124009-10B	Total organic carbon Nitrate as N Surfactants	290U mg/Kg 15.8J+ mg/Kg 2.6U mg/Kg	A	be
R0905177	SA124-0.5B	Chloride Nitrate as N	142J+ mg/Kg 3.62J+ mg/Kg	A	be
R0905177	SA124-10B	Nitrate as N Surfactants	14.1J+ mg/Kg 2.2U mg/Kg	A	be
R0905177	SA125-25B	Nitrate as N	5.11J+ mg/Kg	A	be
R0905177	SA125-39B	Total organic carbon Chloride Nitrate as N Surfactants	290J+ mg/Kg 211J+ mg/Kg 3.79J+ mg/Kg 2.5U mg/Kg	A	be
R0905177	SA125009-39B	Chloride Nitrate as N Surfactants	175J+ mg/Kg 3.13J+ mg/Kg 2.1U mg/Kg	A	be
R0905177	SA125-0.5B	Ammonia as N Chloride Nitrate as N Surfactants	0.55U mg/Kg 9.7J+ mg/Kg 1.32J+ mg/Kg 2.2U mg/Kg	A	be
R0905177	SA125-10B	Nitrate as N	4.53J+ mg/Kg	A	be
R0905177	SA126-0.5B	Chloride Nitrate as N	74.9J+ mg/Kg 3.70J+ mg/Kg	A	be
R0905177	SA126-10B	Chloride Nitrate as N	6.5J+ mg/Kg 1.05J+ mg/Kg	A	be
R0905177	SA126-18B	Chloride Nitrate as N	17.1J+ mg/Kg 1.75J+ mg/Kg	A	be
R0905177	SA126-25B	Chloride Nitrate as N	40.5J+ mg/Kg 2.39J+ mg/Kg	A	be
R0905177	SA126-40B	Total organic carbon Nitrate as N Surfactants	290U mg/Kg 5.33J+ mg/Kg 2.7U mg/Kg	A	be

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0905177**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905177	SA102-10B	Ammonia as N Chloride Nitrate as N Sulfate	0.54U mg/Kg 118J+ mg/Kg 1.76J+ mg/Kg 60.3J+ mg/Kg	A	bf
R0905177	SA102-30B	Chloride Nitrate as N Sulfate	295J+ mg/Kg 2.36J+ mg/Kg 326J+ mg/Kg	A	bf
R0905177	SA109-10B	Chloride Nitrate as N Sulfate	16.6J+ mg/Kg 1.23J+ mg/Kg 50.8J+ mg/Kg	A	bf
R0905177	SA109-25B	Perchlorate Chloride Nitrate as N Surfactants	6100U mg/Kg 21.1J+ mg/Kg 1.19J+ mg/Kg 2.4U mg/Kg	A	bf
R0905177	SA109-34B	Total organic carbon Chloride Nitrate as N Sulfate	290U mg/Kg 192J+ mg/Kg 3.26J+ mg/Kg 601J+ mg/Kg	A	bf
R0905177	SA124009-10B	Ammonia as N Total organic carbon Nitrate as N Sulfate Surfactants	3.09J+ mg/Kg 290U mg/Kg 15.8J+ mg/Kg 164J+ mg/Kg 2.6U mg/Kg	A	bf
R0905177	SA124-0.5B	Ammonia as N Chloride Nitrate as N Sulfate	0.67J+ mg/Kg 142J+ mg/Kg 3.62J+ mg/Kg 78.7J+ mg/Kg	A	bf
R0905177	SA124-10B	Ammonia as N Nitrate as N Sulfate Surfactants	2.66J+ mg/Kg 14.1J+ mg/Kg 150J+ mg/Kg 2.2U mg/Kg	A	bf
R0905177	SA125-25B	Chloride Nitrate as N Sulfate	301J+ mg/Kg 5.11J+ mg/Kg 119J+ mg/Kg	A	bf
R0905177	SA125-39B	Total organic carbon Chloride Nitrate as N Surfactants	290U mg/Kg 211J+ mg/Kg 3.79J+ mg/Kg 2.5U mg/Kg	A	bf

\*Indicates change as the result of report review.  
SDG R0905177

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905177	SA125009-39B	Chloride Nitrate as N Surfactants	175J+ mg/Kg 3.13J+ mg/Kg 2.1U mg/Kg	A	bf
R0905177	SA125-0.5B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.55U mg/Kg 9.7J+ mg/Kg 1.32J+ mg/Kg 89.1J+ mg/Kg 2.2U mg/Kg	A	bf
R0905177	SA125-10B	Ammonia as N Chloride Nitrate as N Sulfate	4.60J+ mg/Kg 367J+ mg/Kg 4.53J+ mg/Kg 107J+ mg/Kg	A	bf
R0905177	SA126-0.5B	Chloride Nitrate as N	74.9J+ mg/Kg 3.70J+ mg/Kg	A	bf
R0905177	SA126-10B	Chloride Nitrate as N Sulfate	6.5J+ mg/Kg 1.05J+ mg/Kg 377J+ mg/Kg	A	bf
R0905177	SA126-18B	Chloride Nitrate as N Sulfate	17.1J+ mg/Kg 1.75J+ mg/Kg 522J+ mg/Kg	A	bf
R0905177	SA126-25B	Chloride Nitrate as N Sulfate	40.5J+ mg/Kg 2.39J+ mg/Kg 322J+ mg/Kg	A	bf
R0905177	SA126-40B	Total organic carbon Chloride Nitrate as N Sulfate Surfactants	290U mg/Kg 258J+ mg/Kg 5.33J+ mg/Kg 631J+ mg/Kg 2.7U mg/Kg	A	bf

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET

LDC #: 21991D6

SDG #: R0905177

Laboratory: Columbia Analytical Services

Stage 2B

Date: 11-18-09

Page: 1 of 1

Reviewer: CR

2nd Reviewer: W

**METHOD:** (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Chlorate (EPA Method 300.1), Cyanide (EPA SW846 Method 9012A), ~~Dissolved Hexavalent Chromium (EPA Method 218.6)~~, Hexavalent Chromium (EPA SW846 Method 7199), Nitrite-N (EPA Method 353.2), pH (EPA SW846 Method 9040B/9045D), Surfactants (SM5540C), Perchlorate (EPA Method 314.0), Total Phosphorus (EPA Method 365.1), TOC (Lloyd/Kahn / 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: 9/10/09
Ila.	Initial calibration	A	
lib.	Calibration verification	A	
III.	Blanks	SW	
IV	Surrogate Spikes	A	
V	Matrix Spike/Matrix Spike Duplicates	SW	MS/D
VI.	Duplicates	A	DUP
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(8,10), (12,13)
XI	Field blanks	SW	EB=1,2, FB=FB072909-S0 CS06W R0904226

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

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

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples: All soil except 1,2,21-23 = water

1	EB091009-SO1	11	SA125-25B	21	EB091009-SO1MS	31	PBW
2	EB091009-SO2	12	SA125-39B	22	EB091009-SO1MSD	32	PBS (3-8)
3	SA102-10B	13	SA125009-39B	23	EB091009-SO1DUP	33	PBS (9-18)
4	SA102-30B	14	SA125-0.5B	24	SA109-34BMS	34	PBS (19,20)
5	SA109-10B	15	SA125-10B	25	SA109-34BMSD	35	
6	SA109-25B	16	SA126-0.5B	26	SA109-34BDUP	36	
7	SA109-34B	17	SA126-10B	27	SA126-40BMS	37	
8	SA124009-10B	18	SA126-18B	28	SA126-40BDUP	38	
9	SA124-0.5B	19	SA126-25B	29		39	
10	SA124-10B	20	SA126-40B	30		40	

Notes: \_\_\_\_\_  
\_\_\_\_\_



**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

**METHOD:** Inorganics, Method See Cover

Reason Code: bl

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

- N N/A Were all samples associated with a given method blank?
- N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

**Conc. units: mg/L**      **Associated Samples: All Water**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification	
				1	2
Cl	PB (mg/L) 0.14	0.164		1.8 / 2.0	
T-P	0.008	0.0076		0.012 / 0.050	
SO4		0.091		2.0 / 2.0	
NH3-N		0.0152		0.041 / 0.050	

**Conc. units: mg/Kg**      **Associated Samples: 3-8**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification	
				No Qualifiers	
Alk. Total	11	0.5			
Alk. Bicarb.	11				
Cl	1.1				

**Conc. units: mg/Kg**      **Associated Samples: 9-18**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification	
				No Qualifiers	
Alk. Total	5				
Alk. Bicarb.	5				

**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

Page: 2 of 4  
Reviewer: CCE  
2nd Reviewer: LS

**METHOD:** Inorganics, Method See Cover

Reason Code: bl

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?

**X** **N** **N/A** Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

**Conc. units: mg/Kg**      **Associated Samples: 19, 20**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
Cl	PB (mg/Kg)	2.7	27				

**Conc. units: mg/Kg**      **Associated Samples: 3-9**

Analyte	Blank ID	Maximum ICB/CCB (mg/Kg)	Blank Action Limit	Sample Identification			
TOC	PB (mg/Kg)	100		7	8		
				170 / 290	170 / 290		

**Conc. units: mg/Kg**      **Associated Samples: 10-20**

Analyte	Blank ID	Maximum ICB/CCB (mg/Kg)	Blank Action Limit	Sample Identification			
TOC	PB (mg/Kg)	40		12	20		
				170 / 290	180 / 290		

**Conc. units: mg/Kg**      **Associated Samples: All Soil**

Analyte	Blank ID	Maximum ICB/CCB (mg/Kg)	Blank Action Limit	Sample Identification			
TOC	PB (mg/Kg)	116.0		7	8	12	20
				See PB	See PB	See PB	See PB



**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

LDC #: 21991D6  
 SDG #: See Cover

METHOD: Inorganics. Method See Cover Reason Code: bl

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

Conc. units: mg/Kg Associated Samples: 3-8

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			No Qualifiers
T-P	1.0			

Conc. units: mg/Kg Associated Samples: 9-15

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			14
NH <sub>4</sub> N		0.0073		0.11 / 0.55

Conc. units: mg/Kg Associated Samples: 19

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			No Qualifiers
Cl		0.136		

Conc. units: mg/Kg Associated Samples: 4, 6, 7

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			No Qualifiers
SO <sub>4</sub>		0.170		

**VALIDATION FINDINGS WORKSHEET**  
Blanks

**METHOD:** Inorganics, Method See Cover

Reason Code: bl

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

- 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.

Conc. units: mg/Kg Associated Samples: 8, 10-13, 15-20

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
	PB (mg/Kg)				No Qualifiers			
SO4			0.182					

Conc. units: mg/Kg Associated Samples: 2, 3, 14, 17, 18, 20

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
	PB (mg/Kg)				No Qualifiers			
			0.100					

LDC #: 21991D6  
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET  
Field Blanks

Page: 1 of 1  
Reviewer: CR  
2nd Reviewer:

METHOD: Inorganics, Method See Cover

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

Reason Code: be

Blank units: mg/L Associated sample units: mg/Kg

Sampling date: 9/10/09 Soil factor applied: 10x except TOC @ 1x

Field blank type: (circle one) Field Blank / Rinsate / Other **EB** Associated Samples: All Soil

Analyte	Blank ID	Blank ID	Sample Identification																						
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
Alkalinity, Total	1.0																								
Alkalinity, Bicarbonate	1.0																								
Ammonia as N	0.041	0.041	0.18 / 0.54																						
TOC (average)	0.3	0.3				170 / 290	170 / 290																180 / 290		
Chloride	2.4	1.8	118 J+		16.5 J+	21.1 J+	192 J+		142 J+																
Nitrate as N	0.90		1.76	2.36	1.23 J+	1.19 J+	3.26 J+	15.8 J+	3.62 J+	14.1 J+	5.11 J+	3.79 J+	175 J+	3.13 J+	1.32 J+	4.53 J+	3.70 J+	1.05 J+	1.75 J+	2.39 J+			5.33 J+		
pH (pH Units)	5.67	6.31																							
Total Phosphorus	0.012	0.011																							
Sulfate	2.0	1.2																							
Surfactants	0.042	0.081	8.1							0.7 / 2.2		0.9 / 2.5	1.1 / 2.1	0.9 / 2.2										1 / 2.7	

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

METHOD: Inorganics, EPA Method See Cover

N N/A Were field blanks identified in this SDG?

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

Blank units: mg/L Associated sample units: mg/Kg except ClO4 in ug/Kg

Sampling date: 7/29/09 Soil factor applied 10x

Field blank type: (circle one) Field Blank / Rinsate / Other

Reason Code: bf

Associated Samples: All Soil

Analyte	Blank ID	Action Limit	Sample Identification																			
			3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
Perchlorate (ug/Kg)	FB072909-SO (SDG# R0904226)					1320 / 6100																
NH3-N	1.71	17.1	0.18 / 0.54					3.09 J+	0.67 J+	2.66 J+			0.11 / 0.55 J+	4.60 J+								
TOC	0.5					170 / 290	170 / 290				170 / 290										180 / 290	
Cl	0.2	520	1.18 J+	295 J+	16.6 J+	21.1 J+	192 J+		142 J+				9.7 J+	1367 J+	74.9 J+	6.5 J+	17.1 J+	40.5 J+			258 J+	
NO3-N	1.02	102	1.76 J+	2.36 J+	1.23 J+	1.19 J+	3.26 J+	15.8 J+	3.62 J+	14.1 J+	5.11 J+	3.79 J+	1.32 J+	4.53 J+	3.70 J+	1.05 J+	1.75 J+	2.39 J+			5.33 J+	
SC4	0.0	80	60.3 J+	326 J+	50.9 J+		60.3 J+	164 J+	78.7 J+	150 J+	119 J+		89.1 J+	107 J+		377 J+	522 J+	322 J+			631 J+	
Surfactants	0.168	16.8				1.3 / 2.4		0.9 / 2.6		0.7 / 2.2		0.9 / 2.5	1.1 / 2.1								1 / 2.7	
T-Phosphorus	0.007																					
pH (pH units)	3.48																					



LDC#: 21991D6  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 1 of 2  
 Reviewer: CE  
 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/Kg)		RPD ( $\leq 50$ )	Difference	Limits	Qualification (Parent only)
	8	10				
Ammonia as N	3.09	2.66	15			
Total Alkalinity	2510	2220	12			
Bicarbonate Alkalinity	2320	2050	12			
Carbonate Alkalinity	195	171	13			
Chloride	986	859	14			
Hexavalent Chromium	2.88	31.2	166			Jdet/A (fd)
Hexavalent Chromium	2.56	31.4	170			Jdet/A (fd)
Nitrate as N	15.8	14.1	11			
Nitrite as N	0.42	0.39		0.03	( $\leq 0.13$ )	
pH (pH Units)	8.46	9.98	16			
Sulfate	164	150	9			
Surfactants	0.9	0.7		0.2	( $\leq 2.6$ )	
TOC	170	520		350	( $\leq 290$ )	Jdet/A (fd)
Total Phosphorus	730	833	13			
Chlorate (ug/Kg)	1290000	1150000	15			
Perchlorate (ug/Kg)	214000	212000	1			

LDC#: 21991D6  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 2 of 2  
 Reviewer: CR  
 2nd Reviewer: [Signature]

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 ( $\leq 50$ )	Difference	Limits	Qualification (Parent only)
	12	13				
Total Alkalinity	446	290	42			
Bicarbonate Alkalinity	438	290	41			
Carbonate Alkalinity	8	3U		5	(<25)	
Chloride	211	175	19			
Hexavalent Chromium	2.90	28.2	163			Jdet/A (fd)
Hexavalent Chromium	2.85	28.1	163			Jdet/A (fd)
Nitrate as N	3.79	3.13	19			
Nitrite as N	0.26	0.25		0.01	( $\leq 0.13$ )	
pH (pH Units)	8.38	9.98	17			
Sulfate	1700	2200	26			
Surfactants	0.9	1.1		0.2	( $\leq 2.5$ )	
TOC	170	630		460	( $\leq 290$ )	Jdet/A
Total Phosphorus	752	797	6			
Chlorate (ug/Kg)	572000	436000	27			
Perchlorate (ug/Kg)	30800	24400	23			

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** September 9, 2009

**LDC Report Date:** December 7, 2009

**Matrix:** Soil

**Parameters:** Wet Chemistry

**Validation Level:** Stage 4

**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** R0905138

### Sample Identification

SA187-10B	SA122-0.5B
SA187-25B	SA122-10B
SA187-39B	SA122-20B
SA45-10B	SA122-31B
SA45-25B	RSAQ5-41BMS
SA45-36B	RSAQ5-41BMSD
SA186-10B	RSAQ5-41BDUP
SA186-25B	
SA186-37B	
SA188-10B	
SA188-25B	
SA188-37B	
RSAQ5-0.5B	
RSAQ5-10B	
RSAQ5-25B	
RSAQ5-41B	
SA31-20B	
SA31-32B	
SA31-0.5B	
SA31-10B	



## Introduction

This data review covers 27 soil samples listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA Method 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Method 9045D for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, 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 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.
- UU 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
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride	12 mg/Kg 12 mg/Kg 0.5 mg/Kg	SA187-10B SA187-25B
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate	8 mg/Kg 8 mg/Kg	SA187-39B SA45-10B SA45-25B SA45-36B SA186-10B SA186-25B SA186-37B SA188-10B SA188-25B SA188-37B RSAQ5-0.5B RSAQ5-10B RSAQ5-25B RSAQ5-41B
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride	11 mg/Kg 11 mg/Kg 1.1 mg/Kg	SA31-20B SA31-32B SA31-0.5B SA31-10B SA122-0.5B SA122-10B SA122-20B SA122-31B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Sulfate	0.170 mg/L	SA31-20B SA31-32B SA31-0.5B SA31-10B SA122-0.5B SA122-10B SA122-20B SA122-31B
PB (prep blank)	Total phosphorus	1.3 mg/Kg	SA187-10B SA187-25B SA187-39B SA45-10B SA45-25B SA45-36B SA186-10B SA186-25B SA186-37B SA188-10B
PB (prep blank)	Total phosphorus	1.0 mg/Kg	SA188-25B SA188-37B RSAQ5-0.5B RSAQ5-10B RSAQ5-25B RSAQ5-41B SA31-20B SA31-32B SA31-0.5B SA31-10B SA122-0.5B SA122-10B SA122-20B SA122-31B
PB (prep blank)	Total organic carbon	40 mg/Kg	SA187-10B SA187-25B SA187-39B SA45-10B
ICB/CCB	Total organic carbon	116.0 mg/Kg	All samples in SDG R0905138
ICB/CCB	Alkalinity, total	0.5 mg/L	SA187-39B SA45-10B SA45-25B SA45-36B SA186-10B SA186-25B SA122-31B
ICB/CCB	Chloride	0.128 mg/L	SA31-0.5B SA31-10B
ICB/CCB	Sulfate	0.673 mg/L	SA187-39B SA186-25B

Method Blank ID	Analyte	Concentration	Associated Samples
Chloride	Chloride	0.104 mg/L	SA187-10B SA187-25B SA187-39B SA45-10B SA45-36B SA186-10B SA186-25B SA186-37B SA188-10B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA187-39B	Total organic carbon	130 mg/Kg	290U mg/Kg
SA45-36B	Total organic carbon	170 mg/Kg	290U mg/Kg
SA186-37B	Total organic carbon	180 mg/Kg	290U mg/Kg
SA188-37B	Total organic carbon	160 mg/Kg	290U mg/Kg
RSAQ5-41B	Total organic carbon	220 mg/Kg	290U mg/Kg
SA31-20B	Total organic carbon	250 mg/Kg	290U mg/Kg
SA31-32B	Total organic carbon	190 mg/Kg	300U mg/Kg
SA122-31B	Total organic carbon	100 mg/Kg	300U mg/Kg

Sample FB072909-SO (from SDG R0904226) 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
FB072909-SO	7/29/09	Perchlorate Ammonia as N Total organic carbon Chloride Nitrate as N Sulfate Surfactants Total phosphorus pH	0.5 ug/L 1.71 mg/L 0.5 mg/L 6.2 mg/L 1.02 mg/L 8.0 mg/L 0.168 mg/L 0.007 mg/L 3.48 units	All samples in SDG R0905138

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
SA187-10B	Ammonia as N Chloride Nitrate as N	0.43 mg/Kg 231 mg/Kg 6.27 mg/Kg	0.54U mg/Kg 231J+ mg/Kg 6.27J+ mg/Kg
SA187-25B	Chloride Nitrate as N Sulfate Surfactants	261 mg/Kg 7.14 mg/Kg 207 mg/Kg 0.7 mg/Kg	261J+ mg/Kg 7.14J+ mg/Kg 207J+ mg/Kg 2.2U mg/Kg
SA187-39B	Total organic carbon Chloride Nitrate as N Sulfate	130 mg/Kg 208 mg/Kg 2.54 mg/Kg 501 mg/Kg	290U mg/Kg 208J+ mg/Kg 2.54J+ mg/Kg 501J+ mg/Kg
SA45-10B	Chloride Nitrate as N Sulfate Surfactants	112 mg/Kg 3.20 mg/Kg 490 mg/Kg 1 mg/Kg	112J+ mg/Kg 3.20J+ mg/Kg 490J+ mg/Kg 2.1U mg/Kg
SA45-25B	Chloride Nitrate as N Sulfate Surfactants	17.1 mg/Kg 1.92 mg/Kg 122 mg/Kg 1.4 mg/Kg	17.1J+ mg/Kg 1.92J+ mg/Kg 122J+ mg/Kg 2.1U mg/Kg
SA45-36B	Total organic carbon Chloride Nitrate as N Surfactants	170 mg/Kg 565 mg/Kg 15.1 mg/Kg 1 mg/Kg	290U mg/Kg 565J+ mg/Kg 15.1J+ mg/Kg 3.2U mg/Kg
SA186-10B	Chloride Nitrate as N Sulfate	111 mg/Kg 18.1 mg/Kg 46.9 mg/Kg	111J+ mg/Kg 18.1J+ mg/Kg 46.9J+ mg/Kg
SA186-25B	Chloride Nitrate as N Sulfate Surfactants	617 mg/Kg 3.36 mg/Kg 155 mg/Kg 1.2 mg/Kg	617J+ mg/Kg 3.36J+ mg/Kg 155J+ mg/Kg 2.1U mg/Kg
SA186-37B	Total organic carbon Chloride Nitrate as N Sulfate Surfactants	180 mg/Kg 216 mg/Kg 5.47 mg/Kg 732 mg/Kg 1.1 mg/Kg	290U mg/Kg 216J+ mg/Kg 5.47J+ mg/Kg 732J+ mg/Kg 3.1U mg/Kg
SA188-10B	Chloride Nitrate as N	266 mg/Kg 8.01 mg/Kg	266J+ mg/Kg 8.01J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA188-25B	Chloride Nitrate as N Surfactants	204 mg/Kg 4.00 mg/Kg 0.7 mg/Kg	204J+ mg/Kg 4.00J+ mg/Kg 2.2U mg/Kg
SA188-37B	Total organic carbon Chloride Nitrate as N Sulfate	160 mg/Kg 339 mg/Kg 4.82 mg/Kg 797 mg/Kg	290U mg/Kg 339J+ mg/Kg 4.82J+ mg/Kg 797J+ mg/Kg
RSAQ5-0.5B	Chloride Nitrate as N Sulfate Surfactants	4.9 mg/Kg 1.50 mg/Kg 65.9 mg/Kg 1.4 mg/Kg	4.9J+ mg/Kg 1.50J+ mg/Kg 65.9J+ mg/Kg 2.2U mg/Kg
RSAQ5-10B	Chloride Nitrate as N Sulfate Surfactants	42.2 mg/Kg 1.97 mg/Kg 42.1 mg/Kg 0.7 mg/Kg	42.2J+ mg/Kg 1.97J+ mg/Kg 42.1J+ mg/Kg 2.2U mg/Kg
RSAQ5-25B	Ammonia as N Chloride Nitrate as N Sulfate	0.36 mg/Kg 53.3 mg/Kg 1.73 mg/Kg 35.7 mg/Kg	0.55U mg/Kg 53.3J+ mg/Kg 1.73J+ mg/Kg 35.7J+ mg/Kg
RSAQ5-41B	Total organic carbon Chloride Nitrate as N	220 mg/Kg 27.0 mg/Kg 1.31 mg/Kg	290U mg/Kg 27.0J+ mg/Kg 1.31J+ mg/Kg
SA31-20B	Total organic carbon Nitrate as N Surfactants	250 mg/Kg 15.3 mg/Kg 1.3 mg/Kg	290U mg/Kg 15.3J+ mg/Kg 2.8U mg/Kg
SA31-32B	Total organic carbon Chloride Nitrate as N Surfactants	190 mg/Kg 366 mg/Kg 6.18 mg/Kg 1.7 mg/Kg	300U mg/Kg 366J+ mg/Kg 6.18J+ mg/Kg 3.5U mg/Kg
SA31-0.5B	Chloride Nitrate as N Sulfate Surfactants	3.1 mg/Kg 1.23 mg/Kg 131 mg/Kg 1.3 mg/Kg	3.1J+ mg/Kg 1.23J+ mg/Kg 131J+ mg/Kg 2.1U mg/Kg
SA31-10B	Chloride Nitrate as N Sulfate Surfactants	132 mg/Kg 3.34 mg/Kg 341 mg/Kg 0.7 mg/Kg	132J+ mg/Kg 3.34J+ mg/Kg 341J+ mg/Kg 2.2U mg/Kg
SA122-0.5B	Chloride Nitrate as N Sulfate Surfactants	40.0 mg/Kg 2.93 mg/Kg 165 mg/Kg 1.1 mg/Kg	40.0J+ mg/Kg 2.93J+ mg/Kg 165J+ mg/Kg 2.1U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA122-10B	Chloride Nitrate as N Sulfate Surfactants	408 mg/Kg 9.48 mg/Kg 218 mg/Kg 0.9 mg/Kg	408J+ mg/Kg 9.48J+ mg/Kg 218J+ mg/Kg 2.1U mg/Kg
SA122-20B	Nitrate as N Surfactants	16.4 mg/Kg 1.4 mg/Kg	16.4J+ mg/Kg 2.6U mg/Kg
SA122-31B	Total organic carbon Chloride Nitrate as N	100 mg/Kg 180 mg/Kg 3.39 mg/Kg	300U mg/Kg 180J+ mg/Kg 3.39J+ mg/Kg

#### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Affected Analyte	Flag	A or P
RSAQ5-41BMS/MSD (All samples in SDG R0905138)	Perchlorate	224 (75-125)	-	-	Perchlorate	J+ (all detects)	A
RSAQ5-41BMS (All samples in SDG R0905138)	Alkalinity, total	65 (75-125)	-	-	Alkalinity, total Alkalinity, bicarbonate Surfactants	J- (all detects)	A
	Surfactants	55 (75-125)	-	-		UJ (all non-detects)	

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

#### VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate 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 R0905138	All analytes reported below the PQL.	J (all detects)	A

### IX. Overall Assessment

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, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Data Qualification Summary - SDG R0905138**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905138	SA187-10B SA187-25B SA187-39B SA45-10B SA45-25B SA45-36B SA186-10B SA186-25B SA186-37B SA188-10B SA188-25B SA188-37B RSAQ5-0.5B RSAQ5-10B RSAQ5-25B RSAQ5-41B SA31-20B SA31-32B SA31-0.5B SA31-10B SA122-0.5B SA122-10B SA122-20B SA122-31B	Perchlorate	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0905138	SA187-10B SA187-25B SA187-39B SA45-10B SA45-25B SA45-36B SA186-10B SA186-25B SA186-37B SA188-10B SA188-25B SA188-37B RSAQ5-0.5B RSAQ5-10B RSAQ5-25B RSAQ5-41B SA31-20B SA31-32B SA31-0.5B SA31-10B SA122-0.5B SA122-10B SA122-20B SA122-31B	Alkalinity, total Alkalinity, bicarbonate Surfactants	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905138	SA187-10B SA187-25B SA187-39B SA45-10B SA45-25B SA45-36B SA186-10B SA186-25B SA186-37B SA188-10B SA188-25B SA188-37B RSAQ5-0.5B RSAQ5-10B RSAQ5-25B RSAQ5-41B SA31-20B SA31-32B SA31-0.5B SA31-10B SA122-0.5B SA122-10B SA122-20B SA122-31B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0905138**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905138	SA187-39B	Total organic carbon	290U mg/Kg	A	bl
R0905138	SA45-36B	Total organic carbon	290U mg/Kg	A	bl
R0905138	SA186-37B	Total organic carbon	290U mg/Kg	A	bl
R0905138	SA188-37B	Total organic carbon	290U mg/Kg	A	bl
R0905138	RSAQ5-41B	Total organic carbon	290U mg/Kg	A	bl
R0905138	SA31-20B	Total organic carbon	290U mg/Kg	A	bl
R0905138	SA31-32B	Total organic carbon	300U mg/Kg	A	bl
R0905138	SA122-31B	Total organic carbon	300U mg/Kg	A	bl

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0905138**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905138	SA187-10B	Ammonia as N Chloride Nitrate as N	0.54U mg/Kg 231J+ mg/Kg 6.27J+ mg/Kg	A	bf
R0905138	SA187-25B	Chloride Nitrate as N Sulfate Surfactants	261J+ mg/Kg 7.14J+ mg/Kg 207J+ mg/Kg 2.2U mg/Kg	A	bf
R0905138	SA187-39B	Total organic carbon Chloride Nitrate as N Sulfate	290U mg/Kg 208J+ mg/Kg 2.54J+ mg/Kg 501J+ mg/Kg	A	bf
R0905138	SA45-10B	Chloride Nitrate as N Sulfate Surfactants	112J+ mg/Kg 3.20J+ mg/Kg 490J+ mg/Kg 2.1U mg/Kg	A	bf
R0905138	SA45-25B	Chloride Nitrate as N Sulfate Surfactants	17.1J+ mg/Kg 1.92J+ mg/Kg 122J+ mg/Kg 2.1U mg/Kg	A	bf
R0905138	SA45-36B	Total organic carbon Chloride Nitrate as N Surfactants	290U mg/Kg 565J+ mg/Kg 15.1J+ mg/Kg 3.2U mg/Kg	A	bf
R0905138	SA186-10B	Chloride Nitrate as N Sulfate	111J+ mg/Kg 18.1J+ mg/Kg 46.9J+ mg/Kg	A	bf
R0905138	SA186-25B	Chloride Nitrate as N Sulfate Surfactants	617J+ mg/Kg 3.36J+ mg/Kg 155J+ mg/Kg 2.1U mg/Kg	A	bf
R0905138	SA186-37B	Total organic carbon Chloride Nitrate as N Sulfate Surfactants	290U mg/Kg 216J+ mg/Kg 5.47J+ mg/Kg 732J+ mg/Kg 3.1U mg/Kg	A	bf
R0905138	SA188-10B	Chloride Nitrate as N	266J+ mg/Kg 8.01J+ mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905138	SA188-25B	Chloride Nitrate as N Surfactants	204J+ mg/Kg 4.00J+ mg/Kg 2.2U mg/Kg	A	bf
R0905138	SA188-37B	Total organic carbon Chloride Nitrate as N Sulfate	290U mg/Kg 339J+ mg/Kg 4.82J+ mg/Kg 797J+ mg/Kg	A	bf
R0905138	RSAQ5-0.5B	Chloride Nitrate as N Sulfate Surfactants	4.9J+ mg/Kg 1.50J+ mg/Kg 65.9J+ mg/Kg 2.2U mg/Kg	A	bf
R0905138	RSAQ5-10B	Chloride Nitrate as N Sulfate Surfactants	42.2J+ mg/Kg 1.97J+ mg/Kg 42.1J+ mg/Kg 2.2U mg/Kg	A	bf
R0905138	RSAQ5-25B	Ammonia as N Chloride Nitrate as N Sulfate	0.55U mg/Kg 53.3J+ mg/Kg 1.73J+ mg/Kg 35.7J+ mg/Kg	A	bf
R0905138	RSAQ5-41B	Total organic carbon Chloride Nitrate as N	290U mg/Kg 27.0J+ mg/Kg 1.31J+ mg/Kg	A	bf
R0905138	SA31-20B	Total organic carbon Nitrate as N Surfactants	290U mg/Kg 15.3J+ mg/Kg 2.8U mg/Kg	A	bf
R0905138	SA31-32B	Total organic carbon Chloride Nitrate as N Surfactants	300U mg/Kg 366J+ mg/Kg 6.18J+ mg/Kg 3.5U mg/Kg	A	bf
R0905138	SA31-0.5B	Chloride Nitrate as N Sulfate Surfactants	3.1J+ mg/Kg 1.23J+ mg/Kg 131J+ mg/Kg 2.1U mg/Kg	A	bf
R0905138	SA31-10B	Chloride Nitrate as N Sulfate Surfactants	132J+ mg/Kg 3.34J+ mg/Kg 341J+ mg/Kg 2.2U mg/Kg	A	bf
R0905138	SA122-0.5B	Chloride Nitrate as N Sulfate Surfactants	40.0J+ mg/Kg 2.93J+ mg/Kg 165J+ mg/Kg 2.1U mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905138	SA122-10B	Chloride Nitrate as N Sulfate Surfactants	408J+ mg/Kg 9.48J+ mg/Kg 218J+ mg/Kg 2.1U mg/Kg	A	bf
R0905138	SA122-20B	Nitrate as N Surfactants	16.4J+ mg/Kg 2.6U mg/Kg	A	bf
R0905138	SA122-31B	Total organic carbon Chloride Nitrate as N	300U mg/Kg 180J+ mg/Kg 3.39J+ mg/Kg	A	bf

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET

LDC #: 21991E6

SDG #: R0905138

Laboratory: Columbia Analytical Services

Stage 4

Date: 11-19-09

Page: 1 of 1

Reviewer: [Signature]

2nd Reviewer: [Signature]

**METHOD: (Analyte)** Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Chlorate (EPA Method 300.1), Cyanide (EPA SW846 Method 9012A), ~~Dissolved Hexavalent Chromium (EPA Method 218.6)~~, Hexavalent Chromium (EPA SW846 Method 7199), Nitrite-N (EPA Method 353.2), pH (EPA SW846 Method 9040B/9045D), Surfactants (SM5540C), Perchlorate (EPA Method 314.0), Total Phosphorus (EPA Method 365.1), TOC (Lloyd/Kahn / ~~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: 9/9/09
Ila.	Initial calibration	A	
Iib.	Calibration verification	A	
III.	Blanks	SW	
IV	Surrogate Spikes	A	
V	Matrix Spike/Matrix Spike Duplicates	SW	MS/D
VI.	Duplicates	A	DUP
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	SW	FB = FB072909 - SO (SD6X/R0904226)

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

Validated Samples: 3011

1	SA187-10B	11	SA188-25B	21	SA122-0.5B	31	PBS (1,2)
2	SA187-25B	12	SA188-37B	22	SA122-10B	32	PBS (3-16)
3	SA187-39B	13	RSAQ5-0.5B	23	SA122-20B	33	PBS (17-24)
4	SA45-10B	14	RSAQ5-10B	24	SA122-31B	34	
5	SA45-25B	15	RSAQ5-25B	25	RSAQ5-41BMS	35	
6	SA45-36B	16	RSAQ5-41B	26	RSAQ5-41BMSD	36	
7	SA186-10B	17	SA31-20B	27	RSAQ5-41BDUP	37	
8	SA186-25B	18	SA31-32B	28		38	
9	SA186-37B	19	SA31-0.5B	29		39	
10	SA188-10B	20	SA31-10B	30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

LDC #: 2199186  
 SDG #: see card

VALIDATION FINDINGS CHECKLIST

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

Method: Inorganics (EPA Method See card)

Validation Area	Yes	No	NA	Findings/Comments
<b>II. Technical Holding Times</b>				
All technical holding times were met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooler temperature criteria was met.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>III. Calibration</b>				
Were all instruments calibrated daily, each set-up time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the proper number of standards used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all initial calibration correlation coefficients > 0.995?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were titrant checks performed as required? (Level IV only)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were balance checks performed as required? (Level IV only)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>IV. Blanks</b>				
Was a method blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>V. Matrix Spike/Duplicate</b>				
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
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.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
<b>VI. LCS</b>				
Was an LCS analyzed for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was an LCS analyzed per extraction batch?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>VII. Regional Quality Assurance and Quality Control</b>				
Were performance evaluation (PE) samples performed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were the performance evaluation (PE) samples within the acceptance limits?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	



LDC #: 2199186  
 SDG #: see cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2  
 Reviewer: CR  
 2nd Reviewer: W

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



LDC #: 21991E6  
SDG #: See Cover

# VALIDATION FINDINGS WORKSHEET

Blanks

Page: 1 of 3  
Reviewer: [Signature]  
2nd Reviewer: [Signature]

METHOD: Inorganics, Method See Cover Reason code: bl

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

**Conc. units: mg/Kg**      **Associated Samples: 1, 2**

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
	PB (mg/Kg)				No Qualifiers			
Alk., Total	12							
Alk., Bicarb.	12							
Cl	0.5							

**Conc. units: mg/Kg**      **Associated Samples: 3-16**

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
	PB (mg/Kg)				No Qualifiers			
Alk., Total	8							
Alk., Bicarb.	8							

**Conc. units: mg/Kg**      **Associated Samples: 17-24**

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
	PB (mg/Kg)				No Qualifiers			
Alk., Total	11							
Alk., Bicarb.	11							
Cl	1.1							
SO4			0.170					

**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

METHOD: Inorganics, Method See Cover Reason code: bl

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.

**Conc. units: mg/Kg Associated Samples: 1-10**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			No Qualifiers
T-P	1.3			

**Conc. units: mg/Kg Associated Samples: 11-24**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			No Qualifiers
T-P	1.0			

**Conc. units: mg/Kg Associated Samples: PB=1-4. ICB/CCB = All.**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			3 6 9 12 16 17 18 24
TOC	40	116.0		130 / 290 170 / 290 180 / 290 160 / 290 220 / 290 250 / 290 190 / 300 100 / 300

**Conc. units: mg/Kg Associated Samples: 3-8, 24**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			No Qualifiers
Alk., Total		0.5		

**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

**METHOD:** Inorganics, Method See Cover

Reason code: bl

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.

**Conc. units:** mg/Kg      **Associated Samples:** 19, 20

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
Cl	PB (mg/Kg)	0.128					

**Conc. units:** mg/Kg      **Prep factor:** 10x x 4xdil      **Associated Samples:** 3, 8

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
SO4	PB (mg/Kg)	0.673	26.92				

**Conc. units:** mg/Kg      **Associated Samples:** 1-4, 6-10

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
Cl	PB (mg/Kg)	0.104					













LDC #: 2/99/55  
 SDG #: seecover

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

Page: 1 of 1  
 Reviewer: CR  
 2nd Reviewer: CR

METHOD: Inorganics, Method Seecover

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

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

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		Acceptable (Y/N)
					%R / RPD	%R / RPD	
LCS	Laboratory control sample	Nb2-N	2.43	2.50	97	97	Y
25	Matrix spike sample	CN	(SSR-SR) 4.66	4.85	96	96	Y
27	Duplicate sample	Say	2020	1770	13	13	Y

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 #: 2199126  
 SDG #: see cover

**VALIDATION FINDINGS WORKSHEET**  
**Sample Calculation Verification**

Page: 1 of 3  
 Reviewer: CF  
 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 SO<sub>4</sub> reported with a positive detect were recalculated and verified using the following equation:

Concentration = 
$$\frac{(7.898 \times 10^{-6} (\text{Area}) + 0.05797) (0F) (PF)}{(\% \text{Solid})}$$

Recalculation: 
$$\frac{(7.898 \times 10^{-6}) (1000701) + 0.05797 (4) (10)}{0.635} = 501 \text{ mg/kg}$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	3	Alk, Total	699	699	Y
		Alk, Bicarb.	680	680	Y
		Alk, Carb.	19	19	Y
		Cl	208	208	Y
		NO <sub>3</sub> -N	2.54	2.54	Y
		SO <sub>4</sub>	501	501	Y
		T-Phosphorus	688	688	Y
		TOC	130	130	Y
		pH (pH units)	8.42	8.42	Y
		ClO <sub>3</sub> (mg/kg)	11600	11600	Y
		ClO <sub>4</sub> ↓	8700	8700	Y

Note: \_\_\_\_\_

LDC #: 2199186  
 SDG #: see cover

**VALIDATION FINDINGS WORKSHEET**  
**Sample Calculation Verification**

Page: 2 of 3  
 Reviewer: ge  
 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 Cl reported with a positive detect were recalculated and verified using the following equation:

$$\frac{(\text{Concentration} = (5.054 \times 10^{-6}) \text{Area} + 0.09261) (DF) (L_{\text{Prep}} F)}{\% \text{Solid}} = \frac{\text{Recalculation: } (5.054 \times 10^{-6}) (1017595 + 0.09261) (10) (2)}{0.942} = 111 \text{ mg/kg}$$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	7	Alk, Total	354	34	Y
		Alk, Bicarb.	340	340	Y
		Alk, Carb.	14	14	Y
		Cl	111	111	Y
		SO <sub>4</sub> NO <sub>3</sub> -N	18.1	18.1	Y
		F-Phosphorus SO <sub>4</sub>	46.9	46.9	Y
		T-Phosphorus	669	669	Y
		TOL	770	770	Y
		pH (units)	8.98	8.98	Y
		ClO <sub>3</sub> (ug/kg)	72900	72900	Y
		ClO <sub>4</sub> ↓	1750	1750	Y

Note: \_\_\_\_\_

LDC #: 2199156  
SDG #: see cover

**VALIDATION FINDINGS WORKSHEET**  
**Sample Calculation Verification**

Page: 3 of 3  
Reviewer: CF  
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 T-Phosphorus reported with a positive detect were recalculated and verified using the following equation:

Concentration =  $\frac{\text{Raw Value (V}_{\text{sample}})}{(\text{weight}_{\text{sample}})(\% \text{ Solid})}$

Recalculation:  $\frac{4.145 \text{ mg/L (0.025 L)}}{(0.00025 \text{ kg})(0.912)} = 455 \text{ mg/l}$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	11	Alk, Total	126	126	Y
		Alk, Bicarb	126	126	Y
		Cl	204	204	Y
		NO <sub>3</sub> -N	4.00	4.00	Y
		SO <sub>4</sub>	14400	14400	Y
		Surfactants	0.7	0.7	Y
		T-Phosphorus	455	455	Y
		TOR	410	410	Y
		pH (pH units)	8.06	8.06	Y
		ClO <sub>3</sub> (ug/kg)	2090	2090	Y
		ClO <sub>4</sub> ↓	2770	2770	Y

Note: \_\_\_\_\_

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** September 10 through September 16, 2009

**LDC Report Date:** December 7, 2009

**Matrix:** Soil

**Parameters:** Wet Chemistry

**Validation Level:** Stage 4

**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** R0905192

### Sample Identification

SA102-10BSPLP2  
SA102-10BSPLP2RE  
SA102-10BSPLP3  
SA102-30BSPLP2  
SA102-30BSPLP2RE  
SA102-30BSPLP3  
SA30-9BSPLP2  
SA30-9BSPLP3  
SA128-10BSPLP2  
SA128-10BSPLP3  
SA128-29BSPLP2  
SA128-29BSPLP3  
SA128-10BSPLP2DUP  
SA128-10BSPLP2MS  
SA128-10BSPLP2MSD

Samples in this SDG underwent SPLP extraction

## Introduction

This data review covers 15 soil samples listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA Method 300.1 for Chlorate, EPA Method 120.1 for Conductivity, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Method 9045D for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, Standard Method 2540C for Total Dissolved Solids, and Standard Method 2540D for Total Suspended Solids, and EPA SW 846 Method 9060 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 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 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
SA102-10BSPLP2	Hexavalent chromium	29.25 & 29.5 hours	24 hours	J- (all detects) UJ (all non-detects)	P
SA102-30BSPLP2	Hexavalent chromium	29.75 hours	24 hours	J- (all detects) UJ (all non-detects)	P
SA30-9BSPLP2	Hexavalent chromium	30 & 30.25 hours	24 hours	J- (all detects) UJ (all non-detects)	P
SA102-10BSPLP2RE SA102-30BSPLP2RE	Cyanide	21 days	14 days	J- (all detects) UJ (all non-detects)	A
SA102-10BSPLP3	Hexavalent chromium	36 & 35.75 hours	24 hours	J- (all detects) UJ (all non-detects)	P
SA102-30BSPLP3	Hexavalent chromium	36 & 36.25 hours	24 hours	J- (all detects) UJ (all non-detects)	P
SA30-9BSPLP3	Hexavalent chromium	36.5 hours	24 hours	J- (all detects) UJ (all non-detects)	P
SA128-10BSPLP2	Hexavalent chromium	27 & 27.25 hours	24 hours	J- (all detects) UJ (all non-detects)	P
SA128-29BSPLP2	Hexavalent chromium	27.75 & 30 hours	24 hours	J- (all detects) UJ (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 with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride pH Total phosphorus Total dissolved solids	0.5 mg/L 0.5 mg/L 0.07 mg/L 8.17 units 0.011 mg/L 7 mg/L	SA102-10BSPLP3 SA102-30BSPLP3 SA30-9BSPLP3
ICB/CCB	Total phosphorus	0.0081 mg/L	SA102-10BSPLP3 SA102-30BSPLP3 SA30-9BSPLP3
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Nitrate as N pH Sulfate	1.8 mg/L 1.8 mg/L 0.052 mg/L 0.031 mg/L 8.26 units 0.27 mg/L	SA102-10BSPLP2 SA102-30BSPLP2 SA30-9BSPLP2
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon pH	1.9 mg/L 1.9 mg/L 0.012 mg/L 0.3 mg/L 7.61 units	SA128-10BSPLP3 SA128-29BSPLP3
ICB/CCB	Alkalinity, total Nitrite as N	1.8 mg/L 0.0070 mg/L	SA128-10BSPLP3 SA128-29BSPLP3
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Chloride Nitrate as N pH Sulfate	1.8 mg/L 1.8 mg/L 0.046 mg/L 0.17 mg/L 0.049 mg/L 7.88 units 0.36 mg/L	SA128-10BSPLP2 SA128-29BSPLP2
ICB/CCB	Alkalinity, total	0.5 mg/L	SA102-30BSPLP3 SA30-9BSPLP3
ICB/CCB	Alkalinity, total	1.2 mg/L	SA102-10BSPLP2 SA102-30BSPLP2 SA30-9BSPLP2 SA128-10BSPLP2
ICB/CCB	Cyanide	0.00753 mg/L	SA102-10BSPLP2RE SA102-30BSPLP2RE

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Chloride	0.045 mg/L	SA30-9BSPLP3

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA102-10BSPLP3	Total phosphorus	0.034 mg/L	0.050U mg/L
SA102-30BSPLP3	Total phosphorus	0.037 mg/L	0.050U mg/L
SA30-9BSPLP3	Total phosphorus	0.027 mg/L	0.050U mg/L
SA30-9BSPLP2	Nitrate as N	0.041 mg/L	0.050U mg/L
SA128-10BSPLP3	Ammonia as N Total organic carbon	0.016 mg/L 0.4 mg/L	0.050U mg/L 1.0U mg/L
SA128-29BSPLP3	Ammonia as N Total organic carbon	0.010 mg/L 0.2 mg/L	0.050U mg/L 1.0U mg/L
SA128-29BSPLP2	Ammonia as N	0.041 mg/L	0.050U mg/L

No field blanks were identified in this SDG.

#### IV. Matrix Spike/Matrix Spike Duplicates

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

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

## VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Analyte	Flag	A or P
SA128-29BSPLP3	Dichloroacetate	86 (90-115)	Chlorate	J- (all detects) UJ (all non-detects)	A

## VIII. Sample Result Verification and Project Quantitation Limit

All sample result verification met validation criteria with the following exceptions:

Sample	Analyte	Finding	Flag	A or P
SA102-10BSPLP2 SA102-30BSPLP2	Cyanide	Sample results were too negative. The absolute value of the negative result was above the reporting limit.	UJ (all non-detects)	A

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905192	All analytes reported below the PQL.	J (all detects)	A

## IX. Overall Assessment

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
SA102-10BSPLP2 SA102-30BSPLP2	Cyanide	X	A

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, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Data Qualification Summary - SDG R0905192**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905192	SA102-10BSPLP2 SA102-30BSPLP2 SA30-9BSPLP2 SA102-10BSPLP3 SA102-30BSPLP3 SA30-9BSPLP3 SA128-10BSPLP2 SA128-29BSPLP2	Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0905192	SA102-10BSPLP2RE SA102-30BSPLP2RE	Cyanide	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
R0905192	SA128-29BSPLP3	Chlorate	J- (all detects) UJ (all non-detects)	A	Surrogate recovery (%R) (s)
R0905192	SA102-10BSPLP2 SA102-30BSPLP2	Cyanide	UJ (all non-detects)	A	Sample result verification (o)
R0905192	SA102-10BSPLP2 SA102-10BSPLP2RE SA102-10BSPLP3 SA102-30BSPLP2 SA102-30BSPLP2RE SA102-30BSPLP3 SA30-9BSPLP2 SA30-9BSPLP3 SA128-10BSPLP2 SA128-10BSPLP3 SA128-29BSPLP2 SA128-29BSPLP3	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0905192	SA102-10BSPLP2 SA102-30BSPLP2	Cyanide	X	A	Overall assessment of data (o)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0905192**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905192	SA102-10BSPLP3	Total phosphorus	0.050U mg/L	A	bl
R0905192	SA102-30BSPLP3	Total phosphorus	0.050U mg/L	A	bl
R0905192	SA30-9BSPLP3	Total phosphorus	0.050U mg/L	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905192	SA30-9BSPLP2	Nitrate as N	0.050U mg/L	A	bl
R0905192	SA128-10BSPLP3	Ammonia as N Total organic carbon	0.050U mg/L 1.0U mg/L	A	bl
R0905192	SA128-29BSPLP3	Ammonia as N Total organic carbon	0.050U mg/L 1.0U mg/L	A	bl
R0905192	SA128-29BSPLP2	Ammonia as N	0.050U mg/L	A	bl

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0905192**

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET

LDC #: 21991F6

SDG #: R0905138192

Laboratory: Columbia Analytical Services

Stage 4

Date: 11-19-09

Page: 1 of 1

Reviewer: *CR*

2nd Reviewer: *[Signature]*

**METHOD: (Analyte)** Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Conductivity (EPA Method 120.1), Cyanide (EPA SW846 Method 9012A), Hexavalent Chromium (EPA SW846 Method 7199), Nitrite-N (EPA Method 353.2), pH (EPA SW846 Method 9040B), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), TDS (SM2540C), TSS (SM2540D), TOC (EPA SW846 Method 9060), Chlorate (300-1), Perchlorate (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	SW	Sampling dates: 9/10/09 - 9/16/09
Ila.	Initial calibration	A	
lib.	Calibration verification	A	
III.	Blanks	SW	
IV	Surrogate Spikes	SW	
V	Matrix Spike/Matrix Spike Duplicates	AA	Client specified MS/D
VI.	Duplicates	AA	DUP
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	SW	
IX.	Overall assessment of data	SW	
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:

Soil

1	SA102-10BSPLP2	11	SA128-29BSPLP2	21		31	PBW (3,6,8)
2	SA102-10BSPLP2RE	12	SA128-29BSPLP3	22		32	PBW (1,2,4,5,7)
3	SA102-10BSPLP3	13	SA128-10BSPLP2DUP			33	PBW (10,12)
4	SA102-30BSPLP2	14		MS	24	34	PBW (9,11)
5	SA102-30BSPLP2RE	15		MS	25	35	
6	SA102-30BSPLP3	16			26	36	
7	SA30-9BSPLP2	17			27	37	
8	SA30-9BSPLP3	18			28	38	
9	SA128-10BSPLP2	19			29	39	
10	SA128-10BSPLP3	20			30	40	

Notes: \_\_\_\_\_



LDC #: 21991F6  
 SDG #: see cover

VALIDATION FINDINGS CHECKLIST

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

Method: Inorganics (EPA Method see cover)

Validation Area	Yes	No	NA	Findings/Comments
<b>I. Technical Holding Times</b>				
All technical holding times were met.		✓		
Cooler temperature criteria was met.	✓			
<b>II. Instrumentation</b>				
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)	✓			
<b>III. Blanks</b>				
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.	✓			
<b>IV. Matrix Spike/Duplicate Samples (Duplicates - applicable)</b>				
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.	✓			<del>check specified CR</del>
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.	✓			↓
<b>V. Laboratory Control Samples</b>				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
<b>VI. Regional Quality Assurance and Quality Control</b>				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?		✓		

LDC #: 21991FB6  
 SDG #: see cover

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2  
 Reviewer: CE  
 2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
<b>VI Sample Result Verification</b>				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were detection limits < RL?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>VII Overall Assessment of Data</b>				
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>VIII Field Duplicates</b>				
Field duplicate pairs were identified in this SDG.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Target analytes were detected in the field duplicates.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
<b>IX Field Blanks</b>				
Field blanks were identified in this SDG.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Target analytes were detected in the field blanks.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	



LDC #: 21991F6  
 SDG #: see can

**VALIDATION FINDINGS WORKSHEET**  
**Technical Holding Times**

Page: 1 of 1  
 Reviewer: CP  
 2nd reviewer: W

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:	7199	9012A					
Parameters:	CG+	CA					
Technical holding time:	24hrs	14 days					
Sample ID	Extraction Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
1	9/22/09 07:45	9/23/09 13:01	(29.25 hrs)				J-US/P
↓		↓ 13:13	(29.5 hrs)				↓
2				10/13/09 (21 days)			J-US/A*
4		9/23/09 13:23	(29.75 hrs)				J-US/P
↓		13:33	(29.75 hrs)				↓
5				10/13/09 (21 days)			J-US/A*
7		9/23/09 13:44	(30 hrs)				J-US/P
↓		13:54	(30.25 hrs)				↓
3	9/18/09 08:30	9/19/09 20:25	(36 hrs)				J-US/P
↓		20:44	(35.75 hrs)				↓
6		20:46	(36.25 hrs)				↓
↓		20:35	(36 hrs)				↓
8		20:56	(36.5 hrs)				↓
↓		21:06	(36.5 hrs)				↓
9	9/29/09 07:45	9/30/09 10:52	(27 hrs)				J-US/P
↓		11:02	(27.25 hrs)				↓
11		13:38	(30 hrs)				↓
↓		11:33	(27.75 hrs)				↓
<del>10</del>							

HT.6 \*Originally ran within holding time but reanalysis was necessary.

**VALIDATION FINDINGS WORKSHEET**

**Blanks**

**METHOD:** Inorganics, Method      See Cover

Reason code: bl

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.

**Conc. units: mg/L** Associated Samples: **3, 6, 8**

Analyte	Blank ID	Maximum ICB/CBB (mg/L)	Blank Action Limit	Sample Identification		
				3	6	8
Alk., Total	PB (mg/L) 0.5					
Alk., Bicarb.	0.5					
Cl	0.07					
pH (pH units)	8.17					
T-P	0.011	0.0081		0.034 / 0.050	0.037 / 0.050	0.027 / 0.050
TDS	7					

**Conc. units: mg/L** Associated Samples: **1, 4, 7**

Analyte	Blank ID	Maximum ICB/CBB (mg/L)	Blank Action Limit	Sample Identification		
				7		
Alk., Total	PB (mg/L) 1.8					
Alk., Bicarb.	1.8					
NH3-N	0.052					
NO3-N	0.031			0.041 / 0.050		
pH (pH units)	8.26					
SO4	0.27		2.7			

**VALIDATION FINDINGS WORKSHEET  
Blanks**

METHOD: Inorganics, Method See Cover

Reason code: bl

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.

Conc. units: mg/L Associated Samples: 10, 12

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification	
				10	12
Alk., Total	1.9	1.8			
Alk., Bicarb.	1.9				
NH3-N	0.012		0.016 / 0.050	0.010 / 0.050	
TOC	0.3		0.4 / 1.0	0.2 / 1.0	
pH (pH units)	7.61				
NO2-N		0.0070			

Conc. units: mg/L Associated Samples: 9, 11

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification	
				11	
Alk., Total	1.8				
Alk., Bicarb.	1.8				
NH3-N	0.046		0.041 / 0.050		
Cl	0.17				
NO3-N	0.049				
pH (pH units)	7.88				
SO4	0.36		3.6		

# VALIDATION FINDINGS WORKSHEET

## Blanks

LDC #: 21991F6  
SDG #: See Cover

METHOD: Inorganics, Method See Cover

Reason code: bl

Page: 33 of 33  
Reviewer: [Signature]  
2nd Reviewer: [Signature]

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.

Conc. units: mg/L Associated Samples: 6, 8

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/L)			
Alk., Total		0.5		

Conc. units: mg/L Associated Samples: 1, 4, 7, 9

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/L)			
Alk., Total		1.2		

Conc. units: mg/L Associated Samples: 2, 5

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/L)			
CN		0.00753		

Conc. units: mg/L Associated Samples: 8

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/L)			
Cl		0.045		









SDG #: see cover

Initial and Continuing Calibration Calculation Verification

Reviewer: CR

2nd Reviewer: R

Method: Inorganics, Method See cover

The correlation coefficient (r) for the calibration of NO<sub>2</sub>-N was recalculated. Calibration date: 9/23/09

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

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

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		Reported		Acceptable (Y/N)
					r	r <sup>2</sup>	r	r <sup>2</sup>	
Initial calibration	NO <sub>2</sub> -N	s1	0	0					
		s2	0.01	106250					
		s3	0.02	205043					
		s4	0.05	457027	0.9999	0.9998			
		s5	0.1	932800					
		s6	0.2	1784163					
		s7	0.5	4297901					
		s8	1	8260378					
		s9	2	16593699					
Calibration verification	TOC	CCV	15	15,540	104				
Calibration verification	CN	CCV	0.50	0.48338	97				
Calibration verification	NO <sub>2</sub> -N	CCV	0.45	0.4683	104				

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 #: 2/99/18  
 SDG #: see cover

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

Page: 1 of 1  
 Reviewer: CR  
 2nd Reviewer: CR

METHOD: Inorganics, Method See cover

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

$$\%R = \frac{\text{Found}}{\text{True}} \times 100$$
 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		Reported		Acceptable (Y/N)
					%R / RPD	%R / RPD	%R / RPD	%R / RPD	
LCS	Laboratory control sample	Br	0.971	1.00	97	97	97	97	Y
A14	Matrix spike sample	ClO3	(SSR-SR) 164	200	82	82	82	82	Y
A13	Duplicate sample	ClO3	29	30	3	3	3	3	Y

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 #: 21991F6  
 SDG #: see cover

**VALIDATION FINDINGS WORKSHEET**  
Sample Calculation Verification

Page: 1 of 1  
 Reviewer: CF  
 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 CF reported with a positive detect were recalculated and verified using the following equation:

Concentration =  $DF((3.703 \times 10^{-8})(Area) - 0.0002215)$       Recalculation:  $((3.703 \times 10^{-8})(5801409) - 0.0002215) / C$   
 $= 2.15 \text{ mg/L}$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	Alk, Total	124	124	Y
		NH3-N	0.102	0.02	
		Alk, Bicarb	26.8	26.8	
		TOR	1.7	1.7	
		Alk, Carb.	97.6	97.6	
		Cl	164	164	
		Cr6+	2.15	2.15	
		Cr6+	2.16	2.16	
		Cond (umhos/cm)	1500	1500	
		NO3-N	1.40	1.4	
		NO2-N	0.026	0.026	
		pH	10.04	10.04	
		P	0.033	0.033	
		TDS	1010	1010	
		SO4	11.5	11.5	
		Surfactants	0.060	0.060	
	2	CN	ND	ND	Y
	1	ClO3	415000	415000	Y
		ClO4	18200	18200	Y

Note:

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** September 11, 2009

**LDC Report Date:** December 8, 2009

**Matrix:** Soil

**Parameters:** Wet Chemistry

**Validation Level:** Stage 2B

**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** R0905198

### Sample Identification

RSAQ6-0.5B  
RSAQ6-10B  
RSAQ6-25B  
RSAQ6-38B  
RSAQ6009-38B  
SA41-12B  
SA41-25B  
SA41-38B  
SA40-10B  
SA40-25B  
SA40-41B  
SA114-10B  
SA114-30B  
SA124-25B  
SA124-42B  
SA40-41BMS  
SA40-41BMSD  
SA40-41BDUP

## Introduction

This data review covers 18 soil samples listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA Method 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Method 9045D for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, 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 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.
- UU 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
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate	10 mg/Kg 10 mg/Kg	SA40-10B SA40-25B SA40-41B SA114-10B SA114-30B SA124-25B SA124-42B
ICB/CCB	Ammonia as N	0.0250 mg/L	SA40-10B SA40-25B SA40-41B SA114-10B SA114-30B SA124-25B SA124-42B
PB (prep blank)	Total organic carbon	40 mg/Kg	RSAQ6-0.5B RSAQ6-10B RSAQ6-25B RSAQ6-38B RSAQ6009-38B

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Total organic carbon	60 mg/Kg	SA41-12B SA41-25B SA41-38B SA40-10B SA40-25B SA40-41B SA114-10B SA114-30B SA124-25B SA124-42B
ICB/CCB	Total organic carbon	116.0 mg/Kg	All samples in SDG R0905198
ICB/CCB	Chloride	0.136 mg/L	SA40-10B SA40-25B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAQ6-25B	Total organic carbon	290 mg/Kg	300U mg/Kg
RSAQ6-38B	Total organic carbon	160 mg/Kg	290U mg/Kg
RSAQ6009-38B	Total organic carbon	130 mg/Kg	290U mg/Kg
SA41-38B	Total organic carbon	170 mg/Kg	280U mg/Kg
SA114-10B	Ammonia as N	0.33 mg/Kg	0.54U mg/Kg
SA114-30B	Ammonia as N	0.54 mg/Kg	0.60U mg/Kg
SA124-42B	Total organic carbon	230 mg/Kg	290U mg/Kg

Samples FB072909-SO (from SDG R0904226) 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
FB072909-SO	7/29/09	Perchlorate Ammonia as N Total organic carbon Chloride Nitrate as N Sulfate Surfactants Total phosphorus pH	0.5 ug/L 1.71 mg/L 0.5 mg/L 6.2 mg/L 1.02 mg/L 8.0 mg/L 0.168 mg/L 0.007 mg/L 3.48 units	All samples in SDG R0905198

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAQ6-0.5B	Chloride Nitrate as N Sulfate Surfactants	17.1 mg/Kg 1.45 mg/Kg 74.0 mg/Kg 0.7 mg/Kg	17.1J+ mg/Kg 1.45J+ mg/Kg 74.0J+ mg/Kg 2.2U mg/Kg
RSAQ6-10B	Chloride Nitrate as N Sulfate	7.7 mg/Kg 1.62 mg/Kg 109 mg/Kg	7.7J+ mg/Kg 1.62J+ mg/Kg 109J+ mg/Kg
RSAQ6-25B	Total organic carbon Chloride Nitrate as N Sulfate Surfactants	290 mg/Kg 11.6 mg/Kg 2.35 mg/Kg 141 mg/Kg 1.9 mg/Kg	300U mg/Kg 11.6J+ mg/Kg 2.35J+ mg/Kg 141J+ mg/Kg 2.2U mg/Kg
RSAQ6-38B	Total organic carbon Chloride Nitrate as N Sulfate	160 mg/Kg 486 mg/Kg 13.1 mg/Kg 725 mg/Kg	290U mg/Kg 486J+ mg/Kg 13.1J+ mg/Kg 725J+ mg/Kg
RSAQ6009-38B	Total organic carbon Chloride Nitrate as N Sulfate Surfactants	130 mg/Kg 476 mg/Kg 13.1 mg/Kg 642 mg/Kg 1.4 mg/Kg	290U mg/Kg 476J+ mg/Kg 13.1J+ mg/Kg 642J+ mg/Kg 2.8U mg/Kg
SA41-12B	Chloride Nitrate as N	330 mg/Kg 7.24 mg/Kg	330J+ mg/Kg 7.24J+ mg/Kg
SA41-25B	Chloride Nitrate as N	577 mg/Kg 3.78 mg/Kg	577J+ mg/Kg 3.78J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA41-38B	Total organic carbon Chloride Nitrate as N Sulfate	170 mg/Kg 348 mg/Kg 3.83 mg/Kg 753 mg/Kg	280U mg/Kg 348J+ mg/Kg 3.83J+ mg/Kg 753J+ mg/Kg
SA40-10B	Chloride Nitrate as N Sulfate	83.6 mg/Kg 3.02 mg/Kg 222 mg/Kg	83.6J+ mg/Kg 3.02J+ mg/Kg 222J+ mg/Kg
SA40-25B	Chloride Nitrate as N	102 mg/Kg 2.20 mg/Kg	102J+ mg/Kg 2.20J+ mg/Kg
SA40-41B	Chloride Nitrate as N	316 mg/Kg 2.74 mg/Kg	316J+ mg/Kg 2.74J+ mg/Kg
SA114-10B	Ammonia as N Nitrate as N Sulfate Surfactants	0.33 mg/Kg 19.5 mg/Kg 477 mg/Kg 1.2 mg/Kg	0.54U mg/Kg 19.5J+ mg/Kg 477J+ mg/Kg 2.1U mg/Kg
SA114-30B	Ammonia as N Nitrate as N Sulfate Surfactants	0.54 mg/Kg 11.7 mg/Kg 537 mg/Kg 1.5 mg/Kg	0.60U mg/Kg 11.7J+ mg/Kg 537J+ mg/Kg 2.4U mg/Kg
SA124-25B	Ammonia as N Nitrate as N Sulfate	0.89 mg/Kg 13.9 mg/Kg 327 mg/Kg	0.89J+ mg/Kg 13.9J+ mg/Kg 327J+ mg/Kg
SA124-42B	Total organic carbon Nitrate as N	230 mg/Kg 9.48 mg/Kg	290U mg/Kg 9.48J+ mg/Kg

#### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Affected Analyte	Flag	A or P
SA40-41BMS (All samples in SDG R0905198)	Chloride Alkalinity, total	139 (75-125) 135 (75-125)	- -	- -	Chloride Alkalinity, total Alkalinity, bicarbonate	J+ (all detects) J+ (all detects) J+ (all 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
SA40-41BDUP (All samples in SDG R0905198)	Sulfate	126 ( $\leq 20$ )	-	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) and relative percent differences (RPD) were within QC limits.

## VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Analyte	Flag	A or P
RSAQ6-38B	Dichloroacetate	86 (90-115)	Chlorate	J- (all detects) UJ (all non-detects)	A

## 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 R0905198	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

## IX. Overall Assessment

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

## X. Field Duplicates

Samples RSAQ6-38B and RSAQ6009-38B 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
	RSAQ6-38B	RSAQ6009-38B				
Alkalinity, total	329 mg/Kg	340 mg/Kg	3 ( $\leq 50$ )	-	-	-
Alkalinity, bicarbonate	329 mg/Kg	340 mg/Kg	3 ( $\leq 50$ )	-	-	-
Chloride	483 mg/Kg	476 mg/Kg	1 ( $\leq 50$ )	-	-	-
Nitrate as N	13.1 mg/Kg	13.1 mg/Kg	0 ( $\leq 50$ )	-	-	-
pH	7.98 units	7.97 units	0 ( $\leq 50$ )	-	-	-
Sulfate	725 mg/Kg	642 mg/Kg	12 ( $\leq 50$ )	-	-	-
Surfactants	0.8U mg/Kg	1.4 mg/Kg	-	0.6 ( $\leq 2.9$ )	-	-
Total organic carbon	160 mg/Kg	130 mg/Kg	-	30 ( $\leq 290$ )	-	-
Total phosphorus	708 mg/Kg	805 mg/Kg	13 ( $\leq 50$ )	-	-	-
Chlorate	104000 ug/Kg	131000 ug/Kg	23 ( $\leq 50$ )	-	-	-
Perchlorate	60200 ug/Kg	66400 ug/Kg	10 ( $\leq 50$ )	-	-	-

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Data Qualification Summary - SDG R0905198**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905198	RSAQ6-0.5B RSAQ6-10B RSAQ6-25B RSAQ6-38B RSAQ6009-38B SA41-12B SA41-25B SA41-38B SA40-10B SA40-25B SA40-41B SA114-10B SA114-30B SA124-25B SA124-42B	Chloride Alkalinity, total Alkalinity, bicarbonate	J+ (all detects) J+ (all detects) J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0905198	RSAQ6-0.5B RSAQ6-10B RSAQ6-25B RSAQ6-38B RSAQ6009-38B SA41-12B SA41-25B SA41-38B SA40-10B SA40-25B SA40-41B SA114-10B SA114-30B SA124-25B SA124-42B	Sulfate	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)
R0905198	RSAQ6-38B	Chlorate	J- (all detects) UJ (all non-detects)	A	Surrogate spikes (%R) (s)
R0905198	RSAQ6-0.5B RSAQ6-10B RSAQ6-25B RSAQ6-38B RSAQ6009-38B SA41-12B SA41-25B SA41-38B SA40-10B SA40-25B SA40-41B SA114-10B SA114-30B SA124-25B SA124-42B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0905198**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905198	RSAQ6-25B	Total organic carbon	300U mg/Kg	A	bl
R0905198	RSAQ6-38B	Total organic carbon	290U mg/Kg	A	bl
R0905198	RSAQ6009-38B	Total organic carbon	290U mg/Kg	A	bl
R0905198	SA41-38B	Total organic carbon	280U mg/Kg	A	bl
R0905198	SA114-10B	Ammonia as N	0.54U mg/Kg	A	bl
R0905198	SA114-30B	Ammonia as N	0.60U mg/Kg	A	bl
R0905198	SA124-42B	Total organic carbon	290U mg/Kg	A	bl

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0905198**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905198	RSAQ6-0.5B	Chloride Nitrate as N Sulfate Surfactants	17.1J+ mg/Kg 1.45J+ mg/Kg 74.0J+ mg/Kg 2.2U mg/Kg	A	bf
R0905198	RSAQ6-10B	Chloride Nitrate as N Sulfate	7.7J+ mg/Kg 1.62J+ mg/Kg 109J+ mg/Kg	A	bf
R0905198	RSAQ6-25B	Total organic carbon Chloride Nitrate as N Sulfate Surfactants	300U mg/Kg 11.6J+ mg/Kg 2.35J+ mg/Kg 141J+ mg/Kg 2.2U mg/Kg	A	bf
R0905198	RSAQ6-38B	Total organic carbon Chloride Nitrate as N Sulfate	290U mg/Kg 486J+ mg/Kg 13.1J+ mg/Kg 725J+ mg/Kg	A	bf



SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905198	RSAQ6009-38B	Total organic carbon Chloride Nitrate as N Sulfate Surfactants	290U mg/Kg 476J+ mg/Kg 13.1J+ mg/Kg 642J+ mg/Kg 2.8U mg/Kg	A	bf
R0905198	SA41-12B	Chloride Nitrate as N	330J+ mg/Kg 7.24J+ mg/Kg	A	bf
R0905198	SA41-25B	Chloride Nitrate as N	577J+ mg/Kg 3.78J+ mg/Kg	A	bf
R0905198	SA41-38B	Total organic carbon Chloride Nitrate as N Sulfate	280U mg/Kg 348J+ mg/Kg 3.83J+ mg/Kg 753J+ mg/Kg	A	bf
R0905198	SA40-10B	Chloride Nitrate as N Sulfate	83.6J+ mg/Kg 3.02J+ mg/Kg 222J+ mg/Kg	A	bf
R0905198	SA40-25B	Chloride Nitrate as N	102J+ mg/Kg 2.20J+ mg/Kg	A	bf
R0905198	SA40-41B	Chloride Nitrate as N	316J+ mg/Kg 2.74J+ mg/Kg	A	bf
R0905198	SA114-10B	Ammonia as N Nitrate as N Sulfate Surfactants	0.54U mg/Kg 19.5J+ mg/Kg 477J+ mg/Kg 2.1U mg/Kg	A	bf
R0905198	SA114-30B	Ammonia as N Nitrate as N Sulfate Surfactants	0.60U mg/Kg 11.7J+ mg/Kg 537J+ mg/Kg 2.4U mg/Kg	A	bf
R0905198	SA124-25B	Ammonia as N Nitrate as N Sulfate	0.89J+ mg/Kg 13.9J+ mg/Kg 327J+ mg/Kg	A	bf
R0905198	SA124-42B	Total organic carbon Nitrate as N	290U mg/Kg 9.48J+ mg/Kg	A	bf

### Tronox Northgate Henderson

LDC #: 21991G6  
 SDG #: R0905198  
 Laboratory: Columbia Analytical Services

## VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 11-19-09  
 Page: 1 of 1  
 Reviewer: CR  
 2nd Reviewer: W

**METHOD: (Analyte)** Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Chlorate (EPA Method 300.1), Cyanide (EPA SW846 Method 9012A), Hexavalent Chromium (EPA SW846 Method 7199), Nitrite-N (EPA Method 353.2), pH (EPA SW846 Method 9045D), Surfactants (SM5540C), Perchlorate (EPA Method 314.0), 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	A	Sampling dates: 9/11/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	SW	
IV.	Surrogate Spikes	SW	
V.	Matrix Spike/Matrix Spike Duplicates	SW	MS/D
VI.	Duplicates	SW	DUP
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(4,5)
XI.	Field blanks	SW	FB = FB072909-SO (SO6X R0904226)

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

Validated Samples: SO:1

1	RSAQ6-0.5B	11	SA40-41B	21	<del>FB</del> S(1-8)	31	
2	RSAQ6-10B	12	SA114-10B	22	<del>FB</del> S(9-15)	32	
3	RSAQ6-25B	13	SA114-30B	23		33	
4	RSAQ6-38B	14	SA124-25B	24		34	
5	RSAQ6009-38B	15	SA124-42B	25		35	
6	SA41-12B	16	SA40-41BMS	26		36	
7	SA41-25B	17	SA40-41BMSD	27		37	
8	SA41-38B	18	SA40-41BDUP	28		38	
9	SA40-10B	19		29		39	
10	SA40-25B	20		30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



**VALIDATION FINDINGS WORKSHEET**

**Blanks**

**METHOD:** Inorganics, Method See Cover

Reason code: bl

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.

**Conc. units: mg/Kg** Associated Samples: 9-15

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			12 13
Alk., Total	10			
Alk., Bicarb.	10			
NH3-N		0.0250		0.33 / 0.54 0.54 / 0.60

**Conc. units: mg/Kg** Associated Samples: 1-5

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			3 4 5
TOC	40			290 / 300 160 / 290 130 / 290

**Conc. units: mg/Kg** Associated Samples: 6-15

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			8 15
TOC	60			170 / 280 230 / 290

**Conc. units: mg/Kg** Associated Samples: All

Analyte	Blank ID	Maximum ICB/CCB (mg/Kg)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			3 4 5 8 15
TOC		116.0		See PB See PB See PB See PB See PB

LDC #: 21991G6  
 SDG #: See Cover

# VALIDATION FINDINGS WORKSHEET

## Blanks

Page: 2 of 2  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

METHOD: Inorganics, Method See Cover Reason code: bl

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.

Conc. units: mg/Kg Associated Samples: 9, 10

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
Cl	PB (mg/Kg)	0.136					











LDC#: 21991G6  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

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

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 ( $\leq 50$ )	Difference	Limits	Qualification (Parent only)
	4	5				
Total Alkalinity	329	340	3			
Bicarbonate Alkalinity	329	340	3			
Chloride	483	476	1			
Nitrate as N	13.1	13.1	0			
pH (pH Units)	7.98	7.97	0			
Sulfate	725	642	12			
Surfactants	0.8U	1.4		0.6	( $\leq 2.9$ )	
TOC	160	130		30	(<290)	
Total Phosphorus	708	805	13			
Chlorate (ug/Kg)	104000	131000	23			
Perchlorate (ug/Kg)	60200	66400	10			

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** September 14, 2009

**LDC Report Date:** December 21, 2009

**Matrix:** Soil/Water

**Parameters:** Wet Chemistry

**Validation Level:** Stage 2B

**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** R0905218

### Sample Identification

EB091409-SO1	RSAR6-37BMS
SA42-10B	RSAR6-37BDUP
SA42009-10B	RSAR6-37BMSD
SA42-25B	
SA42-38B	
SA43-10B	
SA43-25B	
SA43-25BRE	
SA43-43B	
SA43-43BRE	
SA44-10B	
SA44-25B	
SA44-42B	
RSAR6-37B	
RSAR6-25B	
RSAR6-0.5B	
RSAR6-9B	
RSAO8-43B	
RSAO8-11.5B	
RSAO8-21.5B	

## Introduction

This data review covers 22 soil samples and one water sample listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA Method 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Methods 9040B and 9045D for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, and Lloyd/Kahn Method and EPA SW 846 Method 9060 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 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 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
EB091409-SO1	Hexavalent chromium	26 & 26.25 hours	24 hours	J- (all detects) UJ (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 with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
9/15/09	CCV (11:10)	Hexavalent chromium	114 (90-110)	All water samples in SDG R0905218	J+ (all 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 with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Ammonia as N	0.0144 mg/L	All water samples in SDG R0905218

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Total organic carbon	10 mg/Kg 10 mg/Kg 60 mg/Kg	EB091409-SO1 SA42-10B SA42009-10B SA42-25B SA42-38B SA43-10B SA43-25B SA43-43B
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Total organic carbon	11 mg/Kg 11 mg/Kg 50 mg/Kg	SA44-10B SA44-25B SA44-42B RSAR6-37B RSAR6-25B RSAR6-0.5B RSAR6-9B RSAO8-43B
ICB/CCB	Total organic carbon	116.0 mg/Kg	All soil samples in SDG R0905218
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride	15 mg/Kg 15 mg/Kg 1.2 mg/Kg	RSAO8-11.5B RSAO8-21.5B
ICB/CCB	Alkalinity, total	0.5 mg/L	RSAO8-43B RSAO8-11.5B RSAO8-21.5B
ICB/CCB	Ammonia as N	0.0250 mg/L	SA42-10B SA42009-10B SA42-25B SA42-38B
ICB/CCB	Chloride	0.109 mg/L	SA44-10B SA44-25B SA44-42B RSAR6-0.5B RSAR6-9B
ICB/CCB	Sulfate	0.124 mg/L	SA42-38B SA43-10B SA43-25B SA43-43B SA44-10B SA44-25B SA44-42B RSAR6-37B RSAR6-25B RSAR6-0.5B RSAR6-9B RSAO8-43B RSAO8-11.5B RSAO8-21.5B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA43-25B	Total organic carbon	300 mg/Kg	300U mg/Kg
SA43-43B	Total organic carbon	170 mg/Kg	290U mg/Kg
SA44-25B	Total organic carbon	150 mg/Kg	280U mg/Kg
RSAR6-37B	Total organic carbon	150 mg/Kg	280U mg/Kg
RSAO8-43B	Total organic carbon	210 mg/Kg	300U mg/Kg

Sample EB091409-SO1 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
EB091409-SO1	9/14/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride pH Sulfate Surfactants	0.5 mg/L 0.5 mg/L 0.051 mg/L 1.1 mg/L 1.4 mg/L 5.32 units 1.7 mg/L 0.047 mg/L	SA42-10B SA42009-10B SA42-25B SA42-38B SA43-10B SA43-25B SA43-43B SA44-10B SA44-25B SA44-42B RSAR6-37B RSAR6-25B RSAR6-0.5B RSAR6-9B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA42-10B	Surfactants	1.4 mg/Kg	2.2U mg/Kg
SA42009-10B	Surfactants	1.4 mg/Kg	2.2U mg/Kg



Sample	Analyte	Reported Concentration	Modified Final Concentration
SA42-25B	Surfactants	4.3 mg/Kg	4.3J+ mg/Kg
SA42-38B	Surfactants	1.7 mg/Kg	3.1U mg/Kg
SA43-25B	Total organic carbon	300 mg/Kg	300U mg/Kg
SA43-43B	Total organic carbon	170 mg/Kg	290U mg/Kg
SA44-25B	Total organic carbon	150 mg/Kg	280U mg/Kg
SA44-42B	Surfactants	2.2 mg/Kg	2.4U mg/Kg
RSAR6-37B	Total organic carbon	150 mg/Kg	280U mg/Kg

Samples FB072909-SO (from SDG R0904226) and FB082809-SO (from SDG R0904894) were identified as field blanks. No contaminant concentrations were found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB072909-SO	7/29/09	Ammonia as N Total organic carbon Chloride Nitrate as N Sulfate Surfactants Total phosphorus pH Perchlorate	1.71 mg/L 0.5 mg/L 6.2 mg/L 1.02 mg/L 8.0 mg/L 0.168 mg/L 0.007 mg/L 3.48 units 0.5 ug/L	SA42-10B SA42009-10B SA42-25B SA42-38B SA43-10B SA43-25B SA43-43B SA44-10B SA44-25B SA44-42B RSAR6-37B RSAR6-25B RSAR6-0.5B RSAR6-9B
FB072909-SO	7/29/09	Nitrate as N	1.02 mg/L	SA43-25BRE SA43-43BRE
FB082809-SO	8/28/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Sulfate	1.9 mg/L 1.9 mg/L 0.033 mg/L 0.2 mg/L 1.2 mg/L 0.68 mg/L 5.88 units 0.008 mg/L 1.4 mg/L	RSAO8-43B RSAO8-11.5B RSAO8-21.5B

\*Indicates change as the result of report review.  
SDG R0905218

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
SA42-10B	Chloride Sulfate Surfactants	5.8 mg/Kg 28.6 mg/Kg 1.4 mg/Kg	5.8J+ mg/Kg 28.6J+ mg/Kg 2.2U mg/Kg
SA42009-10B	Chloride Sulfate Surfactants	5.9 mg/Kg 28.7 mg/Kg 1.4 mg/Kg	5.9J+ mg/Kg 28.7J+ mg/Kg 2.2U mg/Kg
SA42-25B	Chloride Surfactants	36.7 mg/Kg 4.3 mg/Kg	36.7J+ mg/Kg 4.3J+ mg/Kg
SA42-38B	Sulfate Surfactants	557 mg/Kg 1.7 mg/Kg	557J+ mg/Kg 3.1U mg/Kg
SA43-10B	Chloride Nitrate as N Sulfate	12.7 mg/Kg 1.90 mg/Kg 196 mg/Kg	12.7J+ mg/Kg 1.90J+ mg/Kg 196J+ mg/Kg
SA43-25B	Total organic carbon Chloride Nitrate as N	300 mg/Kg 57.1 mg/Kg 3.05 mg/Kg	300U mg/Kg 57.1J+ mg/Kg 3.05J+ mg/Kg
SA43-25BRE	Nitrate as N	3.01 mg/Kg	3.01J+ mg/Kg
SA43-43B	Total organic carbon Chloride Nitrate as N Sulfate	170 mg/Kg 303 mg/Kg 3.69 mg/Kg 779 mg/Kg	290U mg/Kg 303J+ mg/Kg 3.69J+ mg/Kg 779J+ mg/Kg
SA43-43BRE	Nitrate as N	3.66 mg/Kg	3.66J+ mg/Kg
SA44-10B	Chloride Nitrate as N Sulfate	18.0 mg/Kg 2.43 mg/Kg 232 mg/Kg	18.0J+ mg/Kg 2.43J+ mg/Kg 232J+ mg/Kg
SA44-25B	Total organic carbon Chloride Nitrate as N	150 mg/Kg 7.5 mg/Kg 1.23 mg/Kg	280U mg/Kg 7.5J+ mg/Kg 1.23J+ mg/Kg
SA44-42B	Chloride Nitrate as N Surfactants	84.9 mg/Kg 1.47 mg/Kg 2.2 mg/Kg	84.9J+ mg/Kg 1.47J+ mg/Kg 2.2U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAR6-37B	Total organic carbon Nitrate as N	150 mg/Kg 13.5 mg/Kg	280U mg/Kg 13.5J+ mg/Kg
RSAR6-25B	Nitrate as N	28.3 mg/Kg	28.3J+ mg/Kg
RSAR6-0.5B	Chloride Nitrate as N Sulfate	60.8 mg/Kg 1.06 mg/Kg 105 mg/Kg	60.8J+ mg/Kg 1.06J+ mg/Kg 105J+ mg/Kg
RSAR6-9B	Chloride Nitrate as N Sulfate	6.6 mg/Kg 1.19 mg/Kg 29.9 mg/Kg	6.6J+ mg/Kg 1.19J+ mg/Kg 29.9J+ mg/Kg
RSAO8-43B	Total organic carbon Nitrate as N	210 mg/Kg 3.46 mg/Kg	300U mg/Kg 3.46J+ mg/Kg
RSAO8-11.5B	Ammonia as N Nitrate as N	0.18 mg/Kg 13.9 mg/Kg	0.54U mg/Kg 13.9J+ mg/Kg
RSAO8-21.5B	Ammonia as N Nitrate as N	0.13 mg/Kg 6.58 mg/Kg	0.54U mg/Kg 6.58J+ mg/Kg

#### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Affected Analyte	Flag	A or P
RSAR6-37BMS (SA42-10B SA42009-10B SA42-25B SA42-38B SA43-10B SA43-25B SA43-43B SA44-10B SA44-25B SA44-42B RSAR6-37B RSAR6-25B RSAR6-0.5B RSAR6-9B)	Alkalinity, total	70 (75-125)	-	-	Alkalinity, total Alkalinity, bicarbonate	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Affected Analyte	Flag	A or P
RSAR6-37BMS (SA42-10B SA42009-10B SA42-25B SA42-38B SA44-10B SA44-25B SA44-42B RSAR6-37B RSAR6-25B RSAR6-0.5B RSAR6-9B)	Cyanide	1 (75-125)	-	-	Cyanide	J- (all detects) R (all non-detects)	A
RSAR6-37BMS (SA42-10B SA42009-10B SA42-25B SA42-38B SA43-10B SA43-25B SA43-43B SA44-10B SA44-25B SA44-42B RSAR6-37B RSAR6-25B RSAR6-0.5B RSAR6-9B)	Sulfate	158 (75-125)	-	-	Sulfate	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) and relative percent differences (RPD) were within QC limits.

## VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Analyte	Flag	A or P
SA42-25B	Dichloroacetate	116 (90-115)	Chlorate	J+ (all detects)	A

Sample	Surrogate	%R (Limits)	Analyte	Flag	A or P
SA44-25B	Dichloroacetate	116 (90-115)	Chlorate	J+ (all detects)	A

### 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 R0905218	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

### IX. Overall Assessment

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	Analysis	Flag	A or P
SA43-25BRE SA43-43BRE	Nitrate as N	X	A

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

### X. Field Duplicates

Samples SA42-10B and SA42009-10B 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
	SA42-10B	SA42009-10B				
Alkalinity, total	420 mg/Kg	433 mg/Kg	3 ( $\leq 50$ )	-	-	-
Alkalinity, bicarbonate	411 mg/Kg	421 mg/Kg	2 ( $\leq 50$ )	-	-	-
Alkalinity, carbonate	9 mg/Kg	12 mg/Kg	-	3 ( $\leq 22$ )	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA42-10B	SA42009-10B				
Chloride	5.8 mg/Kg	5.9 mg/Kg	-	0.1 ( $\leq 2.2$ )	-	-
Nitrite as N	0.41 mg/Kg	0.63 mg/Kg	-	0.22 ( $\leq 0.11$ )	-	-
pH	8.59 units	8.57 units	0 ( $\leq 50$ )	-	-	-
Sulfate	28.6 mg/Kg	28.7 mg/Kg	0 ( $\leq 50$ )	-	-	-
Surfactants	1.4 mg/Kg	1.4 mg/Kg	-	0 ( $\leq 2.2$ )	-	-
Total organic carbon	3530 mg/Kg	5770 mg/Kg	48 ( $\leq 50$ )	-	-	-
Total phosphorus	821 mg/Kg	909 mg/Kg	10 ( $\leq 50$ )	-	-	-

**\*Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Data Qualification Summary - SDG R0905218**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905218	EB091409-SO1	Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0905218	EB091409-SO1	Hexavalent chromium	J+ (all detects)	P	Calibration (CCV %R) (c)
R0905218	SA42-10B SA42009-10B SA42-25B SA42-38B SA43-10B SA43-25B SA43-43B SA44-10B SA44-25B SA44-42B RSAR6-37B RSAR6-25B RSAR6-0.5B RSAR6-9B	Alkalinity, total  Alkalinity, bicarbonate	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
*R0905218	SA42-10B SA42009-10B SA42-25B SA42-38B SA44-10B SA44-25B SA44-42B RSAR6-37B RSAR6-25B RSAR6-0.5B RSAR6-9B	Cyanide	J- (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0905218	SA42-10B SA42009-10B SA42-25B SA42-38B SA43-10B SA43-25B SA43-43B SA44-10B SA44-25B SA44-42B RSAR6-37B RSAR6-25B RSAR6-0.5B RSAR6-9B	Sulfate	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0905218	SA42-25B SA44-25B	Chlorate	J+ (all detects)	A	Surrogate spikes (%R) (s)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905218	EB091409-SO1 SA42-10B SA42009-10B SA42-25B SA42-38B SA43-10B SA43-25B SA43-25BRE SA43-43B SA43-43BRE SA44-10B SA44-25B SA44-42B RSAR6-37B RSAR6-25B RSAR6-0.5B RSAR6-9B RSAO8-43B RSAO8-11.5B RSAO8-21.5B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0905218	SA43-25BRE SA43-43BRE	Nitrate as N	X	A	Overall assessment of data (o)

\*Corrected associated samples noted above.

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0905218**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905218	SA43-25B	Total organic carbon	300U mg/Kg	A	bl
R0905218	SA43-43B	Total organic carbon	290U mg/Kg	A	bl
R0905218	SA44-25B	Total organic carbon	280U mg/Kg	A	bl
R0905218	RSAR6-37B	Total organic carbon	280U mg/Kg	A	bl
R0905218	RSAO8-43B	Total organic carbon	300U mg/Kg	A	bl



**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Equipment Blank Data Qualification Summary - SDG R0905218**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905218	SA42-10B	Surfactants	2.2U mg/Kg	A	be
R0905218	SA42009-10B	Surfactants	2.2U mg/Kg	A	be
R0905218	SA42-25B	Surfactants	4.3J+ mg/Kg	A	be
R0905218	SA42-38B	Surfactants	3.1U mg/Kg	A	be
R0905218	SA43-25B	Total organic carbon	300U mg/Kg	A	be
R0905218	SA43-43B	Total organic carbon	290U mg/Kg	A	be
R0905218	SA44-25B	Total organic carbon	280U mg/Kg	A	be
R0905218	SA44-42B	Surfactants	2.4U mg/Kg	A	be
R0905218	RSAR6-37B	Total organic carbon	280U mg/Kg	A	be

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0905218**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905218	SA42-10B	Chloride Sulfate Surfactants	5.8J+ mg/Kg 28.6J+ mg/Kg 2.2U mg/Kg	A	bf
R0905218	SA42009-10B	Chloride Sulfate Surfactants	5.9J+ mg/Kg 28.7J+ mg/Kg 2.2U mg/Kg	A	bf
R0905218	SA42-25B	Chloride Surfactants	36.7J+ mg/Kg 4.3J+ mg/Kg	A	bf
R0905218	SA42-38B	Sulfate Surfactants	557J+ mg/Kg 3.1U mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905218	SA43-10B	Chloride Nitrate as N Sulfate	12.7J+ mg/Kg 1.90J+ mg/Kg 196J+ mg/Kg	A	bf
R0905218	SA43-25B	Total organic carbon Chloride Nitrate as N	300U mg/Kg 57.1J+ mg/Kg 3.05J+ mg/Kg	A	bf
R0905218	SA43-25BRE	Nitrate as N	3.01J+ mg/Kg	A	bf
R0905218	SA43-43B	Total organic carbon Chloride Nitrate as N Sulfate	290U mg/Kg 303J+ mg/Kg 3.69J+ mg/Kg 779J+ mg/Kg	A	bf
R0905218	SA43-43BRE	Nitrate as N	3.66J+ mg/Kg	A	bf
R0905218	SA44-10B	Chloride Nitrate as N Sulfate	18.0J+ mg/Kg 2.43J+ mg/Kg 232J+ mg/Kg	A	bf
R0905218	SA44-25B	Total organic carbon Chloride Nitrate as N	280U mg/Kg 7.5J+ mg/Kg 1.23J+ mg/Kg	A	bf
R0905218	SA44-42B	Chloride Nitrate as N Surfactants	84.9J+ mg/Kg 1.47J+ mg/Kg 2.2U mg/Kg	A	bf
R0905218	RSAR6-37B	Total organic carbon Nitrate as N	280U mg/Kg 13.5J+ mg/Kg	A	bf
R0905218	RSAR6-25B	Nitrate as N	28.3J+ mg/Kg	A	bf
R0905218	RSAR6-0.5B	Chloride Nitrate as N Sulfate	60.8J+ mg/Kg 1.06J+ mg/Kg 105J+ mg/Kg	A	bf
R0905218	RSAR6-9B	Chloride Nitrate as N Sulfate	6.6J+ mg/Kg 1.19J+ mg/Kg 29.9J+ mg/Kg	A	bf
R0905218	RSAO8-43B	Total organic carbon Nitrate as N	300U mg/Kg 3.46J+ mg/Kg	A	bf
R0905218	RSAO8-11.5B	Ammonia as N Nitrate as N	0.54U mg/Kg 13.9J+ mg/Kg	A	bf

\*Indicates change as the result of report review.  
SDG R0905218

<b>SDG</b>	<b>Sample</b>	<b>Analyte</b>	<b>Modified Final Concentration</b>	<b>A or P</b>	<b>Code</b>
R0905218	RSAO8-21.5B	Ammonia as N Nitrate as N	0.54U mg/Kg 6.58J+ mg/Kg	A	bf

Tronox Northgate Henderson

LDC #: 21991H6

VALIDATION COMPLETENESS WORKSHEET

SDG #: R0905218

Stage 2B

Laboratory: Columbia Analytical Services

Date: 11-19-09

Page: 1 of 1

Reviewer: CR

2nd Reviewer: V

**METHOD: (Analyte)** Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Cyanide (EPA SW846 Method 9012A), ~~Dissolved Hexavalent Chromium (EPA Method 218.6)~~, Hexavalent Chromium (EPA SW846 Method 7199), Nitrite-N (EPA Method 353.2), pH (EPA SW846 Method 9040B/9045D), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), TOC (Lloyd/Kahn / 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. Chlorate (300.1), Perchlorate (314.0)

Validation Area		Comments	
I.	Technical holding times	SW	Sampling dates: 9/14/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW	
III.	Blanks	SW	
IV.	Surrogate Spikes	SW	Not required for methods A-CR
V.	Matrix Spike/Matrix Spike Duplicates	SW	MS/D
VI.	Duplicates	A	Q.P
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	SW	
IX.	Overall assessment of data	SW	
X.	Field duplicates	SW	(2,3)
XI.	Field blanks	SW	EB = 1, FB = FB072909-S0, FB082809-S0 (506# R0204226), (506# R0204894)

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

Validated Samples: All soil except 1 = water

1	EB091409-S01	11	SA44-10B	21	RSAR6-37BMS	31	QBW
2	SA42-10B	12	SA44-25B	22	RSAR6-37BDUP	32	PBS(2,7,9)
3	SA42009-10B	13	SA44-42B	23	MSD	33	PBS(19,20)
4	SA42-25B	14	RSAR6-37B	24		34	PBS(11-18)
5	SA42-38B	15	RSAR6-25B	25		35	
6	SA43-10B	16	RSAR6-0.5B	26		36	
7	SA43-25B	17	RSAR6-9B	27		37	
8	SA43-25BRE	18	RSAR6-43B	28		38	
9	SA43-43B	19	RSAR6-11.5B	29		39	
10	SA43-43BRE	20	RSAR6-21.5B	30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_







**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

METHOD: Inorganics, Method See Cover

Reason code: bl

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.

**Conc. units: mg/L**      **Associated Samples: All Water**

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
	PB (mg/L)				No Qualifiers		
NH3-N			0.0144				

**Conc. units: mg/Kg**      **Associated Samples: 7, 9**

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
	PB (mg/Kg)				7	9	
Alk., Total	10						
Alk., Bicarb.	10						
TOC	60				300 / 300	170 / 290	

**Conc. units: mg/Kg**      **Associated Samples: 11-18**

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
	PB (mg/Kg)				12	14	18
Alk., Total	11						
Alk., Bicarb.	11						
TOC	50				150 / 280	150 / 280	210 / 300



**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

METHOD: Inorganics, Method See Cover

Reason code: bl

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.

**Conc. units: mg/Kg** Associated Samples: All Soil

Analyte	Blank ID	Maximum ICB/CCB (mg/Kg)	Blank Action Limit	Sample Identification				
	PB (mg/Kg)			7	9	12	14	18
TOC		116.0		See PB	See PB	See PB	See PB	See PB

**Conc. units: mg/Kg** Associated Samples: 19, 20

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
	PB (mg/Kg)			No Qualifiers		
Alk., Total	15					
Alk., Bicarb	15					
Cl	1.2					

**Conc. units: mg/Kg** Associated Samples: 18-20

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
	PB (mg/Kg)			No Qualifiers		
Alk., Total		0.5				

**Conc. units: mg/Kg** Associated Samples: 2-5

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
	PB (mg/Kg)			No Qualifiers		
NH3-N		0.0250				

**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

Page: 3 of 3  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

LDC # 21991H6  
 SDG # See Cover

METHOD: Inorganics, Method See Cover Reason code: bl

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.

**Associated Samples: 11-13, 16, 17**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
Cl	PB (mg/Kg)	0.109					

**Associated Samples: 5-7, 9, 11-20**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
SO4	PB (mg/Kg)	0.124					



**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

LDC #: 21991H6  
 SDG #: See Cover

METHOD: Inorganics, EPA 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?

Reason Code: bf

Blank units: mg/L Associated sample units: mg/Kg

Sampling date: 7/29/09 Soil factor applied 10x

Field blank type: (circle one) Field Blank / Rinsate / Other:

Associated Samples: 2-7, 9, 11-17 = All, 8, 10 = NO3-N only.

Analyte	Blank ID	Action Limit	Sample Identification																
			2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
NH3-N	1.71	17.1																	
TOC	0.5						300 / 300		170 / 290			150 / 280			150 / 280				
Cl	6.2	620	5.8 J+	5.9 J+	36.7 J+	12.7 J+	57.1 J+	303 J+	3.69 J+	3.66 J+	18.0 J+	7.5 J+	84.9 J+		60.8 J+	6.6 J+			
NO3-N	1.02	102				1.90 J+	3.05 J+	3.01 J+	3.69 J+	3.66 J+	2.43 J+	1.23 J+	1.47 J+	13.5 J+	28.3 J+	1.06 J+	1.19 J+		
SO4	8.0	800	28.6 J+	28.7 J+		196 J+		779 J+			232 J+				105 J+	29.9 J+			
Surfactants	0.168	16.8	1.4 / 2.2	1.4 / 2.2	4.3 J+	1.7 / 3.1							2.2 / 2.4						
T-Phosphorus	0.007																		
pH (pH units)	3.48																		
<u>Barborex</u>	<u>0.5 (mg/L)</u>																		

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

LDC #: 21991H6  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

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

**METHOD: Inorganics, Method** See Cover

Y Were field blanks identified in this SDG?

N Were target analytes detected in the field blanks?

Y Blank units: mg/L Associated sample units: mg/Kg

Soil factor applied 10X except TOC 1X

Sampling date: 8/28/09 Associated Samples: 18-20

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

Reason Code: bf

Analyte	Blank ID	18	19	20	Sample Identification		
Total alkalinity	1.9						
Bicarbonate alkalinity	1.9						
Ammonia as N	0.033		0.18 / 0.54	0.13 / 0.54			
TOC (average)	0.2	210 / 300					
Cl	1.2						
Nitrate as N	0.68	3.46 J+	13.9 J+	6.58 J+			
pH (pH Units)	5.88						
Total Phosphorus	0.008						
Sulfate	1.4						









LDC#: 21991H6  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 1 of 1  
 Reviewer: CR  
 2nd Reviewer: LF

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)
	2	3				
Total Alkalinity	420	433	3			
Bicarbonate Alkalinity	411	421	2			
Bicarbonate Alkalinity	9	12		3	(<22)	
Chloride	4.8	5.0		0.1	( 2.2)	
Nitrite as N	0.41	0.63		0.22	(-0.11)	
pH (pH Units)	8.59	8.57	0			
Sulfate	28.6	26.7	0			
Surfactants	1.4	1.4		0	( 2.2)	
IOC	3530	5170	48			
Total Phosphorus	321	909	10			
Chlorate (ug/Kg)	130	45		85	(-230)	

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** September 15 through September 16, 2009

**LDC Report Date:** December 18, 2009

**Matrix:** Soil/Water

**Parameters:** Wet Chemistry

**Validation Level:** Stage 2B

**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** R0905260

### Sample Identification

EB091509-SO1	SA65009-0.5B
SA136-0.5B	SA153-25BMS
SA136-10B	SA153-25BDUP
SA136-25B	EB091509-SO1DUP
SA136-40B	EB091509-SO1MS
SA30-5B	EB091509-SO1MSD
SA30-9B	SA153-25BMSD
SA30-25B	
SA30-38B	
SA153-10B	
SA153-25B	
SA153-38B	
SA172-10B	
SA172-25B	
SA172-40B	
EB091609-SO1	
SA128-0.5B	
SA128-10B	
SA128-29B	
SA65-0.5B	

## Introduction

This data review covers 22 soil samples and 5 water samples listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA Method 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Methods 7196A and 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Methods 9040B and 9045D for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, and Lloyd/Kahn Method and EPA SW 846 Method 9060 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 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 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
EB091509-SO1	Hexavalent chromium	26.75 hours	24 hours	J- (all detects) UJ (all non-detects)	P
EB091609-SO1	Hexavalent chromium	32.25 & 32.5 hours	24 hours	J- (all detects) UJ (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 with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Total phosphorus	0.005 mg/L	All water samples in SDG R0905260
ICB/CCB	Total phosphorus	0.0081 mg/L	All water samples in SDG R0905260
PB (prep blank)	Chloride	0.11 mg/L	EB091609-SO1
ICB/CCB	Chloride Sulfate Ammonia as N	0.105 mg/L 0.052 mg/L 0.0308 mg/L	EB091609-SO1

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Ammonia as N	0.0144 mg/L	EB091509-SO1
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride	15 mg/Kg 15 mg/Kg 1.2 mg/Kg	SA136-0.5B SA136-10B SA136-25B SA136-40B SA30-5B SA30-9B SA30-25B
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride	12 mg/Kg 12 mg/Kg 1.0 mg/Kg	SA30-38B SA153-10B SA153-38B SA172-10B SA172-25B
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate	11 mg/Kg 11 mg/Kg	SA153-25B SA172-40B SA128-0.5B SA128-10B SA128-29B SA65-0.5B SA65009-0.5B
PB (prep blank)	Total organic carbon	70 mg/Kg	SA128-0.5B SA65-0.5B SA65009-0.5B
ICB/CCB	Total organic carbon	116.0 mg/Kg	All soil samples in SDG R0905260
ICB/CCB	Alkalinity, total	0.5 mg/L	SA136-0.5B SA136-10B SA136-25B SA136-40B SA30-5B SA30-9B SA30-25B SA30-38B SA153-10B
ICB/CCB	Nitrite as N	0.0073 mg/L	SA128-0.5B SA128-10B SA128-29B SA65-0.5B SA65009-0.5B
ICB/CCB	Chloride	0.109 mg/L	SA136-0.5B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Chloride	0.103 mg/L	SA136-10B SA136-25B SA136-40B SA30-5B SA30-9B SA30-25B SA153-10B SA172-10B SA172-25B
ICB/CCB	Sulfate	0.124 mg/L	SA30-38B
ICB/CCB	Sulfate	0.086 mg/L	SA153-10B SA153-25B SA153-38B SA172-10B SA172-40B SA128-0.5B SA128-29B
ICB/CCB	Sulfate Chloride	0.162 mg/L 0.086 mg/L	SA65-0.5B SA65009-0.5B
ICB/CCB	Sulfate	0.134 mg/L	SA30-25B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB091509-SO1	Total phosphorus Ammonia as N	0.019 mg/L 0.023 mg/L	0.050U mg/L 0.050U mg/L
EB091609-SO1	Total phosphorus Chloride Ammonia as N	0.011 mg/L 1.9 mg/L 0.027 mg/L	0.050U mg/L 2.0U mg/L 0.050U mg/L
SA136-40B	Total organic carbon	140 mg/Kg	280U mg/Kg
SA30-25B	Total organic carbon	280 mg/Kg	290U mg/Kg
SA30-38B	Total organic carbon	160 mg/Kg	290U mg/Kg
SA153-25B	Total organic carbon	170 mg/Kg	290U mg/Kg
SA153-38B	Total organic carbon	140 mg/Kg	290U mg/Kg

Samples EB091509-SO1 and EB091609-SO1 were identified as equipment blanks. No contaminant concentrations were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB091509-SO1	9/15/09	Ammonia as N Total organic carbon Chloride pH Total phosphorus Sulfate Surfactants Perchlorate	0.023 mg/L 0.4 mg/L 1.2 mg/L 4.87 units 0.019 mg/L 1 mg/L 0.051 mg/L 0.7 ug/L	SA136-0.5B SA136-10B SA136-25B SA136-40B SA30-5B SA30-9B SA30-25B SA30-38B SA153-10B SA153-25B SA153-38B SA172-10B SA172-25B SA172-40B
EB091609-SO1	9/16/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Sulfate Surfactants Perchlorate	1.0 mg/L 1.0 mg/L 0.027 mg/L 0.3 mg/L 1.9 mg/L 0.73 mg/L 5.47 units 0.011 mg/L 2.4 mg/L 0.033 mg/L 0.6 ug/L	SA128-0.5B SA128-10B SA128-29B SA65-0.5B SA65009-0.5B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA136-0.5B	Surfactants	0.8 mg/Kg	2.2U mg/Kg
SA136-40B	Total organic carbon	140 mg/Kg	280U mg/Kg
SA30-5B	Surfactants	0.7 mg/Kg	2.2U mg/Kg
SA30-25B	Total organic carbon	280 mg/Kg	290U mg/Kg
SA30-38B	Total organic carbon	160 mg/Kg	290U mg/Kg
SA153-25B	Total organic carbon Surfactants	170 mg/Kg 0.6 mg/Kg	290U mg/Kg 2.1U mg/Kg



Sample	Analyte	Reported Concentration	Modified Final Concentration
SA153-38B	Total organic carbon Surfactants	140 mg/Kg 0.8 mg/Kg	290U mg/Kg 3.1U mg/Kg
SA172-40B	Ammonia as N Surfactants	0.11 mg/Kg 1.0 mg/Kg	0.63U mg/Kg 2.5U mg/Kg
SA128-0.5B	Nitrate as N Sulfate Surfactants	2.51 mg/Kg 447 mg/Kg 1.0 mg/Kg	2.51J+ mg/Kg 447J+ mg/Kg 2.3U mg/Kg
SA128-10B	Nitrate as N Sulfate	0.87 mg/Kg 68.0 mg/Kg	0.87J+ mg/Kg 68.0J+ mg/Kg
SA128-29B	Nitrate as N Surfactants	3.88 mg/Kg 2.0 mg/Kg	3.88J+ mg/Kg 3.1U mg/Kg
SA65-0.5B	Sulfate Surfactants	163 mg/Kg 0.7 mg/Kg	163J+ mg/Kg 2.1U mg/Kg
SA65009-0.5B	Sulfate Surfactants	182 mg/Kg 0.9 mg/Kg	182J+ mg/Kg 2.2U mg/Kg

Samples FB072909-SO (from SDG R0904226) 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
FB072909-SO	7/29/09	Ammonia as N Total organic carbon Chloride Nitrate as N Sulfate Surfactants Total phosphorus pH Perchlorate	1.71 mg/L 0.5 mg/L 6.2 mg/L 1.02 mg/L 8.0 mg/L 0.168 mg/L 0.007 mg/L 3.48 units 0.5 ug/L	All soil samples in SDG R0905260

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA136-0.5B	Chloride Nitrate as N Sulfate Surfactants	9.2 mg/Kg 1.63 mg/Kg 77.5 mg/Kg 0.8 mg/Kg	9.2J+ mg/Kg 1.63J+ mg/Kg 77.5J+ mg/Kg 2.2U mg/Kg
SA136-10B	Chloride Nitrate as N Sulfate	6.3 mg/Kg 1.34 mg/Kg 47.8 mg/Kg	6.3J+ mg/Kg 1.34J+ mg/Kg 47.8J+ mg/Kg
SA136-25B	Chloride Nitrate as N Sulfate	2.9 mg/Kg 0.95 mg/Kg 45.5 mg/Kg	2.9J+ mg/Kg 0.95J+ mg/Kg 45.5J+ mg/Kg
SA136-40B	Total organic carbon Chloride Nitrate as N Sulfate	140 mg/Kg 22.7 mg/Kg 2.37 mg/Kg 126 mg/Kg	280U mg/Kg 22.7J+ mg/Kg 2.37J+ mg/Kg 126J+ mg/Kg
SA30-5B	Chloride Nitrate as N Sulfate Surfactants	26.9 mg/Kg 1.25 mg/Kg 59.3 mg/Kg 0.7 mg/Kg	26.9J+ mg/Kg 1.25J+ mg/Kg 59.3J+ mg/Kg 2.2U mg/Kg
SA30-9B	Chloride Nitrate as N Sulfate	23.1 mg/Kg 1.18 mg/Kg 50.8 mg/Kg	23.1J+ mg/Kg 1.18J+ mg/Kg 50.8J+ mg/Kg
SA30-25B	Total organic carbon Chloride Nitrate as N	280 mg/Kg 16.9 mg/Kg 1.17 mg/Kg	290U mg/Kg 16.9J+ mg/Kg 1.17J+ mg/Kg
SA30-38B	Total organic carbon Chloride Nitrate as N	160 mg/Kg 267 mg/Kg 4.67 mg/Kg	290U mg/Kg 267J+ mg/Kg 4.67J+ mg/Kg
SA153-10B	Chloride Nitrate as N	53.4 mg/Kg 6.86 mg/Kg	53.4J+ mg/Kg 6.86+ mg/Kg
SA153-25B	Total organic carbon Chloride Nitrate as N Sulfate Surfactants	170 mg/Kg 129 mg/Kg 4.58 mg/Kg 134 mg/Kg 0.6 mg/Kg	290U mg/Kg 129J+ mg/Kg 4.58J+ mg/Kg 134J+ mg/Kg 2.1U mg/Kg
SA153-38B	Total organic carbon Chloride Nitrate as N Surfactants	140 mg/Kg 203 mg/Kg 4.31 mg/Kg 0.8 mg/Kg	290U mg/Kg 203J+ mg/Kg 4.31J+ mg/Kg 3.1U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA172-10B	Chloride Nitrate as N	33.0 mg/Kg 6.72 mg/Kg	33.0J+ mg/Kg 6.72J+ mg/Kg
SA172-25B	Chloride Nitrate as N Sulfate	49.5 mg/Kg 2.96 mg/Kg 100 mg/Kg	49.5J+ mg/Kg 2.96J+ mg/Kg 100J+ mg/Kg
SA172-40B	Ammonia as N Chloride Nitrate as N Surfactants	0.11 mg/Kg 442 mg/Kg 6.94 mg/Kg 1.0 mg/Kg	0.63U mg/Kg 442J+ mg/Kg 6.94J+ mg/Kg 2.5U mg/Kg
SA128-0.5B	Chloride Nitrate as N Sulfate Surfactants	66.3 mg/Kg 2.51 mg/Kg 447 mg/Kg 1.0 mg/Kg	66.3J+ mg/Kg 2.51J+ mg/Kg 447J+ mg/Kg 2.3U mg/Kg
SA128-10B	Chloride Nitrate as N Sulfate	36.7 mg/Kg 0.87 mg/Kg 68.0 mg/Kg	36.7J+ mg/Kg 0.87J+ mg/Kg 68.0J+ mg/Kg
SA128-29B	Chloride Nitrate as N Sulfate Surfactants	209 mg/Kg 3.88 mg/Kg 662 mg/Kg 2.0 mg/Kg	209J+ mg/Kg 3.88J+ mg/Kg 662J+ mg/Kg 3.1U mg/Kg
SA65-0.5B	Chloride Nitrate as N Sulfate Surfactants	49.0 mg/Kg 101 mg/Kg 163 mg/Kg 0.7 mg/Kg	49.0J+ mg/Kg 101J+ mg/Kg 163J+ mg/Kg 2.1U mg/Kg
SA65009-0.5B	Chloride Sulfate Surfactants	46.9 mg/Kg 182 mg/Kg 0.9 mg/Kg	46.9J+ mg/Kg 182J+ mg/Kg 2.2U mg/Kg

#### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SA153-25BMS (All soil samples in SDG R0905260)	Surfactants	72 (75-125)	-	-	J- (all detects) UJ (all non-detects)	A

\*Indicates change as the result of report review.  
SDG R0905260

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

## VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Analyte	Flag	A or P
SA65-0.5B	Dichloroacetate	80 (90-115)	Chlorate	J- (all detects) UJ (all non-detects)	A

## 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 R0905260	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

## IX. Overall Assessment

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

## X. Field Duplicates

Samples SA65-0.5B ad SA65009-0.5B 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
	SA65-0.5B	SA65009-0.5B				
Ammonia as N	46.4 mg/Kg	70.2 mg/Kg	41 ( $\leq 50$ )	-	-	-

\*Indicates change as the result of report review.  
SDG R0905260

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA65-0.5B	SA65009-0.5B				
Alkalinity, total	325 mg/Kg	352 mg/Kg	8 ( $\leq 50$ )	-	-	-
Alkalinity, bicarbonate	312 mg/Kg	337 mg/Kg	8 ( $\leq 50$ )	-	-	-
Alkalinity, carbonate	13 mg/Kg	15 mg/Kg	-	2 ( $\leq 22$ )	-	-
Chloride	49.0 mg/Kg	46.9 mg/Kg	4 ( $\leq 50$ )	-	-	-
Nitrate as N	101 mg/Kg	108 mg/Kg	7 ( $\leq 50$ )	-	-	-
Nitrite as N	5.76 mg/Kg	9.04 mg/Kg	44 ( $\leq 50$ )	-	-	-
pH	8.89 units	9.39 units	5 ( $\leq 50$ )	-	-	-
Sulfate	163 mg/Kg	182 mg/Kg	11 ( $\leq 50$ )	-	-	-
Surfactants	0.7 mg/Kg	0.9 mg/Kg	-	0.2 ( $\leq 2.2$ )	-	-
Total organic carbon	660 mg/Kg	660 mg/Kg	-	0 ( $\leq 300$ )	-	-
Total phosphorus	896 mg/Kg	792 mg/Kg	12 ( $\leq 50$ )	-	-	-
Chlorate	389 ug/Kg	515 ug/Kg	-	126 ( $\leq 220$ )	-	-
Perchlorate	647000 ug/Kg	850000 ug/Kg	27 ( $\leq 50$ )	-	-	-

**\*Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Data Qualification Summary - SDG R0905260**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905260	EB091509-SO1 EB091609-SO1	Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0905260	SA136-0.5B SA136-10B SA136-25B SA136-40B SA30-5B SA30-9B SA30-25B SA30-38B SA153-10B SA153-25B SA153-38B SA172-10B SA172-25B SA172-40B SA128-0.5B SA128-10B SA128-29B SA65-0.5B SA65009-0.5B	Surfactants	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
*R0905260	SA65-0.5B	Chlorate	J- (all detects) UJ (all non-detects)	A	Surrogate spikes (%R) (s)
R0905260	EB091509-SO1 SA136-0.5B SA136-10B SA136-25B SA136-40B SA30-5B SA30-9B SA30-25B SA30-38B SA153-10B SA153-25B SA153-38B SA172-10B SA172-25B SA172-40B EB091609-SO1 SA128-0.5B SA128-10B SA128-29B SA65-0.5B SA65009-0.5B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

\*Corrected flag for sample noted above

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0905260**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905260	EB091509-SO1	Total phosphorus Ammonia as N	0.050U mg/L 0.050U mg/L	A	bl
R0905260	EB091609-SO1	Total phosphorus Chloride Ammonia as N	0.050U mg/L 2.0U mg/L 0.050U mg/L	A	bl
R0905260	SA136-40B	Total organic carbon	280U mg/Kg	A	bl
R0905260	SA30-25B	Total organic carbon	290U mg/Kg	A	bl
R0905260	SA30-38B	Total organic carbon	290U mg/Kg	A	bl
R0905260	SA153-25B	Total organic carbon	290U mg/Kg	A	bl
R0905260	SA153-38B	Total organic carbon	290U mg/Kg	A	bl

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Equipment Blank Data Qualification Summary - SDG R0905260**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905260	SA136-0.5B	Surfactants	2.2U mg/Kg	A	be
R0905260	SA136-40B	Total organic carbon	280U mg/Kg	A	be
R0905260	SA30-5B	Surfactants	2.2U mg/Kg	A	be
R0905260	SA30-25B	Total organic carbon	290U mg/Kg	A	be
R0905260	SA30-38B	Total organic carbon	290U mg/Kg	A	be
R0905260	SA153-25B	Total organic carbon Surfactants	290U mg/Kg 2.1U mg/Kg	A	be
R0905260	SA153-38B	Total organic carbon Surfactants	290U mg/Kg 3.1U mg/Kg	A	be

\*Indicates change as the result of report review.  
SDG R0905260

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905260	SA172-40B	Ammonia as N Surfactants	0.63U mg/Kg 2.5U mg/Kg	A	be
R0905260	SA128-0.5B	Nitrate as N Sulfate Surfactants	2.51J+ mg/Kg 447J+ mg/Kg 2.3U mg/Kg	A	be
R0905260	SA128-10B	Nitrate as N Sulfate	0.87J+ mg/Kg 68.0J+ mg/Kg	A	be
R0905260	SA128-29B	Nitrate as N Surfactants	3.88J+ mg/Kg 3.1U mg/Kg	A	be
R0905260	SA65-0.5B	Sulfate Surfactants	163J+ mg/Kg 2.1U mg/Kg	A	be
R0905260	SA65009-0.5B	Sulfate Surfactants	182J+ mg/Kg 2.2U mg/Kg	A	be

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0905260**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905260	SA136-0.5B	Chloride Nitrate as N Sulfate Surfactants	9.2J+ mg/Kg 1.63J+ mg/Kg 77.5J+ mg/Kg 2.2U mg/Kg	A	bf
R0905260	SA136-10B	Chloride Nitrate as N Sulfate	6.3J+ mg/Kg 1.34J+ mg/Kg 47.8J+ mg/Kg	A	bf
R0905260	SA136-25B	Chloride Nitrate as N Sulfate	2.9J+ mg/Kg 0.95J+ mg/Kg 45.5J+ mg/Kg	A	bf
R0905260	SA136-40B	Total organic carbon Chloride Nitrate as N Sulfate	280U mg/Kg 22.7J+ mg/Kg 2.37J+ mg/Kg 126J+ mg/Kg	A	bf
R0905260	SA30-5B	Chloride Nitrate as N Sulfate Surfactants	26.9J+ mg/Kg 1.25J+ mg/Kg 59.3J+ mg/Kg 2.2U mg/Kg	A	bf

\*Indicates change as the result of report review.  
SDG R0905260



SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905260	SA30-9B	Chloride Nitrate as N Sulfate	23.1J+ mg/Kg 1.18J+ mg/Kg 50.8J+ mg/Kg	A	bf
R0905260	SA30-25B	Total organic carbon Chloride Nitrate as N	290U mg/Kg 16.9J+ mg/Kg 1.17J+ mg/Kg	A	bf
R0905260	SA30-38B	Total organic carbon Chloride Nitrate as N	290U mg/Kg 267J+ mg/Kg 4.67J+ mg/Kg	A	bf
R0905260	SA153-10B	Chloride Nitrate as N	53.4J+ mg/Kg 6.86+ mg/Kg	A	bf
R0905260	SA153-25B	Total organic carbon Chloride Nitrate as N Sulfate Surfactants	290U mg/Kg 129J+ mg/Kg 4.58J+ mg/Kg 134J+ mg/Kg 2.1U mg/Kg	A	bf
R0905260	SA153-38B	Total organic carbon Chloride Nitrate as N Surfactants	290U mg/Kg 203J+ mg/Kg 4.31J+ mg/Kg 3.1U mg/Kg	A	bf
R0905260	SA172-10B	Chloride Nitrate as N	33.0J+ mg/Kg 6.72J+ mg/Kg	A	bf
R0905260	SA172-25B	Chloride Nitrate as N Sulfate	49.5J+ mg/Kg 2.96J+ mg/Kg 100J+ mg/Kg	A	bf
R0905260	SA172-40B	Ammonia as N Chloride Nitrate as N Surfactants	0.63U mg/Kg 442J+ mg/Kg 6.94J+ mg/Kg 2.5U mg/Kg	A	bf
R0905260	SA128-0.5B	Chloride Nitrate as N Sulfate Surfactants	66.3J+ mg/Kg 2.51J+ mg/Kg 447J+ mg/Kg 2.3U mg/Kg	A	bf
R0905260	SA128-10B	Chloride Nitrate as N Sulfate	36.7J+ mg/Kg 0.87J+ mg/Kg 68.0J+ mg/Kg	A	bf

\*Indicates change as the result of report review.  
SDG R0905260

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905260	SA128-29B	Chloride Nitrate as N Sulfate Surfactants	209J+ mg/Kg 3.88J+ mg/Kg 662J+ mg/Kg 3.1U mg/Kg	A	bf
R0905260	SA65-0.5B	Chloride Nitrate as N Sulfate Surfactants	49.0J+ mg/Kg 101J+ mg/Kg 163J+ mg/Kg 2.1U mg/Kg	A	bf
R0905260	SA65009-0.5B	Chloride Sulfate Surfactants	46.9J+ mg/Kg 182J+ mg/Kg 2.2U mg/Kg	A	bf

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET

LDC #: 2199116

SDG #: R0905260

Laboratory: Columbia Analytical Services

Stage 2B

Date: 11-20-09

Page: 1 of 1

Reviewer: CR

2nd Reviewer: W

**METHOD: (Analyte)** Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Cyanide (EPA SW846 Method 9012A), ~~Dissolved Hexavalent Chromium (EPA Method 218.6)~~ Hexavalent Chromium (EPA SW846 Method 7199), Nitrite-N (EPA Method 353.2), pH (EPA SW846 Method 9040B/9045D), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), TOC (Lloyd/Kahn / 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. Chlorate (300.1), Perchlorate (314.0)

Validation Area		Comments	
I.	Technical holding times	SW	Sampling dates: 9/15/09 - 9/16/09
Ila.	Initial calibration	A	
Iib.	Calibration verification	A	
III.	Blanks	SW	
IV	Surrogate Spikes	SW	Not required for methods CR
V	Matrix Spike/Matrix Spike Duplicates	SW	MS
VI.	Duplicates	A	DR
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(20, 21)
XI.	Field blanks	SW	EB = 1, 16. FB = FB072909-80 (506A R0904226)

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

Validated Samples: All soil except 1, 16 = water

1	EB091509-SO1	11	SA153-25B	21	SA65009-0.5B	31	PBLW
2	SA136-0.5B	12	SA153-38B	22	SA153-25BMS	32	PBS (2-8)
3	SA136-10B	13	SA172-10B	23	SA153-25BDUP	33	PBS (9, 10, 12-14)
4	SA136-25B	14	SA172-25B	24	EB091509-SO20P	34	PBS (11, 15, 17-19)
5	SA136-40B	15	SA172-40B	25		35	MS
6	SA30-5B	16	EB091609-SO1	26		36	MS
7	SA30-9B	17	SA128-0.5B	27	SA153-25BMSD	37	
8	SA30-25B	18	SA128-10B	28		38	
9	SA30-38B	19	SA128-29B	29		39	
10	SA153-10B	20	SA65-0.5B	30		40	

Notes: \_\_\_\_\_





**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

Page: 1 of 5  
Reviewer: GR  
2nd Reviewer: [Signature]

LDC #: 2199116  
SDG #: See Cover

Reason Code: bl

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.

Conc. units: mg/L Associated Samples: All Water

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/L)			16
T-P	0.005	0.0081		0.019 / 0.050   0.011 / 0.050

Conc. units: mg/L Associated Samples: 16

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/L)			16
Cl	0.11	0.105		1.9 / 2.0
SO4		0.052		
NH3-N		0.0308		0.027 / 0.050

Conc. units: mg/L Associated Samples: 1

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/L)			1
NH3-N		0.0144		0.023 / 0.050

**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

METHOD: Inorganics, Method See Cover Reason Code: bl

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.

Conc. units: mg/Kg Associated Samples: 2-8

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
	PB (mg/Kg)				No Qualifiers			
Alk., Total	15							
Alk., Bicarb.	15							
Cl	1.2							

Conc. units: mg/Kg Associated Samples: 9, 10, 12-14

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
	PB (mg/Kg)				No Qualifiers			
Alk., Total	12							
Alk., Bicarb.	12							
Cl	1.0							

Conc. units: mg/Kg Associated Samples: 11, 15, 17-24 21

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
	PB (mg/Kg)				No Qualifiers			
Alk. Total	11							
Alk., Bicarb.	11							

**VALIDATION FINDINGS WORKSHEET**

**Blanks**

**METHOD:** Inorganics, Method See Cover

Reason Code: bl

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.

**Conc. units: mg/Kg Associated Samples: PB=17, 20, 21. ICB/CCB=All Soil**

Analyte	Blank ID	Maximum ICB/CCB (mg/Kg)	Blank Action Limit	Sample Identification		
TOC	PB (mg/Kg)	116.0		5	8	9
	70			11	12	
				140 / 280	280 / 290	160 / 290
				170 / 290	140 / 290	

**Conc. units: mg/Kg Associated Samples: 2-10**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
Alk. Total	PB (mg/Kg)	0.5		No Qualifiers		

**Conc. units: mg/Kg Associated Samples: 17-21**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
NO2-N	PB (mg/Kg)	0.0073		No Qualifiers		

**Conc. units: mg/Kg Associated Samples: 2**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
Cl	PB (mg/Kg)	0.109		No Qualifiers		



**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

LDC #: 2199116  
SDG #: See Cover

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Reviewer: [Signature]  
2nd Reviewer: [Signature]

Reason Code: bl

METHOD: Inorganics, Method See Cover

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

Conc. units: mg/Kg Associated Samples: 3-8, 10, 13, 14

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
	PB (mg/Kg)				No Qualifiers		
Cl			0.103				

Conc. units: mg/Kg Associated Samples: 9

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
	PB (mg/Kg)				No Qualifiers		
SO4			0.124				

Conc. units: mg/Kg Associated Samples: 10-13, 15, 17, 19

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
	PB (mg/Kg)				No Qualifiers		
SO4			0.086				

Conc. units: mg/Kg Associated Samples: 20, 21

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
	PB (mg/Kg)				No Qualifiers		
SO4			0.162				
Cl			0.086				

**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

Page: 5 of 5  
Reviewer: CE  
2nd Reviewer: LS

LDC #: 2199116  
SDG #: See Cover

METHOD: Inorganics, Method See Cover Reason Code: bl

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

Conc. units: mg/Kg Associated Samples: 8

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
ISO4	PB (mg/Kg)	0.134					





**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

LDC #: 2199116  
 SDG #: See Cover

**METHOD:** Inorganics, EPA Method See Cover  
 Were field blanks identified in this SDG?  
 Y N N/A  
 Y N N/A  
 Were target analytes detected in the field blanks?  
 Y N N/A  
**Blank units:** mg/L **Associated sample units:** mg/Kg  
**Sampling date:** 7/29/09 **Soil factor applied:** 10x  
**Field blank type:** (circle one) Field Blank / Rinsate / Other:

Reason Code: bf

Associated Samples: All Soil

Analyte	Blank ID	Action Limit	Sample Identification																	
			2	3	4	5	6	7	8	9	10									
NH3-N	1.71	17.1																		
TOC	0.5					140 / 280						280 / 290								
Cl	6.2	620	9.2 J+	6.3 J+	2.9 J+	22.7 J+	26.9 J+	23.1 J+	16.9 J+	267 J+	53.4 J+									
NO3-N	1.02	102	1.63 J+	1.34 J+	0.95 J+	2.37 J+	1.25 J+	1.18 J+	1.17 J+	4.67 J+	6.86 J+									
SO4	8.0	800	77.5 J+	47.8 J+	45.5 J+	126 J+	59.3 J+	50.8 J+												
Surfactants	0.168	16.8	0.8 / 2.2																	
T-Phosphorus	0.007																			
pH (pH units)	3.48																			
<b>Perchlorate</b>	<b>0.5 mg/L</b>																			

Continued on next page...

LDC #: 2199116  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

Page: 2 of 2  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**METHOD** Inorganics, EPA 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:** mg/L. **Associated sample units:** mg/Kg  
**Sampling date:** 7/29/09 **Soil factor applied:** 10x  
**Field blank type:** (circle one) Field Blank / Rinsate / Other:

Reason Code: bf

Associated Samples: All Soil

Analyte	Blank ID	Action Limit	Sample Identification																	
			11	12	13	14	15	17	18	19	20	21								
NH3-N	FB072909-SO (SDG# R0904226)	17.1																		
TOC	1.71							0.11 / 0.63												
Cl	0.5	170 / 290	140 / 290																	
NO3-N	6.2	620	203 J+	33.0 J+	49.5 J+	44.2 J+	66.3 J+	36.7 J+	209 J+	49.0 J+	46.9 J+									
SO4	1.02	102	4.31 J+	6.72 J+	2.96 J+	6.94 J+	2.51 J+	0.87 J+	3.88 J+	101 J+										
Surfactants	8.0	800	134 J+			100 J+	447 J+	68.0 J+	662 J+	163 J+	182 J+									
T-Phosphorus	0.168	16.8	0.6 / 2.1	0.8 / 3.1			1.0 / 2.3		2.0 / 3.1	0.7 / 2.1	0.9 / 2.2									
pH (pH units)	0.007																			
Perchlorate		0.5 ug/L																		







LDC#: 2199116  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 1 of 1  
 Reviewer: CR  
 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/Kg)		RPD ( $\leq 50$ )	Difference	Limits	Qualification (Parent only)
	20	21				
Ammonia as N	46.4	70.2	41			
Total Alkalinity	325	352	8			
Non-carbonate Alkalinity	312	337	8			
Carbonate Alkalinity	13	15		2	(<22)	
Chloride	49.0	46.9	4			
Nitrate as N	101	108	7			
Nitrite as N	5.76	9.04	44			
pH (pH Units)	8.85	9.39	5			
Sulfate	165	162	11			
Surfactants	0.7	0.9		0.2	(<2.2)	
TOD	660	660		0	( 300)	
Total Phosphorus	896	792	12			
Chlorate (ug/Kg)	389	515		126	(<220)	
Perchlorate (ug/Kg)	647000	350000	27			

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** September 17, 2009

**LDC Report Date:** December 7, 2009

**Matrix:** Soil

**Parameters:** Wet Chemistry

**Validation Level:** Stage 2B

**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** R0905331

### Sample Identification

SA165-0.5B  
SA165-10B  
SA165-28B  
SA151-0.5B  
SA151-10B  
SA151-25B  
SA151-39B  
SA151009-39B  
SA51-10B  
SA51009-10B  
SA51-25B  
SA51-36B  
SA165-10BMS  
SA165-10BMSD  
SA165-10BDUP

## Introduction

This data review covers 15 soil samples listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA Method 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Method 9045D for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, 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 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 with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride	11 mg/Kg 11 mg/Kg 1.0 mg/Kg	SA165-0.5B SA165-10B SA165-28B SA151-0.5B SA151-10B SA151-25B SA151-39B SA151009-39B
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate	9 mg/Kg 9 mg/Kg	SA51-10B SA51009-10B SA51-25B SA51-36B
PB (prep blank)	Total organic carbon	70 mg/Kg	All samples in SDG R0905331
ICB/CCB	Total organic carbon	116.0 mg/Kg	All samples in SDG R0905331

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Nitrite as N	0.0073 mg/L	SA165-0.5B SA165-28B SA151-10B SA151-25B SA151-39B SA151009-39B
ICB/CCB	Nitrite as N	0.0078 mg/L	SA165-10B SA51-10B SA51009-10B SA51-25B SA51-36B
ICB/CCB	Sulfate	0.162 mg/L	SA165-0.5B SA165-28B SA151-0.5B SA151-10B SA151-25B SA151-39B
ICB/CCB	Chloride	0.086 mg/L	SA165-0.5B SA165-28B SA151-0.5B SA151-10B SA151-25B SA151-39B SA151009-39B SA51-25B SA51-36B
ICB/CCB	Sulfate	0.192 mg/L	SA151009-39B SA51-10B SA51009-10B SA51-25B SA51-36B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA165-28B	Total organic carbon	160 mg/Kg	280U mg/Kg
SA151009-39B	Total organic carbon Nitrite as N	250 mg/Kg 0.08 mg/Kg	290U mg/Kg 0.11U mg/Kg
SA165-0.5B	Nitrite as N	0.11 mg/Kg	0.12U mg/Kg
SA151-25B	Nitrite as N	0.09 mg/Kg	0.11U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA51-25B	Nitrite as N	0.1 mg/Kg	0.11U mg/Kg
SA51-36B	Nitrite as N	0.1 mg/Kg	0.12U mg/Kg

Sample FB072909-SO (from SDG R0904226) 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
FB072909-SO	7/29/09	Ammonia as N Total organic carbon Chloride Nitrate as N Sulfate Surfactants Total phosphorus pH Perchlorate	1.71 mg/L 0.5 mg/L 6.2 mg/L 1.02 mg/L 8.0 mg/L 0.168 mg/L 0.007 mg/L 3.48 units 0.5 ug/L	All samples in SDG R0905331

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA165-0.5B	Chloride Nitrate as N Sulfate Surfactants	65.8 mg/Kg 1.85 mg/Kg 378 mg/Kg 0.6 mg/Kg	65.8J+ mg/Kg 1.85J+ mg/Kg 378J+ mg/Kg 2.3U mg/Kg
SA165-10B	Chloride Sulfate	7.1 mg/Kg 25.0 mg/Kg	7.1J+ mg/Kg 25.0J+ mg/Kg
SA165-28B	Total organic carbon Chloride Nitrate as N Sulfate Surfactants	160 mg/Kg 195 mg/Kg 2.80 mg/Kg 555 mg/Kg 1.6 mg/Kg	280U mg/Kg 195J+ mg/Kg 2.80J+ mg/Kg 555J+ mg/Kg 2.9U mg/Kg
SA151-0.5B	Nitrate as N Sulfate	29.7 mg/Kg 642 mg/Kg	29.7J+ mg/Kg 642J+ mg/Kg
SA151-10B	Chloride Nitrate as N Sulfate	306 mg/Kg 15.1 mg/Kg 481 mg/Kg	306J+ mg/Kg 15.1J+ mg/Kg 481J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA151-25B	Chloride Nitrate as N Sulfate Surfactants	328 mg/Kg 4.54 mg/Kg 110 mg/Kg 0.8 mg/Kg	328J+ mg/Kg 4.54J+ mg/Kg 110J+ mg/Kg 2.1U mg/Kg
SA151-39B	Ammonia as N Chloride Nitrate as N Sulfate	0.41 mg/Kg 245 mg/Kg 2.58 mg/Kg 211 mg/Kg	0.56U mg/Kg 245J+ mg/Kg 2.58J+ mg/Kg 211J+ mg/Kg
SA151009-39B	Total organic carbon Chloride Nitrate as N Sulfate	250 mg/Kg 211 mg/Kg 3.49 mg/Kg 259 mg/Kg	290U mg/Kg 211J+ mg/Kg 3.49J+ mg/Kg 259J+ mg/Kg
SA51-10B	Chloride Nitrate as N Sulfate	19.2 mg/Kg 4.34 mg/Kg 269 mg/Kg	19.2J+ mg/Kg 4.34J+ mg/Kg 269J+ mg/Kg
SA51009-10B	Chloride Nitrate as N Sulfate	19.2 mg/Kg 4.40 mg/Kg 274 mg/Kg	19.2J+ mg/Kg 4.40J+ mg/Kg 274J+ mg/Kg
SA51-25B	Chloride Nitrate as N Sulfate	136 mg/Kg 1.01 mg/Kg 526 mg/Kg	136J+ mg/Kg 1.01J+ mg/Kg 526J+ mg/Kg
SA51-36B	Chloride Nitrate as N Sulfate	269 mg/Kg 4.29 mg/Kg 292 mg/Kg	269J+ mg/Kg 4.29J+ mg/Kg 292J+ mg/Kg

#### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SA165-10BMS/MSD (All samples in SDG R0905331)	Chlorate Sulfate	126 (75-125) 128 (75-125)	127 (75-125) -	- -	J+ (all detects) 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) and relative percent differences (RPD) were within QC limits.

## VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate 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 R0905331	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

## IX. Overall Assessment

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

## X. Field Duplicates

Samples SA151-39B and SA151009-39B and samples SA51-10B and SA51009-10B 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
	SA151-39B	SA151009-39B				
Ammonia as N	0.41 mg/Kg	0.8U mg/Kg	-	0.39 ( $\leq 0.56$ )	-	-
Alkalinity, total	491 mg/Kg	535 mg/Kg	9 ( $\leq 50$ )	-	-	-
Alkalinity, bicarbonate	468 mg/Kg	508 mg/Kg	8 ( $\leq 50$ )	-	-	-
Alkalinity, carbonate	23 mg/Kg	27 mg/Kg	-	4 ( $\leq 23$ )	-	-
Bromide	1.2 mg/Kg	0.2U mg/Kg	-	1 ( $\leq 1.1$ )	-	-
Chloride	245 mg/Kg	211 mg/Kg	15 ( $\leq 50$ )	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA151-39B	SA151009-39B				
Hexavalent chromium	0.22 mg/Kg	2.34 mg/Kg	-	2.12 ( $\leq 0.45$ )	J (all detects)	A
Hexavalent chromium	0.25 mg/Kg	2.27 mg/Kg	-	2.02 ( $\leq 0.45$ )	J (all detects)	A
Nitrate as N	2.58 mg/Kg	3.49 mg/Kg	30 ( $\leq 50$ )	-	-	-
Nitrite as N	0.08U mg/Kg	0.08 mg/Kg	-	0 ( $\leq 0.11$ )	-	-
pH	8.94 units	8.88 units	1 ( $\leq 50$ )	-	-	-
Sulfate	211 mg/Kg	259 mg/Kg	20 ( $\leq 50$ )	-	-	-
Total organic carbon	460 mg/Kg	250 mg/Kg	-	210 ( $\leq 290$ )	-	-
Total phosphorus	750 mg/Kg	774 mg/Kg	3 ( $\leq 50$ )	-	-	-
Chlorate	449000 ug/Kg	808000 ug/Kg	57 ( $\leq 50$ )	-	J (all detects)	A
Perchlorate	109000 ug/Kg	138000 ug/Kg	23 ( $\leq 50$ )	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA51-10B	SA51009-10B				
Alkalinity, total	393 mg/Kg	400 mg/Kg	2 ( $\leq 50$ )	-	-	-
Alkalinity, bicarbonate	374 mg/Kg	380 mg/Kg	2 ( $\leq 50$ )	-	-	-
Alkalinity, carbonate	19 mg/Kg	20 mg/Kg	-	1 ( $\leq 22$ )	-	-
Chloride	19.2 mg/Kg	19.2 mg/Kg	0 ( $\leq 50$ )	-	-	-
Nitrate as N	4.34 mg/Kg	4.40 mg/Kg	1 ( $\leq 50$ )	-	-	-
pH	8.96 units	8.94 units	0 ( $\leq 50$ )	-	-	-
Sulfate	269 mg/Kg	274 mg/Kg	2 ( $\leq 50$ )	-	-	-
Total organic carbon	390 mg/Kg	430 mg/Kg	-	40 ( $\leq 300$ )	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA51-10B	SA51009-10B				
Total phosphorus	787 mg/Kg	824 mg/Kg	5 ( $\leq 50$ )	-	-	-
Chlorate	10700 ug/Kg	11900 ug/Kg	11 ( $\leq 50$ )	-	-	-
Perchlorate	19200 ug/Kg	19400 ug/Kg	1 ( $\leq 50$ )	-	-	-

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Data Qualification Summary - SDG R0905331**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905331	SA165-0.5B SA165-10B SA165-28B SA151-0.5B SA151-10B SA151-25B SA151-39B SA151009-39B SA51-10B SA51009-10B SA51-25B SA51-36B	Chlorate Sulfate	J+ (all detects) J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0905331	SA165-0.5B SA165-10B SA165-28B SA151-0.5B SA151-10B SA151-25B SA151-39B SA151009-39B SA51-10B SA51009-10B SA51-25B SA51-36B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0905331	SA151-39B SA151009-39B	Hexavalent chromium	J (all detects)	A	Field duplicates (Difference) (fd)
R0905331	SA151-39B SA151009-39B	Chlorate	J (all detects)	A	Field duplicates (RPD) (fd)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0905331**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905331	SA165-28B	Total organic carbon	280U mg/Kg	A	bl
R0905331	SA151009-39B	Total organic carbon Nitrite as N	290U mg/Kg 0.11U mg/Kg	A	bl
R0905331	SA165-0.5B	Nitrite as N	0.12U mg/Kg	A	bl
R0905331	SA151-25B	Nitrite as N	0.11U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905331	SA51-25B	Nitrite as N	0.11U mg/Kg	A	bl
R0905331	SA51-36B	Nitrite as N	0.12U mg/Kg	A	bl

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0905331**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905331	SA165-0.5B	Chloride Nitrate as N Sulfate Surfactants	65.8J+ mg/Kg 1.85J+ mg/Kg 378J+ mg/Kg 2.3U mg/Kg	A	bf
R0905331	SA165-10B	Chloride Sulfate	7.1J+ mg/Kg 25.0J+ mg/Kg	A	bf
R0905331	SA165-28B	Total organic carbon Chloride Nitrate as N Sulfate Surfactants	280U mg/Kg 195J+ mg/Kg 2.80J+ mg/Kg 555J+ mg/Kg 2.9U mg/Kg	A	bf
R0905331	SA151-0.5B	Nitrate as N Sulfate	29.7J+ mg/Kg 642J+ mg/Kg	A	bf
R0905331	SA151-10B	Chloride Nitrate as N Sulfate	306J+ mg/Kg 15.1J+ mg/Kg 481J+ mg/Kg	A	bf
R0905331	SA151-25B	Chloride Nitrate as N Sulfate Surfactants	328J+ mg/Kg 4.54J+ mg/Kg 110J+ mg/Kg 2.1U mg/Kg	A	bf
R0905331	SA151-39B	Ammonia as N Chloride Nitrate as N Sulfate	0.56U mg/Kg 245J+ mg/Kg 2.58J+ mg/Kg 211J+ mg/Kg	A	bf
R0905331	SA151009-39B	Total organic carbon Chloride Nitrate as N Sulfate	290U mg/Kg 211J+ mg/Kg 3.49J+ mg/Kg 259J+ mg/Kg	A	bf
R0905331	SA51-10B	Chloride Nitrate as N Sulfate	19.2J+ mg/Kg 4.34J+ mg/Kg 269J+ mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905331	SA51009-10B	Chloride Nitrate as N Sulfate	19.2J+ mg/Kg 4.40J+ mg/Kg 274J+ mg/Kg	A	bf
R0905331	SA51-25B	Chloride Nitrate as N Sulfate	136J+ mg/Kg 1.01J+ mg/Kg 526J+ mg/Kg	A	bf
R0905331	SA51-36B	Chloride Nitrate as N Sulfate	269J+ mg/Kg 4.29J+ mg/Kg 292J+ mg/Kg	A	bf

## Tronox Northgate Henderson

### VALIDATION COMPLETENESS WORKSHEET

LDC #: 21991J6

SDG #: R0905331

Laboratory: Columbia Analytical Services

Stage 2B

Date: 11-20-09

Page: 1 of 1

Reviewer: *CR*

2nd Reviewer: \_\_\_\_\_

**METHOD: (Analyte)** Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Chlorate (EPA Method 300.1), Cyanide (EPA SW846 Method 9012A), ~~Dissolved Hexavalent Chromium (EPA Method 218.6)~~, Hexavalent Chromium (EPA SW846 Method 7199), Nitrite-N (EPA Method 353.2), pH (EPA SW846 Method 9040B/9045D), Surfactants (SM5540C), Perchlorate (EPA Method 314.0), Total Phosphorus (EPA Method 365.1), TOC (Lloyd/Kahn / ~~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: 9/17/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	SW	
IV.	Surrogate Spikes	A	
V.	Matrix Spike/Matrix Spike Duplicates	SW	MS/D
VI.	Duplicates	A	Dup
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(7,8), (9,10)
XI.	Field blanks	SW	FB = FB0729001 - SO (SD6A R0904226)

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

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

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:

*soil*

1	SA165-0.5B	11	SA51-25B	21		31	PBS (1-8)
2	SA165-10B	12	SA51-36B	22		32	PBS (9-12)
3	SA165-28B	13	SA165-10BMS	23		33	
4	SA151-0.5B	14	SA165-10BMSD	24		34	
5	SA151-10B	15	SA165-10BDUP	25		35	
6	SA151-25B	16		26		36	
7	SA151-39B	17		27		37	
8	SA151009-39B	18		28		38	
9	SA51-10B	19		29		39	
10	SA51009-10B	20		30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_





**VALIDATION FINDINGS WORKSHEET**

**Blanks**

**METHOD:** Inorganics, Method See Cover

Reason Code: bl

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.

**Conc. units: mg/Kg** **Associated Samples: 1-8**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
Alk., Total	PB (mg/Kg)						
	11						
Alk., Bicarb.	11						
Cl	1.0						

**Conc. units: mg/Kg** **Associated Samples: 9-12**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
Alk., Total	PB (mg/Kg)						
	9	1.0					
Alk., Bicarb.	9						

**Conc. units: mg/Kg** **Associated Samples: All**

Analyte	Blank ID	Maximum ICB/CCB (mg/Kg)	Blank Action Limit	Sample Identification			
	PB (mg/Kg)						
	70	116.0					
TOC				3	8		
				160 / 280	250 / 290		

**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

**METHOD:** Inorganics, Method See Cover

Reason Code: bl

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.

**Conc. units: mg/Kg** **Associated Samples: 1, 3, 5-8**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			
				1 6 8
INO2-N		0.0073		0.11 / 0.12 0.09 / 0.11 0.08 / 0.11

**Conc. units: mg/Kg** **Associated Samples: 2, 9-12**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			
				11 12
INO2-N		0.0078		0.1 / 0.11 0.1 / 0.12

**Conc. units: mg/Kg** **Associated Samples: 1, 3-7**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			
SO4		0.162		No Qualifiers

**Conc. units: mg/Kg** **Associated Samples: 1, 3-8, 11, 12**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			
Cl		0.086		No Qualifiers

LDC #: 21991J6

SDG #: See Cover

# VALIDATION FINDINGS WORKSHEET

## Blanks

METHOD: Inorganics, Method See Cover

Reason Code: bl

Page: 3 of 3  
Reviewer: [Signature]  
2nd Reviewer: [Signature]

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.

Conc. units: mg/Kg Associated Samples: 8-12

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
SO4	PB (mg/Kg)	0.192					

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

**METHOD:** Inorganics, EPA 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:** mg/L **Associated sample units:** mg/Kg  
**Sampling date:** 7/29/09 **Soil factor applied:** 10x  
**Field blank type:** (circle one) Field Blank / Rinsate / Other: Associated Samples: All

Reason Code: bf

Analyte	Blank ID	Action Limit	1	2	3	4	5	6	7	8	9	10	11	12
NH3-N	1.71	17.1							0.41 / 0.56					
TOC	0.5				160 / 280					250 / 290				
Cl	6.2	620	65.8 J+	7.1 J+	195 J+		306 J+	328 J+	245 J+	211 J+	19.2 J+	19.2 J+	136 J+	269 J+
NO3-N	1.02	102	1.85 J+		2.80 J+	29.7 J+	15.1 J+	4.54 J+	2.58 J+	3.49 J+	4.34 J+	4.40 J+	1.01 J+	4.29 J+
SO4	8.0	800	378 J+	25.0 J+	555 J+	642 J+	481 J+	110 J+	211 J+	259 J+	269 J+	274 J+	526 J+	292 J+
Surfactants	0.168	16.8	0.6 / 2.3		1.6 / 2.9			0.8 / 2.1						
T-Phosphorus	0.007													
pH (pH units)	3.48													
Perchlorate	0.5 ug/L													





LDC#: 21991J6  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 1 of 2  
 Reviewer: *[Signature]*  
 2nd Reviewer: *[Signature]*

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 ( $\leq 50$ )	Difference	Limits	Qualification (Parent only)
	<i>17</i>	<i>28</i>				
Ammonia as N	0.41	0.8U		0.39	( $\leq 0.56$ )	
Total Alkalinity	491	535	9			
Bicarbonate Alkalinity	468	508	8			
Carbonate Alkalinity	23	27		4	(<23)	
Bromide	1.2	0.2U		1	(<1.1)	
Chloride	245	211	15			
Hexavalent Chromium	0.22	2.34		2.12	( $\leq 0.45$ )	Jdet/A (fd)
Hexavalent Chromium	0.25	2.27		2.02	(<0.45)	Jdet/A (fd)
Nitrate as N	2.58	3.49	30			
Nitrite as N	0.08U	0.08		0	(<0.11)	
pH (pH Units)	8.94	8.88	1			
Sulfate	211	259	20			
TOC	460	250		210	(<290)	
Total Phosphorus	750	774	3			
Chlorate (ug/Kg)	449000	808000	57			Jdet/A
Perchlorate (ug/Kg)	109000	138000	23			

LDC#: 21991J6  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 2 of 2  
 Reviewer: CR  
 2nd Reviewer: [Signature]

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 ( $\leq 50$ )	Difference	Limits	Qualification (Parent only)
	9	10				
Total Alkalinity	393	400	2			
Bicarbonate Alkalinity	374	380	2			
Carbonate Alkalinity	19	20		1	( 22)	
Chloride	19.2	19.2	0			
Nitrate as N	4.34	4.40	1			
pH (pH Units)	8.96	8.94	0			
Sulfate	269	274	2			
TOC	390	430		40	( $\leq 300$ )	
Total Phosphorus	787	824	5			
Chlorate (ug/Kg)	10700	11900	11			
Perchlorate (ug/Kg)	19200	19400	1			



## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** September 18, 2009

**LDC Report Date:** December 8, 2009

**Matrix:** Soil/Water

**Parameters:** Wet Chemistry

**Validation Level:** Stage 2B

**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** R0905348

### Sample Identification

EB091809-SO1  
SA117-0.5B  
SA117-9B  
SA117-25B  
SA117-41B  
SA161-0.5B  
SA161-10B  
SA161-25B  
SA161009-25B  
SA161-37B  
SA117-9BMS  
SA117-9BDUP  
SA117-9BMSD

## Introduction

This data review covers 12 soil samples and one water sample listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, and Sulfate, EPA Method 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Methods 9040B and 9045D for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, and Lloyd/Kahn Method and EPA SW 846 Method 9060 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 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 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
EB091809-SO1	Hexavalent chromium	24.15 hours	24 hours	J- (all detects) UJ (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 with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Ammonia as N	0.0340 mg/L	All water samples in SDG R0905348
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride	9 mg/Kg 9 mg/Kg 1.0 mg/Kg	SA117-0.5B SA117-25B SA117-41B SA161-0.5B SA161-10B SA161-25B SA161009-25B SA161-37B
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate	10 mg/Kg 10 mg/Kg	SA117-9B
ICB/CCB	Alkalinity, total	0.5 mg/Kg	SA117-9B

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Total organic carbon	50 mg/Kg	All soil samples in SDG R0905348
ICB/CCB	Total organic carbon	116.0 mg/Kg	All soil samples in SDG R0905348
ICB/CCB	Alkalinity, total	1.0 mg/L	SA117-0.5B
ICB/CCB	Alkalinity, total	1.1 mg/L	SA117-25B SA117-41B SA161-0.5B SA161-10B SA161-25B SA161009-25B SA161-37B
ICB/CCB	Nitrite as N	0.0078 mg/L	SA117-0.5B SA117-25B SA117-41B SA161-0.5B
ICB/CCB	Nitrite as N	0.0070 mg/L	SA161-25B SA161009-25B SA161-37B
ICB/CCB	Chloride	0.118 mg/L	SA117-0.5B SA117-25B SA117-41B SA161-0.5B SA161-10B
ICB/CCB	Chloride	0.086 mg/L	SA117-9B SA161-25B SA161009-25B
ICB/CCB	Sulfate	0.192 mg/L	SA117-9B SA117-25B SA117-41B SA161-25B SA161009-25B SA161-37B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB091809-SO1	Ammonia as N	0.013 mg/L	0.050U mg/L

Sample EB091809-SO1 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
EB091809-SO1	9/18/09	Ammonia as N Total organic carbon Chloride pH Sulfate Chlorate Perchlorate	0.013 mg/L 0.4 mg/L 1.9 mg/L 4.53 units 2.1 mg/L 5 ug/L 0.9 ug/L	All soil samples in SDG R0905348

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA117-0.5B	Sulfate Chlorate	94.7 mg/Kg 70 ug/Kg	94.7J+ mg/Kg 220U ug/Kg
SA161-0.5B	Sulfate	33.0 mg/Kg	33.0J+ mg/Kg
SA161-10B	Ammonia as N Sulfate	0.34 mg/Kg 57.6 mg/Kg	0.55U mg/Kg 57.6J+ mg/Kg

Sample FB072909-SO (from SDG R0904226) 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
FB072909-SO	7/29/09	Ammonia as N Total organic carbon Chloride Nitrate as N Sulfate Surfactants Total phosphorus pH Perchlorate	1.71 mg/L 0.5 mg/L 6.2 mg/L 1.02 mg/L 8.0 mg/L 0.168 mg/L 0.007 mg/L 3.48 units 0.5 ug/L	All soil samples in SDG R0905348

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
SA117-0.5B	Chloride Nitrate as N Sulfate	10.4 mg/Kg 1.14 mg/Kg 94.7 mg/Kg	10.4J+ mg/Kg 1.14J+ mg/Kg 94.7J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA117-9B	Chloride Nitrate as N Sulfate	312 mg/Kg 3.12 mg/Kg 267 mg/Kg	312J+ mg/Kg 3.12J+ mg/Kg 267J+ mg/Kg
SA117-25B	Chloride Nitrate as N Sulfate	104 mg/Kg 1.89 mg/Kg 582 mg/Kg	104J+ mg/Kg 1.89J+ mg/Kg 582J+ mg/Kg
SA117-41B	Chloride Nitrate as N	86.5 mg/Kg 1.49 mg/Kg	86.5J+ mg/Kg 1.49J+ mg/Kg
SA161-0.5B	Chloride Nitrate as N Sulfate Surfactants	9.3 mg/Kg 34.8 mg/Kg 33.0 mg/Kg 0.7 mg/Kg	9.3J+ mg/Kg 34.8J+ mg/Kg 33.0J+ mg/Kg 2.2U mg/Kg
SA161-10B	Ammonia as N Chloride Nitrate as N Sulfate	0.34 mg/Kg 93.5 mg/Kg 16.8 mg/Kg 57.6 mg/Kg	0.55U mg/Kg 93.5J+ mg/Kg 16.8J+ mg/Kg 57.6J+ mg/Kg
SA161-25B	Nitrate as N Surfactants	14.5 mg/Kg 1.1 mg/Kg	14.5J+ mg/Kg 2.6U mg/Kg
SA161009-25B	Nitrate as N Surfactants	13.8 mg/Kg 1.2 mg/Kg	13.8J+ mg/Kg 2.6U mg/Kg
SA161-37B	Nitrate as N Surfactants	14.2 mg/Kg 1.6 mg/Kg	14.2J+ mg/Kg 2.9U mg/Kg

#### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SA117-9BMS (All soil samples in SDG R0905348)	Chloride  Sulfate	-52 (75-125)  1 (75-125)	-  -	-  -	J- (all detects) R (all non-detects) 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
SA117-9BDUP (All soil samples in SDG R0905348)	Chloride Nitrate as N Sulfate	48 ( $\leq 20$ ) 29 ( $\leq 20$ ) 53 ( $\leq 20$ )	- - -	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) and relative percent differences (RPD) were within QC limits.

## VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Analyte	Flag	A or P
SA161-37B	Dichloroacetate	117 (90-115)	Chlorate	J+ (all detects)	A

## 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 R0905348	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

## IX. Overall Assessment

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

## X. Field Duplicates

Samples SA161-25B and SA161009-25B 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
	SA161-25B	SA161009-25B				
Alkalinity, total	122 mg/Kg	107 mg/Kg	13 ( $\leq 50$ )	-	-	
Alkalinity, bicarbonate	122 mg/Kg	107 mg/Kg	13 ( $\leq 50$ )	-	-	-
Chloride	13300 mg/Kg	12500 mg/Kg	6 ( $\leq 50$ )	-	-	-
Hexavalent chromium	7.21 mg/Kg	26.8 mg/Kg	115 ( $\leq 50$ )	-	J (all detects)	A
Hexavalent chromium	7.22 mg/Kg	27.1 mg/Kg	116 ( $\leq 50$ )	-	J (all detects)	A
Nitrate as N	14.5 mg/Kg	13.8 mg/Kg	5 ( $\leq 50$ )	-	-	-
Nitrite as N	0.36 mg/Kg	0.34 mg/Kg	-	0.02 ( $\leq 0.13$ )	-	-
pH	7.82 units	7.84 units	0 ( $\leq 50$ )	-	-	-
Sulfate	15200 mg/Kg	19700 mg/Kg	26 ( $\leq 50$ )	-	-	-
Surfactants	1.1 mg/Kg	1.2 mg/Kg	-	0.1 ( $\leq 2.6$ )	-	-
Total organic carbon	550 mg/Kg	650 mg/Kg	-	100 ( $\leq 300$ )	-	-
Total phosphorus	200 mg/Kg	275 mg/Kg	32 ( $\leq 50$ )	-	-	-
Chlorate	13000000 ug/Kg	12800000 ug/Kg	2 ( $\leq 50$ )	-	-	-
Perchlorate	890000 ug/Kg	857000 ug/Kg	4 ( $\leq 50$ )	-	-	-

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Data Qualification Summary - SDG R0905348**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905348	EB091809-SO1	Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0905348	SA117-0.5B SA117-9B SA117-25B SA117-41B SA161-0.5B SA161-10B SA161-25B SA161009-25B SA161-37B	Chloride  Sulfate	J- (all detects) R (all non-detects) J- (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0905348	SA117-0.5B SA117-9B SA117-25B SA117-41B SA161-0.5B SA161-10B SA161-25B SA161009-25B SA161-37B	Chloride Nitrate as N Sulfate	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)
R0905348	SA161-37B	Chlorate	J+ (all detects)	A	Surrogate spikes (%R) (s)
R0905348	EB091809-SO1 SA117-0.5B SA117-9B SA117-25B SA117-41B SA161-0.5B SA161-10B SA161-25B SA161009-25B SA161-37B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0905348	SA161-25B SA161009-25B	Hexavalent chromium	J (all detects)	A	Field duplicates (RPD) (fd)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0905348**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905348	EB091809-SO1	Ammonia as N	0.050U mg/L	A	bl

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Equipment Blank Data Qualification Summary - SDG R0905348**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905348	SA117-0.5B	Sulfate Chlorate	94.7J+ mg/Kg 220U ug/Kg	A	be
R0905348	SA161-0.5B	Sulfate	33.0J+ mg/Kg	A	be
R0905348	SA161-10B	Ammonia as N Sulfate	0.55U mg/Kg 57.6J+ mg/Kg	A	be

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0905348**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905348	SA117-0.5B	Chloride Nitrate as N Sulfate	10.4J+ mg/Kg 1.14J+ mg/Kg 94.7J+ mg/Kg	A	bf
R0905348	SA117-9B	Chloride Nitrate as N Sulfate	312J+ mg/Kg 3.12J+ mg/Kg 267J+ mg/Kg	A	bf
R0905348	SA117-25B	Chloride Nitrate as N Sulfate	104J+ mg/Kg 1.89J+ mg/Kg 582J+ mg/Kg	A	bf
R0905348	SA117-41B	Chloride Nitrate as N	86.5J+ mg/Kg 1.49J+ mg/Kg	A	bf
R0905348	SA161-0.5B	Chloride Nitrate as N Sulfate Surfactants	9.3J+ mg/Kg 34.8J+ mg/Kg 33.0J+ mg/Kg 2.2U mg/Kg	A	bf
R0905348	SA161-10B	Ammonia as N Chloride Nitrate as N Sulfate	0.55U mg/Kg 93.5J+ mg/Kg 16.8J+ mg/Kg 57.6J+ mg/Kg	A	bf
R0905348	SA161-25B	Nitrate as N Surfactants	14.5J+ mg/Kg 2.6U mg/Kg	A	bf
R0905348	SA161009-25B	Nitrate as N Surfactants	13.8J+ mg/Kg 2.6U mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905348	SA161-37B	Nitrate as N Surfactants	14.2J+ mg/Kg 2.9U mg/Kg	A	bf

### Tronox Northgate Henderson

LDC #: 21991K6

## VALIDATION COMPLETENESS WORKSHEET

Date: 1/20/09

SDG #: R0905348

Stage 2B

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: ca  
 2nd Reviewer: V  
 (include) Nitrite-N

**METHOD: (Analyte)** Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Chlorate, Nitrate-N, Sulfate (EPA SW846 Method 9056), Cyanide (EPA SW846 Method 9012A), ~~Dissolved Hexavalent Chromium (EPA Method 218.6)~~, Hexavalent Chromium (EPA SW846 Method 7199), Nitrite-N (EPA Method 353.2), pH (EPA SW846 Method 9040B/9045D), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), TOC (Lloyd/Kahn / 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. Chlorate (300.1), Perchlorate (314.0)

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 9/18/01
Ia.	Initial calibration	A	
Iib.	Calibration verification	A	
III.	Blanks	SW	
IV	Surrogate Spikes	SW	Not required for methods CR
V	Matrix Spike/Matrix Spike Duplicates	SW	MS
VI.	Duplicates	SW	DUP
VII.	Laboratory control samples	A	LCS/ND
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(8,9)
XI.	Field blanks	SW	EB=1, FB=FB072909-SO (506# R0904226)

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

Validated Samples: All soil except 1 = water

1	EB091809-SO1	11	SA117-9BMS	21	PBS (2,4-10)	31	
2	SA117-0.5B	12	SA117-9BDUP	22	PBSW (1)	32	
3	SA117-9B	13	MSD	23	PBS (3)	33	
4	SA117-25B	14		24		34	
5	SA117-41B	15		25		35	
6	SA161-0.5B	16		26		36	
7	SA161-10B	17		27		37	
8	SA161-25B	18		28		38	
9	SA161009-25B	19		29		39	
10	SA161-37B	20		30		40	

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_





**VALIDATION FINDINGS WORKSHEET**

**Blanks**

**METHOD:** Inorganics, Method See Cover

Reason Code: bl

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.

**Conc. units: mg/Kg**      **Associated Samples: All Water**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			
NH3-N		0.0340		1 0.013 / 0.050

**Conc. units: mg/Kg**      **Associated Samples: 2, 4-10**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			No Qualifiers
Alk., Total	9			
Alk., Bicarb.	9			
Cl	1.0			

**Conc. units: mg/Kg**      **Associated Samples: 3**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			No Qualifiers
Alk., Total	10	0.5		
Alk., Bicarb.	10			



**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

**METHOD:** Inorganics, Method See Cover

Reason Code: bl

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.

**Conc. units: mg/Kg** Associated Samples: **All Soil**

Analyte	Blank ID	Maximum ICB/CCB (mg/Kg)	Blank Action Limit	Sample Identification		
	PB (mg/Kg)			No Qualifiers		
TOC	50	116.0				

**Conc. units: mg/Kg** Associated Samples: **2**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
	PB (mg/Kg)			No Qualifiers		
Alk. Total		1.0				

**Conc. units: mg/Kg** Associated Samples: **4-10**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
	PB (mg/Kg)			No Qualifiers		
Alk. Total		1.1				

**Conc. units: mg/Kg** Associated Samples: **2, 4-6**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
	PB (mg/Kg)			No Qualifiers		
NO2-N		0.0078				

**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

**METHOD:** Inorganics, Method See Cover

Reason Code: bl

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.

**Conc. units: mg/Kg** **Associated Samples: 8-10**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
NO2-N	PB (mg/Kg)	0.0070				

**Conc. units: mg/Kg** **Associated Samples: 2, 4-7**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
Cl	PB (mg/Kg)	0.118				

**Conc. units: mg/Kg** **Associated Samples: 3, 8, 9**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
Cl	PB (mg/Kg)	0.086				

**Conc. units: mg/Kg** **Associated Samples: 3-5, 8-10**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
SO4	PB (mg/Kg)	0.192				

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

**METHOD:** Trace Metals (EPA SW846 6010B/7000)

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: mg/L Associated sample units: mg/Kg soil

Soil factor applied: 10x

Sampling date: 9/18/09

Field blank type: (circle one) Field Blank / Rinsate / Other: **EB**

Reason code: be

Associated Samples: All Soil

Analyte	Blank ID	1	2	6	7	Sample Identification
NH3-N	0.013				0.34 / 0.55	
TOC	0.4					
Cl	1.9					
pH (pH units)	4.53					
SO4	2.1		94.7 J+	33.0 J+	57.6 J+	
Chlorate	5 mg/L		70/220			
Perchlorate	0.9 ug/L					

LDC #: 21991K6  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

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

**METHOD:** Inorganics, EPA 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:** mg/L **Associated sample units:** mg/Kg  
**Sampling date:** 7/29/09 **Soil factor applied:** 10x  
**Field blank type:** (circle one) Field Blank / Rinsate / Other:

Reason Code: bf

Associated Samples: All Soil

Analyte	Blank ID	Action Limit	Sample Identification																	
			2	3	4	5	6	7	8	9	10									
NH3-N	FB072909-SO (SDG#: R0904226)	17.1																		
TOC	0.5																			
Cl	6.2	620	10.4 J+	312 J+	104 J+	86.5 J+	9.3 J+													
NO3-N	1.02	102	1.14 J+	3.12 J+	1.89 J+	1.49 J+	34.8 J+													
SO4	8.0	800	94.7 J+	267 J+	582 J+	33.0 J+														
Surfactants	0.168	16.8					0.7 / 2.2													
T-Phosphorus	0.007																			
pH (pH units)	3.48																			
Perchlorate			0.5 mg/L																	







LDC#: 21991K6  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 1 of 1  
 Reviewer: CR  
 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/Kg)		RPD ( $\leq 50$ )	Difference	Limits	Qualification (Parent only)
	8	9				
Total Alkalinity	122	107	13			
Bicarbonate Alkalinity	122	107	13			
Chloride	13300	12500	6			
Hexavalent Chromium	7.21	26.8	115			Jdet/A (fd)
Hexavalent Chromium	7.22	27.1	116			Jdet/A (fd)
Nitrate as N	14.5	13.8	5			
Nitrite as N	0.36	0.34		0.02	(<0.13)	
pH (pH Units)	7.82	7.84	0			
Sulfate	15200	19700	26			
Surfactants	1.1	1.2		0.1	(<2.6)	
TOC	550	650		100	(<300)	
Total Phosphorus	200	275	32			
Chlorate (ug/Kg)	13000000	12800000	2			
Perchlorate (ug/Kg)	890000	657000	4			



## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** September 21, 2009

**LDC Report Date:** December 10, 2009

**Matrix:** Soil

**Parameters:** Wet Chemistry

**Validation Level:** Stage 2B

**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** R0905387

### Sample Identification

SA32-0.5B  
SA32-9B  
SA32-25B  
SA32009-25B  
SA32-37B  
SA66-0.5B  
SA66009-0.5B  
SA66-10B  
SA66-28B  
SA129-10B  
SA129-29B  
RSAT4-0.5B  
RSAT4-10B  
RSAT4-25B  
RSAT4-40B  
RSAT4-53B  
SA32-0.5BMS  
SA32-0.5BMSD  
SA32-0.5BDUP

## Introduction

This data review covers 19 soil samples listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA Method 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Method 9045D for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, 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 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.
- UU 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
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride	9 mg/Kg 9 mg/Kg 1.0 mg/Kg	SA32-0.5B
ICB/CCB	Alkalinity, total Chloride Nitrite as N	1.1 mg/L 0.118 mg/L 0.007 mg/L	SA32-0.5B
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate	10 mg/Kg 10 mg/Kg	SA32-9B SA32-25B SA32009-25B SA32-37B SA66-0.5B SA66009-0.5B SA66-10B SA66-28B SA129-10B SA129-29B RSAT4-0.5B RSAT4-10B RSAT4-25B
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride	12 mg/Kg 12 mg/Kg 1.1 mg/Kg	RSAT4-40B RSAT4-53B

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Total organic carbon	60 mg/Kg	All samples in SDG R0905387
ICB/CCB	Total organic carbon	116.0 mg/Kg	All samples in SDG R0905387
PB (prep blank)	Total phosphorus	1.4 mg/Kg	SA32009-25B SA32-37B SA66-0.5B SA66009-0.5B SA66-10B SA66-28B SA129-10B SA129-29B RSAT4-0.5B RSAT4-10B RSAT4-25B RSAT4-40B RSAT4-53B
ICB/CCB	Total phosphorus	0.0067 mg/L	SA32009-25B SA32-37B SA66-0.5B SA66009-0.5B SA66-10B SA66-28B SA129-10B SA129-29B RSAT4-0.5B RSAT4-10B RSAT4-25B RSAT4-40B RSAT4-53B
ICB/CCB	Alkalinity, total	0.5 mg/L	SA32-9B SA32-25B SA32009-25B SA32-37B SA66-0.5B SA66009-0.5B SA66-10B SA66-28B SA129-10B SA129-29B RSAT4-0.5B RSAT4-10B RSAT4-25B RSAT4-40B RSAT4-53B
ICB/CCB	Chloride	0.112 mg/L	SA32-9B SA66-0.5B SA66009-0.5B SA66-10B SA129-29B RSAT4-0.5B RSAT4-10B RSAT4-53B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Chloride	0.086 mg/L	SA32-25B
ICB/CCB	Sulfate	0.192 mg/L	SA32-25B SA32009-25B SA32-37B SA66-28B RSAT4-25B RSAT4-40B RSAT4-53B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA32-37B	Total organic carbon	190 mg/Kg	290U mg/Kg
SA66-28B	Total organic carbon	260 mg/Kg	290U mg/Kg

Samples FB072909-SO (from SDG R0904226) and FB080309-SO (from SDG R0904279) were identified as field blanks. No contaminant concentrations were found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB072909-SO	7/29/09	Perchlorate Ammonia as N Total organic carbon Chloride Nitrate as N Sulfate Surfactants Total phosphorus pH	0.5 ug/L 1.71 mg/L 0.5 mg/L 6.2 mg/L 1.02 mg/L 8.0 mg/L 0.168 mg/L 0.007 mg/L 3.48 units	SA32-0.5B SA32-9B SA32-25B SA32009-25B SA32-37B SA66-0.5B SA66009-0.5B SA66-10B SA66-28B SA129-10B SA129-29B
FB080309-SO	8/3/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Total dissolved solids Sulfate Surfactants	3.0 mg/L 3.0 mg/L 0.113 mg/L 1.2 mg/L 3.9 mg/L 0.65 mg/L 6.48 units 0.015 mg/L 22 mg/L 1.6 mg/L 0.043 mg/L	RSAT4-0.5B RSAT4-10B RSAT4-25B RSAT4-10B RSAT4-53B

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
SA32-0.5B	Chloride Nitrate as N Sulfate	74.2 mg/Kg 1.62 mg/Kg 96.9 mg/Kg	74.2J+ mg/Kg 1.62J+ mg/Kg 96.9J+ mg/Kg
SA32-9B	Chloride Nitrate as N Sulfate Surfactants	37.0 mg/Kg 1.47 mg/Kg 81.4 mg/Kg 1.2 mg/Kg	37.0J+ mg/Kg 1.47J+ mg/Kg 81.4J+ mg/Kg 2.2U mg/Kg
SA32-25B	Chloride Nitrate as N Surfactants	210 mg/Kg 6.83 mg/Kg 0.9 mg/Kg	210J+ mg/Kg 6.83J+ mg/Kg 2.3U mg/Kg
SA32009-25B	Chloride Nitrate as N	191 mg/Kg 6.46 mg/Kg	191J+ mg/Kg 6.46J+ mg/Kg
SA32-37B	Total organic carbon Chloride Nitrate as N Surfactants	190 mg/Kg 507 mg/Kg 2.85 mg/Kg 1.4 mg/Kg	290U mg/Kg 507J+ mg/Kg 2.85J+ mg/Kg 3.1U mg/Kg
SA66-0.5B	Chloride Nitrate as N Sulfate Surfactants	26.0 mg/Kg 0.94 mg/Kg 17.8 mg/Kg 10.2 mg/Kg	26.0J+ mg/Kg 0.94J+ mg/Kg 17.8J+ mg/Kg 10.2J+ mg/Kg
SA66009-0.5B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.09 mg/Kg 24.9 mg/Kg 0.94 mg/Kg 17.3 mg/Kg 12.7 mg/Kg	0.54U mg/Kg 24.9J+ mg/Kg 0.94J+ mg/Kg 17.3J+ mg/Kg 12.7J+ mg/Kg
SA66-10B	Chloride Nitrate as N Sulfate Surfactants	62.5 mg/Kg 0.99 mg/Kg 28.8 mg/Kg 1.4 mg/Kg	62.5J+ mg/Kg 0.99J+ mg/Kg 28.8J+ mg/Kg 2.2U mg/Kg
SA66-28B	Ammonia as N Total organic carbon Nitrate as N Surfactants	0.76 mg/Kg 260 mg/Kg 4.87 mg/Kg 3.1 mg/Kg	0.76J+ mg/Kg 290U mg/Kg 4.87J+ mg/Kg 3.1J+ mg/Kg
SA129-10B	Ammonia as N Nitrate as N Sulfate Surfactants	5.48 mg/Kg 6.99 mg/Kg 98.4 mg/Kg 2.9 mg/Kg	5.48J+ mg/Kg 6.99J+ mg/Kg 98.4J+ mg/Kg 2.9J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA129-29B	Chloride Nitrate as N Sulfate Surfactants	64.7 mg/Kg 1.30 mg/Kg 83.3 mg/Kg 1.0 mg/Kg	64.7J+ mg/Kg 1.30J+ mg/Kg 83.3J+ mg/Kg 2.3U mg/Kg
RSAT4-0.5B	Chloride Nitrate as N Surfactants	6.5 mg/Kg 1.48 mg/Kg 1.2 mg/Kg	6.5J+ mg/Kg 1.48J+ mg/Kg 2.1U mg/Kg
RSAT4-10B	Chloride Nitrate as N Surfactants	10.1 mg/Kg 1.58 mg/Kg 0.8 mg/Kg	10.1J+ mg/Kg 1.58J+ mg/Kg 2.2U mg/Kg
RSAT4-25B	Chloride Nitrate as N Surfactants	13.9 mg/Kg 1.86 mg/Kg 1.2 mg/Kg	13.9J+ mg/Kg 1.86J+ mg/Kg 2.2U mg/Kg
RSAT4-40B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	245 mg/Kg 245 mg/Kg 141 mg/Kg 5.58 mg/Kg	245J+ mg/Kg 245J+ mg/Kg 141J+ mg/Kg 5.58J+ mg/Kg
RSAT4-53B	Chloride Nitrate as N Surfactants	57.2 mg/Kg 2.53 mg/Kg 1.4 mg/Kg	57.2J+ mg/Kg 2.53J+ mg/Kg 2.6U mg/Kg

#### IV. Matrix Spike/Matrix Spike Duplicates

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

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

#### VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits with the following exceptions:



Sample	Surrogate	%R (Limits)	Analyte	Flag	A or P
SA32-9B	Dichloroacetate	129 (90-115)	Chlorate	J+ (all detects)	A
SA66009-0.5B	Dichloroacetate	145 (90-115)	Chlorate	J+ (all detects)	A
RSAT4-40B	Dichloroacetate	142 (90-115)	Chlorate	J+ (all detects)	A

### 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 R0905387	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

### IX. Overall Assessment

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

### X. Field Duplicates

Samples SA32-25B and SA32009-25B and samples SA66-0.5B and SA66009-0.5B 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
	SA32-25B	SA32009-25B				
Alkalinity, total	123 mg/Kg	120 mg/Kg	2 ( $\leq 50$ )	-	-	-
Alkalinity, bicarbonate	123 mg/Kg	120 mg/Kg	2 ( $\leq 50$ )	-	-	-
Bromide	1.5 mg/Kg	1.5 mg/Kg	-	0 ( $\leq 1.1$ )	-	-
Chloride	210 mg/Kg	191 mg/Kg	9 ( $\leq 50$ )	-	-	-
Nitrate as N	6.83 mg/Kg	6.46 mg/Kg	6 ( $\leq 50$ )	-	-	-
Nitrite as N	0.08 mg/Kg	0.09 mg/Kg	-	0.01 ( $\leq 0.11$ )	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA32-25B	SA32009-25B				
pH	8.20 units	8.20 units	0 ( $\leq 50$ )	-	-	-
Sulfate	18800 mg/Kg	17900 mg/Kg	5 ( $\leq 50$ )	-	-	-
Surfactants	0.9 mg/Kg	0.6U mg/Kg	-	0.3 ( $\leq 2.3$ )	-	-
Hexavalent chromium	0.21 mg/Kg	0.20U mg/Kg	-	0.01 ( $\leq 0.44$ )	-	-
Total organic carbon	680 mg/Kg	490 mg/Kg	-	190 ( $\leq 300$ )	-	-
Total phosphorus	718 mg/Kg	676 mg/Kg	6 ( $\leq 50$ )	-	-	-
Chlorate	64600 ug/Kg	74800 ug/Kg	15 ( $\leq 50$ )	-	-	-
Perchlorate	270000 ug/Kg	271000 ug/Kg	0 ( $\leq 50$ )	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA66-0.5B	SA66009-0.5B				
Ammonia as N	0.08U mg/Kg	0.09 mg/Kg	-	0.01 ( $\leq 0.55$ )	-	-
Alkalinity, total	2480 mg/Kg	2390 mg/Kg	4 ( $\leq 50$ )	-	-	-
Alkalinity, bicarbonate	2140 mg/Kg	2050 mg/Kg	4 ( $\leq 50$ )	-	-	-
Alkalinity, carbonate	240 mg/Kg	340 mg/Kg	34 ( $\leq 50$ )	-	-	-
Chloride	26.0 mg/Kg	24.9 mg/Kg	4 ( $\leq 50$ )	-	-	-
Nitrate as N	0.94 mg/Kg	0.94 mg/Kg	-	0 ( $\leq 0.55$ )	-	-
Nitrite as N	11.10 mg/Kg	11.04 mg/Kg	1 ( $\leq 50$ )	-	-	-
pH	17.8 units	17.3 units	3 ( $\leq 50$ )	-	-	-
Sulfate	10.2 mg/Kg	12.7 mg/Kg	22 ( $\leq 50$ )	-	-	-
Total organic carbon	2860 mg/Kg	2930 mg/Kg	2 ( $\leq 50$ )	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA66-0.5B	SA66009-0.5B				
Total phosphorus	706 mg/Kg	725 mg/Kg	3 ( $\leq 50$ )	-	-	-
Chlorate	73 ug/Kg	100 ug/Kg	-	27 ( $\leq 220$ )	-	-
Perchlorate	404 ug/Kg	690 ug/Kg	-	286 ( $\leq 550$ )	-	-

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Data Qualification Summary - SDG R0905387**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905387	SA32-9B SA66009-0.5B RSAT4-40B	Chlorate	J+ (all detects)	A	Surrogate spikes (%R)
R0905387	SA32-0.5B SA32-9B SA32-25B SA32009-25B SA32-37B SA66-0.5B SA66009-0.5B SA66-10B SA66-28B SA129-10B SA129-29B RSAT4-0.5B RSAT4-10B RSAT4-25B RSAT4-40B RSAT4-53B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0905387**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905387	SA32-37B	Total organic carbon	290U mg/Kg	A	bl
R0905387	SA66-28B	Total organic carbon	290U mg/Kg	A	bl

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0905387**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905387	SA32-0.5B	Chloride Nitrate as N Sulfate	74.2J+ mg/Kg 1.62J+ mg/Kg 96.9J+ mg/Kg	A	bf
R0905387	SA32-9B	Chloride Nitrate as N Sulfate Surfactants	37.0J+ mg/Kg 1.47J+ mg/Kg 81.4J+ mg/Kg 2.2U mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905387	SA32-25B	Chloride Nitrate as N Surfactants	210J+ mg/Kg 6.83J+ mg/Kg 2.3U mg/Kg	A	bf
R0905387	SA32009-25B	Chloride Nitrate as N	191J+ mg/Kg 6.46J+ mg/Kg	A	bf
R0905387	SA32-37B	Total organic carbon Chloride Nitrate as N Surfactants	290U mg/Kg 507J+ mg/Kg 2.85J+ mg/Kg 3.1U mg/Kg	A	bf
R0905387	SA66-0.5B	Chloride Nitrate as N Sulfate Surfactants	26.0J+ mg/Kg 0.94J+ mg/Kg 17.8J+ mg/Kg 10.2J+ mg/Kg	A	bf
R0905387	SA66009-0.5B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.54U mg/Kg 24.9J+ mg/Kg 0.94J+ mg/Kg 17.3J+ mg/Kg 12.7J+ mg/Kg	A	bf
R0905387	SA66-10B	Chloride Nitrate as N Sulfate Surfactants	62.5J+ mg/Kg 0.99J+ mg/Kg 28.8J+ mg/Kg 2.2U mg/Kg	A	bf
R0905387	SA66-28B	Ammonia as N Total organic carbon Nitrate as N Surfactants	0.76J+ mg/Kg 290U mg/Kg 4.87J+ mg/Kg 3.1J+ mg/Kg	A	bf
R0905387	SA129-10B	Ammonia as N Nitrate as N Sulfate Surfactants	5.48J+ mg/Kg 6.99J+ mg/Kg 98.4J+ mg/Kg 2.9J+ mg/Kg	A	bf
R0905387	SA129-29B	Chloride Nitrate as N Sulfate Surfactants	64.7J+ mg/Kg 1.30J+ mg/Kg 83.3J+ mg/Kg 2.3U mg/Kg	A	bf
R0905387	RSAT4-0.5B	Chloride Nitrate as N Surfactants	6.5J+ mg/Kg 1.48J+ mg/Kg 2.1U mg/Kg	A	bf
R0905387	RSAT4-10B	Chloride Nitrate as N Surfactants	10.1J+ mg/Kg 1.58J+ mg/Kg 2.2U mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905387	RSAT4-25B	Chloride Nitrate as N Surfactants	13.9J+ mg/Kg 1.86J+ mg/Kg 2.2U mg/Kg	A	bf
R0905387	RSAT4-40B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	245J+ mg/Kg 245J+ mg/Kg 141J+ mg/Kg 5.58J+ mg/Kg	A	bf
R0905387	RSAT4-53B	Chloride Nitrate as N Surfactants	57.2J+ mg/Kg 2.53J+ mg/Kg 2.6U mg/Kg	A	bf

**Tronox Northgate Henderson**

LDC #: 21991L6  
 SDG #: R0905387  
 Laboratory: Columbia Analytical Services

**VALIDATION COMPLETENESS WORKSHEET**

Stage 2B

Date: 11-27-09  
 Page: 1 of 1  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**METHOD: (Analyte)** Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Chlorate (EPA Method 300.1), Cyanide (EPA SW846 Method 9012A), ~~Dissolved Hexavalent Chromium (EPA Method 218.6)~~, Hexavalent Chromium (EPA SW846 Method 7199), Nitrite-N (EPA Method 353.2), Perchlorate (EPA Method 314.0), pH (EPA SW846 Method 9040B/9045D), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), TOC (Lloyd/Kahn / ~~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: <u>9/21/09</u>
Ia.	Initial calibration	A	
Ib.	Calibration verification	A	
III.	Blanks	SW	
IV	Surrogate Spikes	SW	
V	Matrix Spike/Matrix Spike Duplicates	A	MS/D
VI.	Duplicates	A	DP
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(3,4), (6,7)
XI	Field blanks	SW	FB = FB080309-SO, FB072909-SO Soil (R0904226), (R0904226)

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

Validated Samples:

1	SA32-0.5B	11	SA129-29B	21	31
2	SA32-9B	12	RSAT4-0.5B	22	32
3	SA32-25B	13	RSAT4-10B	23	33
4	SA32009-25B	14	RSAT4-25B	24	34
5	SA32-37B	15	RSAT4-10B	25	35
6	SA66-0.5B	16	RSAT4-53B	26	36
7	SA66009-0.5B	17	SA32-0.5BMS	27	37
8	SA66-10B	18	SA32-0.5BMSD	28	38
9	SA66-28B	19	SA32-0.5BDUP	29	39
10	SA129-10B	20		30	40

Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



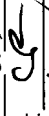
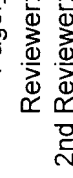


# VALIDATION FINDINGS WORKSHEET

## Blanks

METHOD: Inorganics, Method See Cover

Reason Code: bl

Page: 1 of 3  
 Reviewer:   
 2nd Reviewer: 

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.

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

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
	PB (mg/Kg)				No Qualifiers			
Alk., Total	9		1.1					
Alk., Bicarb.	9							
Cl	1.0		0.118					
NO2-N			0.007					

Conc. units: **mg/Kg** Associated Samples: **2-14**

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
	PB (mg/Kg)				No Qualifiers			
Alk., Total	10							
Alk., Bicarb.	10							

Conc. units: **mg/Kg** Associated Samples: **15, 16**

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
	PB (mg/Kg)				No Qualifiers			
Alk., Total	12							
Alk., Bicarb.	12							
Cl	1.1							

**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

**METHOD:** Inorganics, Method See Cover

Reason Code: bl

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.

**Conc. units: mg/Kg** Associated Samples: All

Analyte	Blank ID	Maximum ICB/CCB (mg/Kg)	Blank Action Limit	Sample Identification
	PB (mg/Kg)	116.0		
				5 9
TOC	60	116.0		190 / 290 260 / 290

**Conc. units: mg/Kg** Associated Samples: 4-16

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)	0.0067		
T-P	1.4	0.0067		No Qualifiers

**Conc. units: mg/Kg** Associated Samples: 2-16

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)	0.5		
Alk. Total		0.5		No Qualifiers

**Conc. units: mg/Kg** Associated Samples: 2, 6-8, 11-13, 16

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)	0.112		
Cl		0.112		No Qualifiers

**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

**METHOD:** Inorganics, Method See Cover

Reason Code: bl

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.

**Conc. units: mg/Kg**      **Associated Samples: 3**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
Cl	PB (mg/Kg)	0.086					

**Conc. units: mg/Kg**      **Associated Samples: 3-5, 9, 14-16**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
SO4	PB (mg/Kg)	0.192					

LDC #: 21991L6  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

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 Reviewer: CR  
 2nd Reviewer: [Signature]

**METHOD:** Inorganics, EPA 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: mg/L Associated sample units: mg/Kg  
 Sampling date: 7/29/09 Soil factor applied 10x  
 Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: 1-11

Reason Code: bf

Analyte	Blank ID	Action Limit	Sample Identification										
			1	2	3	4	5	6	7	8	9	10	11
Perchlorate (ug/L)	0.5												
NH3-N	1.71	17.1							0.09 / 0.54		0.76 J+	5.48 J+	
TOC	0.5						190 / 290				260 / 290		
Cl	6.2	620	74.2 J+	37.0 J+	210 J+	191 J+	507 J+	26.0 J+	24.9 J+	62.5 J+			64.7 J+
NO3-N	1.02	102	1.62 J+	1.47 J+	6.83 J+	6.46 J+	2.85 J+	0.94 J+	0.94 J+	0.99 J+	4.87 J+	6.99 J+	1.30 J+
SO4	8.0	800	96.9 J+	81.4 J+				17.8 J+	17.3 J+	28.8 J+		98.4 J+	83.3 J+
Surfactants	0.168	16.8		1.2 / 2.2	0.9 / 2.3		1.4 / 3.1	10.2 J+	12.7 J+	1.4 / 2.2	3.1 J+	2.9 J+	1.0 / 2.3
T-Phosphorus	0.007												
pH (pH units)	3.48												

LDC #: 21991L6  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

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 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**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:** mg/L **Associated sample units:** mg/Kg  
**Sampling date:** 8/3/09 **Soil factor applied:** 10X except TOC 1X  
**Field blank type:** (circle one) Field Blank / Rinsate / Other: FB Associated Samples: 12-16 Reason Code: bf

Analyte	Blank ID	Sample Identification													
		12	13	14	15	16									
Total alkalinity	3.0	300				245 J+									
Bicarbonate alkalinity	3.0	300				245 J+									
Ammonia as N	0.113	11.3													
TOC (average)	1.2														
Cl	3.9	390	10.1 J+	13.9 J+	141 J+	57.2 J+									
Nitrate as N	0.65	65	1.48 J+	1.86 J+	5.58 J+	2.53 J+									
pH (pH Units)	6.48														
Total Phosphorus	0.015														
TDS	22														
Sulfate	1.6														
Surfactants	0.043	4.3	0.8 / 2.2	1.2 / 2.2	1.4 / 2.6										



LDC#: 21991L6  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 1 of 2  
 Reviewer: CR  
 2nd Reviewer: h

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 ( $\leq 50$ )	Difference	Limits	Qualification (Parent only)
	3	4				
Total Alkalinity	123	120	2			
Bicarbonate Alkalinity	123	120	2			
Bromide	1.5	1.5		0	( $\leq 1.1$ )	
Chloride	210	191	9			
Nitrate as N	6.83	6.46	6			
Nitrite as N	0.08	0.09		0.01	( $\leq 0.11$ )	
pH (pH Units)	8.20	8.20	0			
Sulfate	18800	17900	5			
Surfactants	0.9	0.6U		0.3	(<2.3)	
Hexavalent Chromium	0.21	0.20U		0.01	( $\leq 0.44$ )	
TOC	680	490		190	(<300)	
Total Phosphorus	718	676	6			
Chlorate (ug/Kg)	64600	74800	15			
Perchlorate (ug/Kg)	270000	271000	0			

LDC#: 21991L6  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 2 of 2  
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 2nd Reviewer: [Signature]

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 ( $\leq 50$ )	Difference	Limits	Qualification (Parent only)
	6	7				
Ammonia as N	0.08U	0.09		0.01	( $\leq 0.55$ )	
Total Alkalinity	2480	2390	4			
Bicarbonate Alkalinity	2140	2050	4			
Carbonate Alkalinity	240	340	34			
Chloride	26.0	24.9	4			
Nitrate as N	0.94	0.94		0	( $\leq 0.55$ )	
pH (pH Units)	11.10	11.04	1			
Sulfate	17.8	17.3	3			
Surfactants	10.2	12.7	22			
TOC	2860	2930	2			
Total Phosphorus	706	725	3			
Chlorate (ug/Kg)	73	100	<u>31</u> <u>CP</u>	27	( $\leq 220$ )	
Perchlorate (ug/Kg)	404	690		286	( $\leq 550$ )	



## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** September 24 through September 25, 2009

**LDC Report Date:** December 8, 2009

**Matrix:** Soil/Water

**Parameters:** Wet Chemistry

**Validation Level:** Stage 2B

**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** R0905464

### Sample Identification

SA205-0.5B	SA208-0.5B
SA205-10B	SA208-7B
SA205-25B	SA101-0.5BMS
SA205-41B	SA101-0.5BDUP
SA84-0.5B	SA101-0.5BMSD
SA84-10B	EB092509-SO1A2MS
SA84009-10B	EB092509-SO1A2DUP
SA84-25B	
SA84-43B	
EB092509-SO1A2	
EB092509-SO2A4	
SA101-0.5B	
SA101-10B	
SA101-25B	
SA101-42B	
SA121-0.5B	
SA121009-0.5B	
SA121-10B	
SA121-25B	
SA121-44B	

## Introduction

This data review covers 23 soil samples and 4 water samples listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, Nitrite as Nitrogen, and Sulfate, EPA Method 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Methods 9040B and 9045D for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, and Lloyd/Kahn Method and EPA SW 846 Method 9060 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 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.
- UU 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
EB092509-SO1A2	Hexavalent chromium	28.75 hours	24 hours	J- (all detects) UJ (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 with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Total phosphorus	1.7 mg/L 1.7 mg/L 0.2 mg/L 0.006 mg/L	All water samples in SDG R0905464
ICB/CCB	Alkalinity, total Total organic carbon Total phosphorus Ammonia as N Chloride	1.9 mg/L 0.118 mg/L 0.0166 mg/L 0.0161 mg/L 0.136 mg/L	All water samples in SDG R0905464
PB (prep blank)	Cyanide	0.026 mg/L	EB092509-SO2A4

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Chloride Nitrite as N	1.0 mg/Kg 0.08 mg/Kg	SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-10B SA101-0.5B
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Chloride Sulfate	12 mg/Kg 12 mg/Kg 0.28 mg/Kg 1.4 mg/Kg 1.1 mg/Kg	SA84009-10B SA84-25B SA84-43B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121009-0.5B SA121-10B SA121-25B SA121-44B SA208-0.5B SA208-7B
ICB/CCB	Total phosphorus	1.4 mg/Kg	SA205-0.5B SA205-10B
ICB/CCB	Nitrite as N	0.00756 mg/L	SA205-0.5B SA205-10B
PB (prep blank)	Total organic carbon	50 mg/Kg	SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121009-0.5B SA121-10B SA121-25B SA121-44B SA208-0.5B SA208-7B
PB (prep blank)	Total organic carbon	40 mg/Kg	SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B
ICB/CCB	Total organic carbon Total phosphorus	116.0 mg/Kg 0.0064 mg/L	All soil samples in SDG R0905464

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Nitrite as N	0.00890 mg/L	SA205-25B SA205-41B SA84-0.5B SA84-10B SA101-0.5B
ICB/CCB	Chloride	0.102 mg/L	SA205-0.5B SA205-10B SA205-25B
ICB/CCB	Chloride	0.104 mg/L	SA84-0.5B SA101-0.5B
ICB/CCB	Sulfate	0.133 mg/L	SA101-0.5B
ICB/CCB	Chloride	0.102 mg/L	SA101-10B SA121-0.5B SA121009-0.5B SA121-10B
ICB/CCB	Sulfate	0.130 mg/L	SA101-10B SA121009-0.5B SA208-7B
ICB/CCB	Chloride	0.124 mg/L	SA205-41B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-25B SA101-42B
ICB/CCB	Sulfate	0.149 mg/L	SA205-41B
ICB/CCB	Chloride	0.114 mg/L	SA121-25B SA121-44B SA208-0.5B SA208-7B
ICB/CCB	Sulfate	0.161 mg/L	SA121-0.5B SA121-10B
ICB/CCB	Sulfate	0.039 mg/L	SA84-10B SA84009-10B SA84-43B SA101-25B SA101-42B SA121-25B SA121-44B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB092509-SO1A2	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Total phosphorus Ammonia as N	1.9 mg/L 1.9 mg/L 0.4 mg/L 0.011 mg/L 0.016 mg/L	2.0U mg/L 2.0U mg/L 1.0U mg/L 0.050U mg/L 0.050U mg/L
EB092509-SO2A4	Total organic carbon Total phosphorus Chloride	0.3 mg/L 0.018 mg/L 1.9 mg/L	1.0U mg/L 0.050U mg/L 2.0U mg/L
SA205-0.5B	Nitrite as N	0.09 mg/Kg	0.11U mg/Kg
SA205-25B	Nitrite as N	0.09 mg/Kg	0.11U mg/Kg
SA205-41B	Nitrite as N	0.11 mg/Kg	0.13U mg/Kg
SA101-0.5B	Nitrite as N	0.1 mg/Kg	0.11U mg/Kg
SA101-10B	Ammonia as N	0.19 mg/Kg	0.54U mg/Kg
SA101-25B	Ammonia as N	0.35 mg/Kg	0.60U mg/Kg
SA101-42B	Ammonia as N Total organic carbon	0.65 mg/Kg 160 mg/Kg	0.66U mg/Kg 290U mg/Kg
SA121-44B	Ammonia as N Total organic carbon	0.29 mg/Kg 120 mg/Kg	0.72U mg/Kg 290U mg/Kg
SA208-0.5B	Total organic carbon	210 mg/Kg	290U mg/Kg
SA208-7B	Ammonia as N	0.19 mg/Kg	0.54U mg/Kg

Samples EB092509-SO1A2 and EB092509-SO2A4 were identified as equipment blanks. No contaminant concentrations were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB092509-SO1A2	9/25/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Nitrate as N pH Total phosphorus Sulfate Surfactants	1.9 mg/L 1.9 mg/L 0.016 mg/L 0.4 mg/L 0.94 mg/L 8.01 units 0.011 mg/L 1.7 mg/L 0.081 mg/L	SA208-0.5B SA208-7B

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB092509-SO2A4	9/25/09	Total organic carbon Chloride pH Total phosphorus Sulfate Surfactants	0.3 mg/L 1.9 mg/L 4.08 units 0.018 mg/L 6.6 mg/L 0.208 mg/L	SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121009-0.5B SA121-10B SA121-25B SA121-44B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA208-0.5B	Total organic carbon Nitrate as N Surfactants	210 mg/Kg 2.26 mg/Kg 0.7 mg/Kg	290U mg/Kg 2.26J+ mg/Kg 2.2U mg/Kg
SA208-7B	Ammonia as N Nitrate as N Surfactants	0.19 mg/Kg 2.73 mg/Kg 0.9 mg/Kg	0.54U mg/Kg 2.73J+ mg/Kg 2.2U mg/Kg
SA101-0.5B	Sulfate Surfactants	65.6 mg/Kg 1.5 mg/Kg	65.6J+ mg/Kg 2.2U mg/Kg
SA101-10B	Sulfate Surfactants	49.2 mg/Kg 0.8 mg/Kg	49.2J+ mg/Kg 2.2U mg/Kg
SA101-25B	Sulfate Surfactants	187 mg/Kg 1.3 mg/Kg	187J+ mg/Kg 2.4U mg/Kg
SA101-42B	Total organic carbon Sulfate Surfactants	160 mg/Kg 550 mg/Kg 1.2 mg/Kg	290U mg/Kg 550J+ mg/Kg 2.9U mg/Kg
SA121-0.5B	Sulfate	118 mg/Kg	118J+ mg/Kg
SA121009-0.5B	Sulfate Surfactants	108 mg/Kg 0.9 mg/Kg	108J+ mg/Kg 2.2U mg/Kg
SA121-10B	Sulfate	247 mg/Kg	247J+ mg/Kg
SA121-44B	Total organic carbon Surfactants	120 mg/Kg 1.0 mg/Kg	290U mg/Kg 2.9U mg/Kg



Samples FB072909-SO (from SDG R0904226) and FB080309-SO (from SDG R0904279) were identified as field blanks. No contaminant concentrations were found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB072909-SO	7/29/09	Ammonia as N Total organic carbon Chloride Nitrate as N Sulfate Surfactants Total phosphorus pH Perchlorate	1.71 mg/L 0.5 mg/L 6.2 mg/L 1.02 mg/L 8.0 mg/L 0.168 mg/L 0.007 mg/L 3.48 units 0.5 ug/L	SA208-0.5B SA208-7B
FB080309-SO	8/3/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Total dissolved solids Sulfate Surfactants	3.0 mg/L 3.0 mg/L 0.113 mg/L 1.2 mg/L 3.9 mg/L 0.65 mg/L 6.48 units 0.015 mg/L 22 mg/L 1.6 mg/L 0.043 mg/L	SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121009-0.5B SA121-10B SA121-25B SA121-44B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA208-0.5B	Total organic carbon Chloride Nitrate as N Sulfate Surfactants	210 mg/Kg 125 mg/Kg 2.26 mg/Kg 49.2 mg/Kg 0.7 mg/Kg	290U mg/Kg 125J+ mg/Kg 2.26J+ mg/Kg 49.2J+ mg/Kg 2.2U mg/Kg
SA208-7B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.19 mg/Kg 204 mg/Kg 2.73 mg/Kg 78.4 mg/Kg 0.9 mg/Kg	0.54U mg/Kg 204J+ mg/Kg 2.73J+ mg/Kg 78.4J+ mg/Kg 2.2U mg/Kg
SA205-0.5B	Chloride Nitrate as N Surfactants	5.0 mg/Kg 1.86 mg/Kg 1.4 mg/Kg	5.0J+ mg/Kg 1.86J+ mg/Kg 2.2U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA205-10B	Chloride Nitrate as N	66.8 mg/Kg 2.38 mg/Kg	66.8J+ mg/Kg 2.38J+ mg/Kg
SA205-25B	Chloride Nitrate as N	29.6 mg/Kg 2.34 mg/Kg	29.6J+ mg/Kg 2.34J+ mg/Kg
SA205-41B	Nitrate as N Surfactants	4.72 mg/Kg 0.8 mg/Kg	4.72J+ mg/Kg 2.7U mg/Kg
SA84-0.5B	Chloride Nitrate as N Surfactants	22.6 mg/Kg 2.63 mg/Kg 1.4 mg/Kg	22.6J+ mg/Kg 2.63J+ mg/Kg 2.1U mg/Kg
SA84-10B	Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	297 mg/Kg 265 mg/Kg 4.52 mg/Kg 2.5 mg/Kg	297J+ mg/Kg 265J+ mg/Kg 4.52J+ mg/Kg 2.5J+ mg/Kg
SA84009-10B	Chloride Nitrate as N Surfactants	259 mg/Kg 4.43 mg/Kg 2.6 mg/Kg	259J+ mg/Kg 4.43J+ mg/Kg 2.6J+ mg/Kg
SA84-25B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	266 mg/Kg 259 mg/Kg 148 mg/Kg 4.06 mg/Kg 3.6 mg/Kg	266J+ mg/Kg 259J+ mg/Kg 148J+ mg/Kg 4.06J+ mg/Kg 3.6J+ mg/Kg
SA84-43B	Nitrate as N	4.50 mg/Kg	4.50J+ mg/Kg
SA101-0.5B	Chloride Nitrate as N Surfactants	90.6 mg/Kg 5.33 mg/Kg 1.5 mg/Kg	90.6J+ mg/Kg 5.33J+ mg/Kg 2.2U mg/Kg
SA101-10B	Ammonia as N Chloride Nitrate as N Surfactants	0.19 mg/Kg 42.1 mg/Kg 5.10 mg/Kg 0.8 mg/Kg	0.54U mg/Kg 42.1J+ mg/Kg 5.10J+ mg/Kg 2.2U mg/Kg
SA101-25B	Ammonia as N Nitrate as N Surfactants	0.35 mg/Kg 8.40 mg/Kg 1.3 mg/Kg	0.60U mg/Kg 8.40J+ mg/Kg 2.4U mg/Kg
SA101-42B	Ammonia as N Total organic carbon Chloride Nitrate as N Surfactants	0.65 mg/Kg 160 mg/Kg 548 mg/Kg 2.41 mg/Kg 1.2 mg/Kg	0.66U mg/Kg 160U mg/Kg 548J+ mg/Kg 2.41J+ mg/Kg 2.6U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA121-0.5B	Chloride Nitrate as N	5.0 mg/Kg 1.90 mg/Kg	5.0J+ mg/Kg 1.90J+ mg/Kg
SA121009-0.5B	Chloride Nitrate as N Surfactants	5.0 mg/Kg 1.91 mg/Kg 0.9 mg/Kg	5.0J+ mg/Kg 1.91J+ mg/Kg 2.2U mg/Kg
SA121-10B	Chloride Nitrate as N	23.5 mg/Kg 3.50 mg/Kg	23.5J+ mg/Kg 3.50J+ mg/Kg
SA121-25B	Alkalinity, total Alkalinity, bicarbonate Nitrate as N	202 mg/Kg 202 mg/Kg 20.9 mg/Kg	202J+ mg/Kg 202J+ mg/Kg 20.9J+ mg/Kg
SA121-44B	Ammonia as N Total organic carbon Nitrate as N Surfactants	0.29 mg/Kg 120 mg/Kg 11.9 mg/Kg 1.0 mg/Kg	0.72U mg/Kg 290U mg/Kg 11.9J+ mg/Kg 2.9U mg/Kg

#### IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SA101-0.5BMS/MSD (SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121009-0.5B SA121-10B SA121-25B SA121-44B)	Perchlorate Chlorate Chloride	- - 41 (75-125)	54 (75-125) 65 (75-125) -	- - -	J- (all detects) UJ (all non-detects)	A

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SA101-0.5BMS/MSD (SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121009-0.5B SA121-10B SA121-25B SA121-44B)	Sulfate	20 (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
SA101-0.5BDUP (SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121009-0.5B SA121-10B SA121-25B SA121-44B)	Sulfate	35 ( $\leq 20$ )	-	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) and relative percent differences (RPD) were within QC limits.

## VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Analyte	Flag	A or P
SA205-25B	Dichloroacetate	118 (90-115)	Chlorate	J+ (all detects)	A
SA84-0.5B	Dichloroacetate	125 (90-115)	Chlorate	J+ (all detects)	A
SA84-25B	Dichloroacetate	133 (90-115)	Chlorate	J+ (all detects)	A
SA101-10B	Dichloroacetate	120 (90-115)	Chlorate	J+ (all detects)	A
SA121009-0.5B	Dichloroacetate	117 (90-115)	Chlorate	J+ (all detects)	A
SA208-0.5B	Dichloroacetate	120 (90-115)	Chlorate	J+ (all detects)	A

## 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 R0905464	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

## IX. Overall Assessment

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

## X. Field Duplicates

Samples SA84-10B and SA84009-10B and samples SA121-0.5B and SA121009-0.5B 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
	SA84-10B	SA84009-10B				
Alkalinity, total	307 mg/Kg	323 mg/Kg	5 ( $\leq 50$ )	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA84-10B	SA84009-10B				
Alkalinity, bicarbonate	297 mg/Kg	309 mg/Kg	4 ( $\leq 50$ )	-	-	-
Alkalinity, carbonate	10 mg/Kg	14 mg/Kg	-	4 ( $\leq 22$ )	-	-
Chloride	265 mg/Kg	259 mg/Kg	2 ( $\leq 50$ )	-	-	-
Nitrate as N	4.52 mg/Kg	4.43 mg/Kg	2 ( $\leq 50$ )	-	-	-
Nitrite as N	0.26 mg/Kg	0.15 mg/Kg	-	0.11 ( $\leq 0.11$ )	-	-
pH	8.42 units	8.45 units	0 ( $\leq 50$ )	-	-	-
Sulfate	214 mg/Kg	224 mg/Kg	5 ( $\leq 50$ )	-	-	-
Surfactants	2.5 mg/Kg	2.6 mg/Kg	-	0.1 ( $\leq 2.2$ )	-	-
Total organic carbon	680 mg/Kg	460 mg/Kg	-	220 ( $\leq 300$ )	-	-
Total phosphorus	565 mg/Kg	536 mg/Kg	5 ( $\leq 50$ )	-	-	-
Chlorate	14900 ug/Kg	15800 ug/Kg	6 ( $\leq 50$ )	-	-	-
Perchlorate	223000 ug/Kg	218000 ug/Kg	2 ( $\leq 50$ )	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA121-0.5B	SA121009-0.5B				
Alkalinity, total	327 mg/Kg	345 mg/Kg	5 ( $\leq 50$ )	-	-	-
Alkalinity, bicarbonate	314 mg/Kg	331 mg/Kg	5 ( $\leq 50$ )	-	-	-
Alkalinity, carbonate	13 mg/Kg	14 mg/Kg	-	1 ( $\leq 22$ )	-	-
Chloride	5.0 mg/Kg	5.0 mg/Kg	-	0 ( $\leq 2.2$ )	-	-
Hexavalent chromium	1.58 mg/Kg	0.19U mg/Kg	-	1.39 ( $\leq 0.42$ )	J (all detects) UJ (all non-detects)	A
Hexavalent chromium	1.56 mg/Kg	0.19U mg/Kg	-	1.37 ( $\leq 0.42$ )	J (all detects) UJ (all non-detects)	A

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA121-0.5B	SA121009-0.5B				
Nitrate as N	1.90 mg/Kg	1.91 mg/Kg	-	0.01 ( $\leq 0.55$ )	-	-
pH	9.42 units	9.45 units	0 ( $\leq 50$ )	-	-	-
Sulfate	118 mg/Kg	108 mg/Kg	9 ( $\leq 50$ )	-	-	-
Surfactants	0.6U mg/Kg	0.9 mg/Kg	-	0.3 ( $\leq 2.2$ )	-	-
Total organic carbon	700 mg/Kg	730 mg/Kg	-	30 ( $\leq 290$ )	-	-
Total phosphorus	683 mg/Kg	708 mg/Kg	4 ( $\leq 50$ )	-	-	-
Chlorate	596 ug/Kg	582 ug/Kg	-	14 ( $\leq 550$ )	-	-
Perchlorate	759 ug/Kg	541 ug/Kg	-	218 ( $\leq 220$ )	-	-

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Data Qualification Summary - SDG R0905464**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905464	EB092509-SO1A2	Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0905464	SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121009-0.5B SA121-10B SA121-25B SA121-44B	Perchlorate Chlorate Chloride	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
	SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121009-0.5B SA121-10B SA121-25B SA121-44B	Sulfate	J- (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)



SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905464	SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121009-0.5B SA121-10B SA121-25B SA121-44B	Sulfate	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)
R0905464	SA205-25B SA84-0.5B SA84-25B SA101-10B SA121009-0.5B SA208-0.5B	Chlorate	J+ (all detects)	A	Surrogate spikes (%R) (s)
R0905464	SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B EB092509-SO1A2 EB092509-SO2A4 SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121009-0.5B SA121-10B SA121-25B SA121-44B SA208-0.5B SA208-7B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0905464	SA121-0.5B SA121009-0.5B	Hexavalent chromium	J (all detects) UJ (all non-detects)	A	Field duplicates (Difference) (fd)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0905464**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905464	EB092509-SO1A2	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Total phosphorus Ammonia as N	2.0U mg/L 2.0U mg/L 1.0U mg/L 0.050U mg/L 0.050U mg/L	A	bl
R0905464	EB092509-SO2A4	Total organic carbon Total phosphorus Chloride	1.0U mg/L 0.050U mg/L 2.0U mg/L	A	bl
R0905464	SA205-0.5B	Nitrite as N	0.11U mg/Kg	A	bl
R0905464	SA205-25B	Nitrite as N	0.11U mg/Kg	A	bl
R0905464	SA205-41B	Nitrite as N	0.13U mg/Kg	A	bl
R0905464	SA101-0.5B	Nitrite as N	0.11U mg/Kg	A	bl
R0905464	SA101-10B	Ammonia as N	0.54U mg/Kg	A	bl
R0905464	SA101-25B	Ammonia as N	0.60U mg/Kg	A	bl
R0905464	SA101-42B	Ammonia as N Total organic carbon	0.66U mg/Kg 290U mg/Kg	A	bl
R0905464	SA121-44B	Ammonia as N Total organic carbon	0.72U mg/Kg 290U mg/Kg	A	bl
R0905464	SA208-0.5B	Total organic carbon	290U mg/Kg	A	bl
R0905464	SA208-7B	Ammonia as N	0.54U mg/Kg	A	bl

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Equipment Blank Data Qualification Summary - SDG R0905464**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905464	SA208-0.5B	Total organic carbon Nitrate as N Surfactants	290U mg/Kg 2.26J+ mg/Kg 2.2U mg/Kg	A	be

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905464	SA208-7B	Ammonia as N Nitrate as N Surfactants	0.54U mg/Kg 2.73J+ mg/Kg 2.2U mg/Kg	A	be
R0905464	SA101-0.5B	Sulfate Surfactants	65.6J+ mg/Kg 2.2U mg/Kg	A	be
R0905464	SA101-10B	Sulfate Surfactants	49.2J+ mg/Kg 2.2U mg/Kg	A	be
R0905464	SA101-25B	Sulfate Surfactants	187J+ mg/Kg 2.4U mg/Kg	A	be
R0905464	SA101-42B	Total organic carbon Sulfate Surfactants	290U mg/Kg 550J+ mg/Kg 2.9U mg/Kg	A	be
R0905464	SA121-0.5B	Sulfate	118J+ mg/Kg	A	be
R0905464	SA121009-0.5B	Sulfate Surfactants	108J+ mg/Kg 2.2U mg/Kg	A	be
R0905464	SA121-10B	Sulfate	247J+ mg/Kg	A	be
R0905464	SA121-44B	Total organic carbon Surfactants	290U mg/Kg 2.9U mg/Kg	A	be

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0905464**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905464	SA208-0.5B	Total organic carbon Chloride Nitrate as N Sulfate Surfactants	290U mg/Kg 125J+ mg/Kg 2.26J+ mg/Kg 49.2J+ mg/Kg 2.2U mg/Kg	A	bf
R0905464	SA208-7B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.54U mg/Kg 204J+ mg/Kg 2.73J+ mg/Kg 78.4J+ mg/Kg 2.2U mg/Kg	A	bf
R0905464	SA205-0.5B	Chloride Nitrate as N Surfactants	5.0J+ mg/Kg 1.86J+ mg/Kg 2.2U mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905464	SA205-10B	Chloride Nitrate as N	66.8J+ mg/Kg 2.38J+ mg/Kg	A	bf
R0905464	SA205-25B	Chloride Nitrate as N	29.6J+ mg/Kg 2.34J+ mg/Kg	A	bf
R0905464	SA205-41B	Nitrate as N Surfactants	4.72J+ mg/Kg 2.7U mg/Kg	A	bf
R0905464	SA84-0.5B	Chloride Nitrate as N Surfactants	22.6J+ mg/Kg 2.63J+ mg/Kg 2.1U mg/Kg	A	bf
R0905464	SA84-10B	Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	297J+ mg/Kg 265J+ mg/Kg 4.52J+ mg/Kg 2.5J+ mg/Kg	A	bf
R0905464	SA84009-10B	Chloride Nitrate as N Surfactants	259J+ mg/Kg 4.43J+ mg/Kg 2.6J+ mg/Kg	A	bf
R0905464	SA84-25B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	266J+ mg/Kg 259J+ mg/Kg 148J+ mg/Kg 4.06J+ mg/Kg 3.6J+ mg/Kg	A	bf
R0905464	SA84-43B	Nitrate as N	4.50J+ mg/Kg	A	bf
R0905464	SA101-0.5B	Chloride Nitrate as N Surfactants	90.6J+ mg/Kg 5.33J+ mg/Kg 2.2U mg/Kg	A	bf
R0905464	SA101-10B	Ammonia as N Chloride Nitrate as N Surfactants	0.54U mg/Kg 42.1J+ mg/Kg 5.10J+ mg/Kg 2.2U mg/Kg	A	bf
R0905464	SA101-25B	Ammonia as N Nitrate as N Surfactants	0.60U mg/Kg 8.40J+ mg/Kg 2.4U mg/Kg	A	bf
R0905464	SA101-42B	Ammonia as N Total organic carbon Chloride Nitrate as N Surfactants	0.66U mg/Kg 160U mg/Kg 548J+ mg/Kg 2.41J+ mg/Kg 2.6U mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905464	SA121-0.5B	Chloride Nitrate as N	5.0J+ mg/Kg 1.90J+ mg/Kg	A	bf
R0905464	SA121009-0.5B	Chloride Nitrate as N Surfactants	5.0J+ mg/Kg 1.91J+ mg/Kg 2.2U mg/Kg	A	bf
R0905464	SA121-10B	Chloride Nitrate as N	23.5J+ mg/Kg 3.50J+ mg/Kg	A	bf
R0905464	SA121-25B	Alkalinity, total Alkalinity, bicarbonate Nitrate as N	202J+ mg/Kg 202J+ mg/Kg 20.9J+ mg/Kg	A	bf
R0905464	SA121-44B	Ammonia as N Total organic carbon Nitrate as N Surfactants	0.72U mg/Kg 290U mg/Kg 11.9J+ mg/Kg 2.9U mg/Kg	A	bf

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET

LDC #: 21991N6

SDG #: R0905464

Laboratory: Columbia Analytical Services

Stage 2B

Date: 11/23/09

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [Signature]

**METHOD: (Analyte)** Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Cyanide (EPA SW846 Method 9012A), ~~Dissolved Hexavalent Chromium (EPA Method 218.6)~~, Hexavalent Chromium (EPA SW846 Method 7199), Nitrite-N (EPA Method 353.2), pH (EPA SW846 Method 9040B/9045D), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), TOC (Lloyd/Kahn / 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. *Chlorate (300.1), Perchlorate (314.0)*

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 9/24/09; 9/25/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	SW	
IV.	Surrogate Spikes	N	Not required for methods
V.	Matrix Spike/Matrix Spike Duplicates	SW	M/S
VI.	Duplicates	SW	Dup
VII.	Laboratory control samples	A	LC5/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(6,7), (16,17)
XI.	Field blanks	SW	EB=10, 11. FB=FB072909-SO, FB080309-SO, (506# R0904226) (506# R0904279)

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

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

D = Duplicate  
TB = Trip blank  
EB = Equipment blank

Validated Samples:

*All soil except 10, 11 = water*

1	SA205-0.5B	11	EB092509-SO2A4	21	SA208-0.5B	31	PBW
2	SA205-10B	12	SA101-0.5B	22	SA208-7B	32	PBS (1-6, 12)
3	SA205-25B	13	SA101-10B	23	SA101-0.5BMS	33	PBS (7-9, 13-22)
4	SA205-41B	14	SA101-25B	24	SA101-0.5BDUP	34	
5	SA84-0.5B	15	SA101-42B	25	↓ MSD	35	
6	SA84-10B	16	SA121-0.5B	26	EB092509-SO1A2MS	36	
7	SA84009-10B	17	SA121009-0.5B	27	↓ DMS	37	
8	SA84-25B	18	SA121-10B	28	↓ DMS	38	
9	SA84-43B	19	SA121-25B	29		39	
10	EB092509-SO1A2	20	SA121-44B	30		40	

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_







**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

**METHOD:** Inorganics, Method See Cover

Reason Code: bl

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.

**Conc. units: mg/L** **Associated Samples: All Water**

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification	
	PB (mg/L)					
Alk., Total	1.7		1.9		10	11
Alk., Bicarb.	1.7				1.9 / 2.0	
TOC	0.2		0.118		0.4 / 1.0	0.3 / 1.0
T-P	0.006		0.0166		0.011 / 0.050	0.018 / 0.050
NH3-N			0.0161		0.016 / 0.050	
Cl			0.136			1.9 / 2.0

**Conc. units: mg/L** **Associated Samples: 11**

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification	
	PB (mg/L)					
CN	0.026				No Qualifiers	

**Conc. units: mg/Kg** **Associated Samples: 1-6, 12**

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification	
	PB (mg/Kg)					
Cl	1.0					
NO2-N	0.08				0.09 / 0.11	0.09 / 0.11 0.11 / 0.13 0.1 / 0.11

**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

**METHOD:** Inorganics, Method See Cover

Reason Code: bl

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.

**Conc. units: mg/Kg** **Associated Samples: 7-9, 13-22**

Analyte	Blank ID		Maximum ICB/CBB (mg/L)	Blank Action Limit	Sample Identification				
	PB (mg/Kg)				13	14	15	20	22
Alk., Total	12								
Alk., Bicarb.	12								
NH3-N	0.28				0.19 / 0.54	0.35 / 0.60	0.65 / 0.66	0.29 / 0.72	0.19 / 0.54
Cl	1.4								
SO4	1.1								

**Conc. units: mg/Kg** **Associated Samples: 1, 2**

Analyte	Blank ID		Maximum ICB/CBB (mg/L)	Blank Action Limit	Sample Identification				
	PB (mg/Kg)				1				
T-P	1.4								
NO2-N			0.00756		See PB				

**Conc. units: mg/Kg** **Associated Samples: 12-22**

Analyte	Blank ID		Maximum ICB/CBB (mg/L)	Blank Action Limit	Sample Identification				
	PB (mg/Kg)				15	20	21		
TOC	50				160 / 290	120 / 290	210 / 290		

**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

**METHOD:** Inorganics, Method See Cover

Reason Code: bl

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

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

Y N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

**Conc. units: mg/Kg Associated Samples: 1-9**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			
TOC	40			
No Qualifiers				

**Conc. units: mg/Kg Associated Samples: All Soil**

Analyte	Blank ID	Maximum ICB/CCB (mg/Kg)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			
TOC		116.0		15 20 21 See PB See PB
T-P		0.0064		See PB

**Conc. units: mg/Kg Associated Samples: 3-6, 12**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			
NO2-N		0.00890		3 4 12 See PB See PB

**Conc. units: mg/Kg Associated Samples: 1-3**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification
	PB (mg/Kg)			
Cl		0.102		
No Qualifiers				

**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

**METHOD:** Inorganics, Method See Cover

Reason Code: bl

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.

**Conc. units: mg/Kg** **Associated Samples: 5, 12**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
Cl	PB (mg/Kg)	0.104				

**Conc. units: mg/Kg** **Associated Samples: 12**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
SO4	PB (mg/Kg)	0.133				

**Conc. units: mg/Kg** **Associated Samples: 13, 16-18**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
Cl	PB (mg/Kg)	0.102				

**Conc. units: mg/Kg** **Associated Samples: 13, 17, 22**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification		
				No Qualifiers		
SO4	PB (mg/Kg)	0.130				

**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

**METHOD:** Inorganics, Method See Cover

Reason Code: bl

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.

**Conc. units: mg/Kg** **Associated Samples: 4, 6-9, 14, 15**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
Cl	PB (mg/Kg)	0.124					

**Conc. units: mg/Kg** **Associated Samples: 4**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
SO4	<del>0-149</del> 0.149						

**Conc. units: mg/Kg** **Associated Samples: 19-22**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
Cl	PB (mg/Kg)	0.114					

**Conc. units: mg/Kg** **Associated Samples: 16, 18**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
SO4	PB (mg/Kg)	0.161					

LDC #: 21991N6  
 SDG #: See Cover

# VALIDATION FINDINGS WORKSHEET

## Blanks

Page: 6 of 6  
 Reviewer: SR  
 2nd Reviewer: LN

**METHOD:** Inorganics, Method See Cover Reason Code: bl

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.

**Conc. units:** mg/Kg **Associated Samples:** 6, 7, 9, 14, 15, 19, 20

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
				No Qualifiers			
SO4	PB (mg/Kg)	0.039					

LDC #: 21191N6  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

Page: 1 of 1  
 Reviewer: OR  
 2nd Reviewer: [Signature]

**METHOD: Inorganics, Method** See Cover  
 Were field blanks identified in this SDG? Y  
 Were target analytes detected in the field blanks? N  
**Blank units:** mg/L **Associated sample units:** mg/Kg  
**Sampling date:** 9/25/09 Soil factor applied 10X except TOC 1X  
**Field blank type:** (circle one) Field Blank / Rinsate / Other **EB**  
 Reason Code: be  
 Associated Samples: 21, 22

Analyte	Blank ID	Action Level	21	22	Sample Identification
Total alkalinity	10				
Bicarbonate alkalinity	1.9				
Ammonia as N	1.9				
TOC (average)	0.016			0.19 / 0.54	
Nitrate as N	0.4		210 / 290		
pH (pH Units)	0.94	94	2.26 J+	2.73 J+	
Total Phosphorus	8.01				
Sulfate	0.011				
Surfactants	1.7				
	0.081	8.1	0.7 / 2.2	0.9 / 2.2	

LDC #: 21191N6  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

Page: 1 of CR  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**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:** mg/L **Associated sample units:** mg/Kg Reason Code: be  
**Sampling date:** 9/25/09 Soil factor applied 10X except TOC 1X  
**Field blank type:** (circle one) Field Blank / Rinsate / Other: (EB) Associated Samples: 12-20

Analyte	Blank ID	Sample Identification												
		11	12	13	14	15	16	17	18	20				
TOC (average)	0.3					160 / 290								
Cl	1.9													
pH (pH Units)	4.08													
Total Phosphorus	0.018													
Sulfate	6.6	660	65.6 J+	49.2 J+	187 J+	550 J+	118 J+	108 J+	247 J+					
Surfactants	0.208	20.8	1.5 / 2.2	0.8 / 2.2	1.3 / 2.4	1.2 / 2.6		0.9 / 2.2					1.0 / 2.9	



**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

METHOD: Inorganics, EPA Method See Cover

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

Reason Code: bf

Blank units: mg/L Associated sample units: mg/Kg

Sampling date: 7/29/09 Soil factor applied: 10x

Field blank type: (circle one) Field Blank / Rinsate / Other:

Associated Samples: 21, 22

Analyte	Blank ID	Action Limit	21	22	Sample Identification
	FB072909-SO (SDG# R0904226)				
NH3-N	1.71	17.1		0.19 / 0.54	
TOC	0.5		210 / 290		
Cl	6.2	620	125 J+	204 J+	
NO3-N	1.02	102	2.26 J+	2.73 J+	
SO4	8.0	800	49.2 J+	78.4 J+	
Surfactants	0.168	16.8	0.7 / 2.2	0.9 / 2.2	
T-Phosphorus	0.007				
pH (pH units)	3.48				

Perchlorate 0.5 mg/L

LDC #: 21191N6  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

Page: 1 of 2  
 Reviewer: GR  
 2nd Reviewer: LR

**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:** mg/L **Associated sample units:** mg/Kg  
**Sampling date:** 8/3/09 Soil factor applied 10X except TOC. 1X  
**Field blank type:** (circle one) Field Blank Rinsate / Other: FB  
 Reason Code: bf  
 Associated Samples: 1-9, 12-20

Analyte	Blank ID	Sample Identification																			
		1	2	3	4	5	6	7	8	9											
Total alkalinity	FB080309-SO (SDG# R0904279) 3.0	300									266 J+										
Bicarbonate alkalinity	3.0	300							297 J+												
Ammonia as N	0.113	11.3																			
TOC (average)	1.2																				
Cl	3.9	390	66.8 J+		29.6 J+				22.6 J+		265 J+					148 J+					
Nitrate as N	0.65	65	1.86 J+	2.38 J+	2.34 J+	4.72 J+			2.63 J+		4.52 J+				4.43 J+	4.06 J+				4.50 J+	
pH (pH Units)	6.48																				
Total Phosphorus	0.015																				
TDS	22																				
Sulfate	1.6																				
Surfactants	0.043	4.3	1.4 / 2.2			0.8 / 2.7			1.4 / 2.1		2.5 J+			2.6 J+		3.6 J+					

Continued on next page...

LDC #: 21191N6  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

Page: 2 of 2  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**METHOD: Inorganics, Method** See Cover  
 N/A Were field blanks identified in this SDG?  
 N/A Were target analytes detected in the field blanks?  
**Blank units:** mg/L **Associated sample units:** mg/Kg  
**Sampling date:** 8/3/09 **Soil factor applied:** 10X except TOC 1X  
**Field blank type:** (circle one) Field Blank / Rinsate / Other: FB Reason Code: bf

Associated Samples: 1-9, 12-20

Analyte	Blank ID	Sample Identification																				
		12	13	14	15	16	17	18	19	20												
Total alkalinity	FB080309-SO (SDG# R0904279)	300																				
Bicarbonate alkalinity	3.0	300																				
Ammonia as N	3.0	300																				
TOC (average)	0.113	11.3	0.19 / 0.54	0.35 / 0.60	0.65 / 0.66																0.29 / 0.72	
Cl	1.2				160 / 290																120 / 290	
Nitrate as N	3.9	390	42.1 J+		548 J+	5.0 J+																
pH (pH Units)	0.65	65	5.10 J+	8.40 J+	2.41 J+	1.90 J+															11.9 J+	
Total Phosphorus	6.48																					
TDS	0.015																					
Sulfate	22																					
Surfactants	1.6																					
	0.043	4.3	0.8 / 2.2	1.3 / 2.4	1.2 / 2.6	0.9 / 2.2																1.0 / 2.9









LDC#: 21991N6  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 1 of 2  
 Reviewer: CP  
 2nd Reviewer: LV

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 ( $\leq 50$ )	Difference	Limits	Qualification (Parent only)
	6	7				
Total Alkalinity	307	323	5			
Bicarbonate Alkalinity	297	309	4			
Carbonate Alkalinity	10	14		4	( $\leq 22$ )	
Chloride	265	259	2			
Nitrate as N	4.52	4.43	2			
Nitrite as N	0.26	0.15		0.11	( $\leq 0.11$ )	
pH (pH Units)	8.42	8.45	0			
Sulfate	214	224	5			
Surfactants	2.5	2.6		0.1	( $\leq 2.2$ )	
TOC	680	460		220	( $\leq 300$ )	
Total Phosphorus	565	536	5			
Chlorate (ug/Kg)	14900	15800	6			
Perchlorate (ug/Kg)	223000	218000	2			



LDC#: 21991N6  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page: 2 of 2  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

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 ( $\leq 50$ )	Difference	Limits	Qualification (Parent only)
	16	17				
Total Alkalinity	327	345	5			
Bicarbonate Alkalinity	314	331	5			
Carbonate Alkalinity	13	14		1	( $\leq 22$ )	
Chloride	5.0	5.0		0	( $\leq 2.2$ )	
Hexavalent Chromium	1.58	0.19U		1.39	( $\leq 0.42$ )	J/U/J/A (fd)
Hexavalent Chromium	1.56	0.19U		1.37	( $\leq 0.42$ )	J/U/J/A (fd)
Nitrate as N	1.90	1.91		0.01	( $\leq 0.55$ )	
pH (pH Units)	9.42	9.45	0			
Sulfate	118	108	9			
Surfactants	0.6U	0.9		0.3	( $\leq 2.2$ )	
TOC	700	730		30	( $\leq 290$ )	
Total Phosphorus	683	708	4			
Chlorate (ug/Kg)	596	582		14	( $\leq 550$ )	
Perchlorate (ug/Kg)	759	541		218	( $\leq 220$ )	