Tronox LLC Facility, 2009 Phase B Investigation, Henderson
Data Validation Reports
LDC #21495

Wet Chemistry

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: May 21, 2009

LDC Report Date: September 21, 2009

Matrix: Water

Parameters: Dissolved Hexavalent Chromium

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0902886

Sample Identification

MC-3B-FILT

Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 218.6 for Dissolved Hexavalent Chromium.

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 were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No hexavalent chromium was found in the initial, continuing and preparation blanks.

Sample MC-3B-FILT was identified as a filter blank. No hexavalent chromium was found in this blank.

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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) were within QC limits.

VII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0902886	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Dissolved Hexavalent Chromium - Data Qualification Summary - SDG R0902886

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0902886	MC-3B-FILT	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Dissolved Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG R0902886

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Dissolved Hexavalent Chromium - Field Blank Data Qualification Summary - SDG R0902886

No Sample Data Qualified in this SDG

LDC #: 21495A6

SDG #: R0902886

Laboratory: Columbia Analytical Services

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 9/16/09
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: (Analyte) Diss. Hexavalent Chromium (EPA Method 218.6)

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: 5/21/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	} MS/Dup from SDG R0903006
V	Duplicates	A	
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	ND	Filter Blank = 1

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: Aq

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

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: May 27 through June 4, 2009

LDC Report Date: October 4, 2009

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903006

Sample Identification

MC-3B
EB052709
M-127B
FB060409
MC-3BMS
MC-3BDUP

Introduction

This data review covers 6 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 353.2 for Nitrite as Nitrogen, EPA 300.1 for Chlorate, EPA Method 120.1 for Conductivity, EPA SW 846 Method 9012A for Cyanide, EPA Method 218.6 for Dissolved Hexavalent Chromium, 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, Standard Method 2540C for Total Dissolved Solids, 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.

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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.

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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
MC-3B EB052709	Bromide	42 days	28 days	J- (all detects) UJ (all non-detects)	A
MC-3B	Cyanide	15 days	14 days	J- (all detects) UJ (all non-detects)	A
MC-3B	Nitrite as N (353.2)	7 days	48 hours	J- (all detects) R (all non-detects)	P
M-127B	Nitrite as N (353.2)	6 days	48 hours	J- (all detects) R (all non-detects)	P
EB052709	pH	50 hours	48 hours	J (all detects) UJ (all non-detects)	P
FB060409	Nitrite as N (9056) Nitrate as N (9056)	48 hours 48 hours	5 days 5 days	J- (all detects) R (all non-detects) J- (all detects) R (all non-detects)	A

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

Sample	Analyte	Finding	Criteria	Flag	A or P
M-127B	Cyanide	Analysis was performed on unpreserved sample (pH was 11 units).	Analysis must be performed on an preserved aliquot at ≥12 pH units.	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

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
5/29/09	CCV (9:17)	Nitrite as N (9056)	112.3 (90-110)	MC-3B EB052709	J+ (all detects)	P
5/29/09	CCV (13:01)	Nitrite as N (9056)	110.7 (90-110)	MC-3B EB052709	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
MB	Alkalinity, total Alkalinity, bicarbonate	1.9 mg/L 1.9 mg/L	All samples in SDG R0903006
ICB/CCB	Alkalinity, total	1.9 mg/L	All samples in SDG R0903006
MB	Total phosphorus	0.01 mg/L	MC-3B EB052709 M-127B
ICB/CCB	Total phosphorus	0.01 mg/L	MC-3B EB052709 M-127B
MB	Chloride Nitrate as N	0.11 mg/L 0.090 mg/L	M-127B
ICB/CCB	Chloride	0.110 mg/L	M-127B
MB	Total phosphorus Chloride	0.015 mg/L 0.06 mg/L	FB060409
ICB/CCB	Total phosphorus Chloride	0.015 mg/L 0.06 mg/L	FB060409

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
EB052709	Alkalinity, total Alkalinity, bicarbonate Total phosphorus	1.9 mg/L 1.9 mg/L 0.01 mg/L	2.0U mg/L 2.0U mg/L 0.05U mg/L
M-127B	Total phosphorus	0.042 mg/L	0.05U mg/L
FB060409	Alkalinity, total Alkalinity, bicarbonate Total phosphorus	1.9 mg/L 1.9 mg/L 0.020 mg/L	2.0U mg/L 2.0U mg/L 0.05U mg/L

Sample EB052709 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
EB052709	5/27/09	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Conductivity pH Total phosphorus	1.9 mg/L 1.9 mg/L 0.3 mg/L 2.47 umhos/cm 5.99 units 0.01 mg/L	MC-3B

Sample FB060409 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
FB060409	6/4/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Conductivity pH Total phosphorus	1.9 mg/L 1.9 mg/L 0.102 mg/L 0.4 mg/L 1.81 umhos/cm 6.08 units 0.020 mg/L	MC-3B M-127B

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

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
MC-3B	Ammonia as N	0.537 mg/L	0.537J+ mg/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
M-127B	Ammonia as N Total phosphorus	0.030 mg/L 0.042 mg/L	0.050U mg/L 0.050U mg/L

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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) were within QC limits.

VII. Surrogates

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.

The project quantitation limits were met with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
MC-3B EB052709 M-127B FB060409	Nitrite as N (9056)	Laboratory reporting limit reported at 0.012 mg/L.	PQL should be reported at 0.010 mg/L per the QAPP.	None	P

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903006	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	Compound	Flag	A or P
MC-3B M-127B	Nitrite as N (353.2)	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 R0903006

SDG	Sample	Analyte	Flag	A or P	Reason
R0903006	MC-3B EB052709	Bromide	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
R0903006	MC-3B	Cyanide	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
R0903006	MC-3B M-127B	Nitrite as N (353.2)	J- (all detects) R (all non-detects)	P	Technical holding times (h)
R0903006	EB052709	pH	J (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0903006	FB060409	Nitrite as N (9056) Nitrate as N (9056)	J- (all detects) R (all non-detects) J- (all detects) R (all non-detects)	A	Technical holding times (h)
R0903006	M-127B	Cyanide	J- (all detects) R (all non-detects)	P	Sample condition (preservation) (pH)
R0903006	MC-3B EB052709	Nitrite as N (9056)	J+ (all detects)	P	Calibration (CCV %R) (c)
R0903006	MC-3B EB052709 M-127B FB060409	Nitrite as N (9056)	None	P	Sample result verification
R0903006	MC-3B EB052709 M-127B FB060409 MC-3BMS MC-3BDUP	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0903006	MC-3B M-127B	Nitrite as N (353.2)	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0903006

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903006	EB052709	Alkalinity, total Alkalinity, bicarbonate Total phosphorus	2.0U mg/L 2.0U mg/L 0.05U mg/L	A	bl
R0903006	M-127B	Total phosphorus	0.05U mg/L	A	bl
R0903006	FB060409	Alkalinity, total Alkalinity, bicarbonate Total phosphorus	2.0U mg/L 2.0U mg/L 0.05U mg/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0903006

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903006	MC-3B	Ammonia as N	0.537J+ mg/L	A	bf
R0903006	M-127B	Ammonia as N Total phosphorus	0.050U mg/L 0.050U mg/L	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 21495B6
SDG #: R0903006
Laboratory: Columbia Analytical Services

Date: 9/26/09
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Nitrite-N, Sulfate (EPA SW846 Method 9056), Nitrite-N (EPA Method 353.2), Chlorate (EPA ~~SW846 Method 9056M~~), Conductivity (EPA Method 120.1), Cyanide (EPA SW846 Method 9012A), Dissolved Hexavalent Chromium (EPA Method 218.6), pH (EPA SW846 Method 9040B), Surfactants (SM5540C), Perchlorate (EPA Method 314.0), Total Phosphorus (EPA Method 365.1), TDS (SM2540C), TSS (SM2540D), TOC (EPA SW846 Method 9060), ~~Cation-Anion Balance Difference, Calculated TDS/EC Ratio, Measured TDS/EC Ratio, Conductivity Ratio, TDS Ratio (SM1030E)~~

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: 5/27/09 - 6/4/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW ~~SW~~	
III.	Blanks	SW	
IV	Surrogate	A	
V	Matrix Spike/Matrix Spike Duplicates	A	3 MS/MSP
VI.	Duplicates	A	
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	SW ~~SW~~	
IX.	Overall assessment of data	SW ~~SW~~	
X.	Field duplicates	N	
XI	Field blanks	SW	Filter Blank=MC-3B-FILT (R0902886), EB=2, FB=4

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

Validated Samples: All

1	MC-3B	11	MS	21		31	
2	EB052709	12		22		32	
3	M-127B	13		23		33	
4	FB060409	14		24		34	
5	MC-3BMS	15		25		35	
6	MC-3BDUP	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 41495B6
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

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

Method: Inorganics (EPA Method See Cover)

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

LDC #: 21495B6
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: MG
2nd Reviewer: [illegible]

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

LDC #: 21495B6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: ✓
2nd reviewer: J

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-4	Aq	(Alk pH Br Cl NO_3 NO_2 (9056) SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4)
1,3	Aq	Alk pH Br Cl NO_3 (NO_2) SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
~5	Aq	Alk pH Br Cl NO_3 NO_2 SO_4 (353.2) NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond (ClO_3) ClO_4
L6	✓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond (ClO_3) ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio

Comments:

LDC #: 24495B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: W
2nd reviewer: [signature]

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

Method:		9056	9012A	353.2	9040B		
Parameters:		Br	CN	NO_2-N	pH		
Technical holding time:		28 days	14 days	48 hours	48 hours		
Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
1, 2	5/27/09	7/8/09	(42 days)				J-/UJ/A (hw)
1	5/27/09		6/11/09	(15 days)			J-/UJ/A (hw)
1	5/27/09			6/3/09	(7 days)		J-/R/P (hw)
3	5/28/09			6/3/09	(6 days)		↓ ↓
2	5/29/09 1400				5/29/09 1600	(50 hrs)	J/UJ/P (hw)

LDC #: 21459B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

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

All circled dates have exceeded the technical holding time.

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

Method:		9056		9012A			
Parameters:		NO_3-N, NO_2-N		CN			
Technical holding time:		48 hrs					
Sample ID	**Sampling date**	**Analysis date**	**Analysis date**	**Analysis date**	**Analysis date**	**Analysis date**	**Qualifier**
4	6/4/09	6/9/09	(5 days)				J-/R/A (H) (water)
3				pH=11 (Z1r)			J-/R/P (pH)

LDC #: 21495B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: MH
2nd Reviewer:

METHOD: Inorganics, EPA Method See cover

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

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

LEVEL IV/D ONLY:

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

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
1	6/3/09	ICV	NO_3-N (6.1 353.2)	88.3	1,3	J-/nJ/P (C)
2	6/3/09	CCV	↓	88.5	↓	↓
3	5/29/09	CCV (9:17)	NO_2-N (9056M)	112.3	1,2	J+/UJ/P (C)
4	5/29/09	CCV (13:01)	↓	110.7	↓	↓

Comments:

LDC #: 21495B6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

METHOD: Inorganics, Method See Cover

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

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB			2	4								
Total Alk	1.9	1.9		1.9 / 2.0	1.9 / 2.0								
Bicar Alk	1.9			1.9 / 2.0	1.9 / 2.0								

Conc. units: mg/L **Associated Samples:** T-P:1-3, Cl, NO3-N:3

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB			2	3								
T-P	0.01	0.01		0.01 / 0.05	0.042 / 0.05								
Cl	0.11	0.110											
NO3-N	0.090		0.90										

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

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB			4									
T-P	0.015	0.015		0.020 / 0.05									
Cl	0.06	0.06											

LDC #: 21495B6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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: 5/27/09 Soil factor applied
Field blank type: (circle one) Field Blank / Rinsate / Other: EB
Associated Samples: 1 (>RL)

Reason Code: be

Analyte	Blank ID	Sample Identification								
	2	Action Level								
Total Alkalinity	1.9									
Bicarbonate Alkalinity	1.9									
TOC (average)	0.3									
Conductivity (umhos/cm)	2.47	24.7								
pH (pH Units)	5.99									
Total Phosphorus	0.01									

LDC #: 21495B6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

METHOD: Inorganics, Method See Cover
(Y) N N/A Were field blanks identified in this SDG?
(N) N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 6/4/09 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: FB Associated Samples: 1,3

Reason Code: bf

Analyte	Blank ID	Sample Identification								
	4	Action Level	1	3						
Total Alkalinity	1.9									
Bicarbonate Alkalinity	1.9									
Ammonia as N	0.102	1.02	0.537 J+	0.030 / 0.050						
TOC (average)	0.4									
Conductivity (umhos/cm)	1.81									
pH (pH Units)	6.08									
Total Phosphorus	0.020			0.042 / 0.050						

LDC #: 21495B6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: MH
2nd Reviewer: Q

METHOD: Inorganics, Method See cover

#	Sample ID	Analyte	Lab Reporting Limit (units)	QAPP limit RDL (units)	Finding	Qualifications
1	1, 2, 3, 4	NO_3-N w/9056	0.012 mg/L	0.010 mg/L	lab limit > QAPP limit	None/P

Comments:

ABVCRDL.6

LDC #: v1495B6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: MH
2nd Reviewer: [signature]

METHOD: Inorganics, Method See Cover

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
1		1, 3	NO_2-N by 353.2	outside HT > 2X	X/(A) (O)

Comments: _____

LDC #: 21459B6
SDG #: see cover

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method see cover

The correlation coefficient (r) for the calibration of ClO4 was recalculated. Calibration date: 4/29/09

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

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

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

Type of analysis	Analyte	Standard	Conc. (ug/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	ClO4	s1	0	0	*0.999654*	0.999656	Y
		s2	1	0.002			
		s3	2	0.004			
		s4	5	0.01			
		s5	10	0.023			
		s6	25	0.058			
ccv Calibration verification	Toc	10	10.1		101	NR	Y
ccv Calibration verification	SO4	6.4	6.326		99	NR	Y
ccv Calibration verification	Cyot	0.500	0.513		103	NR	Y

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

LDC #: 21495B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

METHOD: Inorganics, Method See cover

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

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

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

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

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

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

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Br	0.96	1.00	96	96	Y
5	Matrix spike sample	Cl	(SSR-SR) 23200	20050	111	111	✓
6	Duplicate sample	Chloride	6.71	26.6	13	13	✓

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 #: 14953B0
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Inorganics, Method See cover

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

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

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

Concentration = Recalculation:

Cl = ~~=~~(0.029766 × Area + 0.033898) × DF

Cl = (0.029766 × 218.121 + 0.033898) × 2000 = 12840 mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	1	Total Alk	839	839	Y
		NH_3-N	0.537	0.537	
		Br	1.4	1.4	
		TOC (Avg)	7.5	7.5	
		Cl	12800	12800	
		Conductivity (uMHos/cm)	33100	33100	
		pH (units)	7.48	7.48	
		T-P	9.32	9.32	
		TDS	25900	25900	
		SO_4	4200	4200	
		Surfactants	1.10	1.10	
		Chloride (mg/L)	766	766	

Note: * Br = Raw data from SDG R0903143

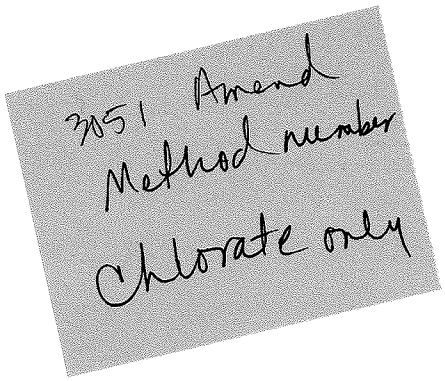
Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Collection Date:	June 1 through June 4, 2009
LDC Report Date:	September 28, 2009
Matrix:	Soil
Parameters:	Wet Chemistry
Validation Level:	Stage 2B
Laboratory:	Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903051

Sample Identification

RSA12-0.5B
RSAI3-0.5B
RSAJ5-0.5B
RSAK5-0.5B
SA76-0.5B
SA76009-0.5B
RSAL3-0.5B
SA100-0.5B
RSAM3-0.5B
RSAM2-0.5B
SA189-0.5B
SA88-0.5B
SA152-0.5B
SA152009-0.5B
RSAJ2-0.5B
RSAJ3-0.5B
SA202-0.5B
RSA12-0.5BMS
RSA12-0.5BMSD
RSA12-0.5BDUP



Introduction

This data review covers 20 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 353.2 for Nitrite as Nitrogen, EPA Method 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, 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

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
6/5/09	CCV	Total organic carbon	89.1 (90-110)	RSA12-0.5B RSAI3-0.5B RSAJ5-0.5B RSAK5-0.5B SA76-0.5B SA76009-0.5B RSAL3-0.5B SA100-0.5B RSAM3-0.5B	J- (all detects) UJ (all non-detects)	P
6/9/09	CCV beginning	Surfactants	112 (90-110)	SA189-0.5B SA88-0.5B SA152-0.5B SA152009-0.5B RSAJ2-0.5B RSAJ3-0.5B SA202-0.5B	J+ (all detects)	P
6/9/09	CCV beginning	Surfactants	115 (90-110)	SA189-0.5B SA88-0.5B SA152-0.5B SA152009-0.5B RSAJ2-0.5B RSAJ3-0.5B SA202-0.5B	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
MB	Total phosphorus	1.9 mg/Kg	RSA12-0.5B

Method Blank ID	Analyte	Concentration	Associated Samples
MB	Total phosphorus	2.3 mg/Kg	RSAI3-0.5B RSAJ5-0.5B RSAK5-0.5B SA76-0.5B SA76009-0.5B RSAL3-0.5B SA100-0.5B RSAM3-0.5B RSAM2-0.5B SA189-0.5B SA88-0.5B SA152-0.5B SA152009-0.5B RSAJ2-0.5B RSAJ3-0.5B SA202-0.5B
ICB/CCB	Total phosphorus	0.0111 mg/L	RSA12-0.5B
ICB/CCB	Total phosphorus	0.0147 mg/L	RSAI3-0.5B RSAJ5-0.5B RSAK5-0.5B SA76-0.5B SA76009-0.5B RSAL3-0.5B SA100-0.5B RSAM3-0.5B RSAM2-0.5B SA189-0.5B SA88-0.5B SA152-0.5B SA152009-0.5B RSAJ2-0.5B RSAJ3-0.5B SA202-0.5B
MB	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Chloride Nitrate as N Surfactants	10 mg/Kg 10 mg/Kg 0.05 mg/Kg 9 mg/Kg 4.5 mg/Kg 1.3 mg/Kg	RSA12-0.5B RSAI3-0.5B RSAJ5-0.5B RSAK5-0.5B SA76-0.5B SA76009-0.5B RSAL3-0.5B SA100-0.5B RSAM3-0.5B RSAM2-0.5B
ICB/CCB	Alkalinity, total Chloride Nitrate as N	1.0 mg/L 0.098 mg/L 0.046 mg/L	RSA12-0.5B RSAI3-0.5B RSAJ5-0.5B RSAK5-0.5B SA76-0.5B SA76009-0.5B RSAL3-0.5B SA100-0.5B RSAM3-0.5B RSAM2-0.5B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Ammonia as N	0.0074 mg/L	RSA12-0.5B RSAI3-0.5B RSAJ5-0.5B RSAK5-0.5B
MB	Alkalinity, total Alkalinity, bicarbonate	11 mg/Kg 11 mg/Kg	SA189-0.5B SA88-0.5B SA152-0.5B SA152009-0.5B RSAJ2-0.5B RSAJ3-0.5B SA202-0.5B
MB	Chloride	1.1 mg/Kg	SA152-0.5B SA152009-0.5B
MB	Chloride	0.94 mg/Kg	SA189-0.5B SA88-0.5B RSAJ2-0.5B RSAJ3-0.5B SA202-0.5B
ICB/CCB	Alkalinity, total Ammonia as N	1.0 mg/L 0.0051 mg/L	SA189-0.5B SA88-0.5B SA152-0.5B SA152009-0.5B RSAJ2-0.5B RSAJ3-0.5B SA202-0.5B
ICB/CCB	Chloride	1.1 mg/L	SA152-0.5B SA152009-0.5B
ICB/CCB	Chloride	0.94 mg/L	SA189-0.5B SA88-0.5B RSAJ2-0.5B RSAJ3-0.5B SA202-0.5B

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
RSA12-0.5B	Ammonia as N Chloride Surfactants	0.52 mg/Kg 19 mg/Kg 0.9 mg/Kg	0.53U mg/Kg 21U mg/Kg 2.1U mg/Kg
RSAI3-0.5B	Surfactants	1.2 mg/Kg	2.1U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAK5-0.5B	Ammonia as N	0.47 mg/Kg	0.54U mg/Kg
SA76-0.5B	Ammonia as N Surfactants	0.27 mg/Kg 1.4 mg/Kg	0.53U mg/Kg 2.1U mg/Kg
SA76009-0.5B	Ammonia as N Surfactants	0.49 mg/Kg 1.5 mg/Kg	0.54U mg/Kg 2.2U mg/Kg
RSAL3-0.5B	Ammonia as N Surfactants	0.17 mg/Kg 1.4 mg/Kg	0.52U mg/Kg 2.1U mg/Kg
SA100-0.5B	Ammonia as N	0.33 mg/Kg	0.51U mg/Kg
RSAM2-0.5B	Ammonia as N	0.37 mg/Kg	0.52U mg/Kg
SA152-0.5B	Ammonia as N	0.06 mg/Kg	0.52U mg/Kg
SA202-0.5B	Ammonia as N	0.16 mg/Kg	0.53U mg/Kg

Sample FB072109-SO (from SDG R0904016) 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
FB072109-SO	7/21/09	Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Sulfate Surfactants	0.191 mg/L 0.5 mg/L 9.7 mg/L 1.76 mg/L 3.36 mg/L 0.01 mg/L 5.5 mg/L 0.159 mg/L	All samples in SDG R0903051

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
RSA12-0.5B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.52 mg/Kg 19 mg/Kg 5.6 mg/Kg 17 mg/Kg 0.9 mg/Kg	0.53U mg/Kg 21U mg/Kg 5.6J+ mg/Kg 21U mg/Kg 2.1U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAI3-0.5B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	1.05 mg/Kg 67 mg/Kg 8.3 mg/Kg 51 mg/Kg 1.2 mg/Kg	1.05J+ mg/Kg 67J+ mg/Kg 8.3J+ mg/Kg 51J+ mg/Kg 2.1U mg/Kg
RSAJ5-0.5B	Ammonia as N Chloride Nitrate as N Sulfate	0.59 mg/Kg 55 mg/Kg 7.5 mg/Kg 236 mg/Kg	0.59J+ mg/Kg 55J+ mg/Kg 7.5J+ mg/Kg 236J+ mg/Kg
RSAK5-0.5B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.47 mg/Kg 164 mg/Kg 11.1 mg/Kg 438 mg/Kg 2.2 mg/Kg	0.54U mg/Kg 164J+ mg/Kg 11.1J+ mg/Kg 438J+ mg/Kg 2.2J+ mg/Kg
SA76-0.5B	Ammonia as N Chloride Nitrate as N Surfactants	0.27 mg/Kg 655 mg/Kg 41.8 mg/Kg 1.4 mg/Kg	0.53U mg/Kg 655J+ mg/Kg 41.8J+ mg/Kg 2.1U mg/Kg
SA76009-0.5B	Ammonia as N Chloride Nitrate as N Surfactants	0.49 mg/Kg 846 mg/Kg 52.2 mg/Kg 1.5 mg/Kg	0.54U mg/Kg 846J+ mg/Kg 52.2J+ mg/Kg 2.2U mg/Kg
RSAL3-0.5B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.17 mg/Kg 24 mg/Kg 7.6 mg/Kg 66 mg/Kg 1.4 mg/Kg	0.52U mg/Kg 24J+ mg/Kg 7.6J+ mg/Kg 66J+ mg/Kg 2.1U mg/Kg
SA100-0.5B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.33 mg/Kg 30 mg/Kg 8.7 mg/Kg 46 mg/Kg 2.4 mg/Kg	0.51U mg/Kg 30J+ mg/Kg 8.7J+ mg/Kg 46J+ mg/Kg 2.4J+ mg/Kg
RSAM3-0.5B	Ammonia as N Chloride Nitrate as N Sulfate	1.72 mg/Kg 756 mg/Kg 6.3 mg/Kg 48 mg/Kg	1.72J+ mg/Kg 756J+ mg/Kg 6.3J+ mg/Kg 48J+ mg/Kg
RSAM2-0.5B	Ammonia as N Nitrate as N Sulfate	0.37 mg/Kg 14.0 mg/Kg 298 mg/Kg	0.52U mg/Kg 14.0J+ mg/Kg 298J+ mg/Kg
SA189-0.5B	Chloride Nitrate as N Sulfate	879 mg/Kg 14.2 mg/Kg 67.0 mg/Kg	879J+ mg/Kg 14.2J+ mg/Kg 67.0J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA88-0.5B	Nitrate as N Surfactants	29.2 mg/Kg 0.9 mg/Kg	29.2J+ mg/Kg 2.1U mg/Kg
SA152-0.5B	Ammonia as N Chloride Nitrate as N Sulfate	0.06 mg/Kg 5.8 mg/Kg 2.85 mg/Kg 26.9 mg/Kg	0.52U mg/Kg 5.8J+ mg/Kg 2.85J+ mg/Kg 26.9J+ mg/Kg
SA152009-0.5B	Chloride Nitrate as N Sulfate	6.4 mg/Kg 3.18 mg/Kg 33.1 mg/Kg	6.4J+ mg/Kg 3.18J+ mg/Kg 33.1J+ mg/Kg
RSAJ2-0.5B	Ammonia as N Nitrate as N	2.49 mg/Kg 26.6 mg/Kg	2.49J+ mg/Kg 26.6J+ mg/Kg
RSAJ3-0.5B	Ammonia as N Nitrate as N	4.22 mg/Kg 14.4 mg/Kg	4.22J+ mg/Kg 14.4J+ mg/Kg
SA202-0.5B	Ammonia as N Nitrate as N Sulfate Surfactants	0.16 mg/Kg 14.1 mg/Kg 396 mg/Kg 1.3 mg/Kg	0.53U mg/Kg 14.1J+ mg/Kg 396J+ mg/Kg 2.1U 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 with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
RSA12-0.5BDUP (All samples in SDG R0903051)	Chlorate	34 (≤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) were within QC limits.

VII. Surrogates

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
RSAJ3-0.5B	Dichloroacetate	72.4 (90-115)	Chlorate	J- (all detects) UJ (all non-detects)	P

VIII. Sample Result Verification and Project Quantitation Limit

The project quantitation limits were met with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
RSA12-0.5B RSAI3-0.5B RSAJ5-0.5B RSAK5-0.5B SA76-0.5B SA76009-0.5B RSAL3-0.5B SA100-0.5B RSAM3-0.5B RSAM2-0.5B	Nitrite as N	Laboratory reporting limit reported at 1.2 mg/Kg.	PQL should be reported at 0.1 mg/Kg per the QAPP.	None	P

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903051	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 with the following exceptions:

Sample	Analyte
SA76-0.5B SA76009-0.5B SA100-0.5B SA189-0.5B SA88-0.5B	Cyanide analysis was not performed for these samples.

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

X. Field Duplicates

Samples SA76-0.5B and SA76009-0.5B and samples SA152-0.5B and SA152009-0.5B 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)	Flag	A or P
	SA76-0.5B	SA76009-0.5B				
Ammonia as N	0.27 mg/Kg	0.49 mg/Kg	-	0.22 (≤0.54)	-	-
Alkalinity, total	258 mg/Kg	323 mg/Kg	22 (≤50)	-	-	-
Alkalinity, Bicarbonate	253 mg/Kg	310 mg/Kg	20 (≤50)	-	-	-
Alkalinity, Carbonate	4 mg/Kg	13 mg/Kg	-	9 (≤22)	-	-
Chloride	655 mg/Kg	846 mg/Kg	25 (≤50)	-	-	-
Hexavalent chromium	0.46 mg/Kg	0.69 mg/Kg	-	0.23 (≤0.42)	-	-
Hexavalent chromium	0.49 mg/Kg	0.68 mg/Kg	-	0.19 (≤0.42)	-	-
Nitrate as N	41.8 mg/Kg	52.2 mg/Kg	22 (≤50)	-	-	-
Nitrite as N	1.3U mg/Kg	2.3 mg/Kg	-	1 (≤5.4)	-	-
pH	8.70 units	9.21 units	6 (≤50)	-	-	-
Sulfate	746 mg/Kg	815 mg/Kg	9 (≤50)	-	-	-
Surfactants	1.4 mg/Kg	1.5 mg/Kg	-	0.1 (≤2.2)	-	-
Total organic carbon	1870 mg/Kg	3580 mg/Kg	-	1710 (≤620)	J (all detects)	A
Total phosphorus	1110 mg/Kg	1140 mg/Kg	3 (≤50)	-	-	-
Chlorate	930000 ug/Kg	832000 ug/Kg	11 (≤50)	-	-	-
Perchlorate	329000 ug/Kg	305000 ug/Kg	8 (≤50)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA152-0.5B	SA152009-0.5B				
Ammonia as N	0.06 mg/Kg	0.05U mg/Kg	-	0.01 (≤0.52)	-	-
Alkalinity, Total	466 mg/Kg	448 mg/Kg	4 (≤50)	-	-	-
Alkalinity, Bicarbonate	437 mg/Kg	419 mg/Kg	4 (≤50)	-	-	-
Alkalinity, Carbonate	29 mg/Kg	29 mg/Kg	-	0 (≤21)	-	-
Chloride	5.8 mg/Kg	6.4 mg/Kg	-	0.6 (≤2.1)	-	-
Nitrate as N	2.85 mg/Kg	3.18 mg/Kg	11 (≤50)	-	-	-
pH	9.85 units	9.91 units	1 (≤50)	-	-	-
Sulfate	26.9 mg/Kg	33.1 mg/Kg	21 (≤50)	-	-	-
Total organic carbon	1750 mg/Kg	3270 mg/Kg	-	1520 (≤640)	J (all detects)	A
Total phosphorus	985 mg/Kg	854 mg/Kg	14 (≤50)	-	-	-
Chlorate	414 ug/Kg	366 ug/Kg	-	48 (≤210)	-	-
Perchlorate	352 ug/Kg	354 ug/Kg	1 (≤50)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R0903051

SDG	Sample	Analyte	Flag	A or P	Reason
R0903051	RSA12-0.5B RSAI3-0.5B RSAJ5-0.5B RSAK5-0.5B SA76-0.5B SA76009-0.5B RSAL3-0.5B SA100-0.5B RSAM3-0.5B	Total organic carbon	J- (all detects) UJ (all non-detects)	P	Calibration (CCV %R) (c)
R0903051	SA189-0.5B SA88-0.5B SA152-0.5B SA152009-0.5B RSAJ2-0.5B RSAJ3-0.5B SA202-0.5B	Surfactants	J+ (all detects)	P	Calibration (CCV %R) (c)
R0903051	RSA12-0.5B RSAI3-0.5B RSAJ5-0.5B RSAK5-0.5B SA76-0.5B SA76009-0.5B RSAL3-0.5B SA100-0.5B RSAM3-0.5B RSAM2-0.5B SA189-0.5B SA88-0.5B SA152-0.5B SA152009-0.5B RSAJ2-0.5B RSAJ3-0.5B SA202-0.5B	Chlorate	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)
R0903051	RSAJ3-0.5B	Chlorate	J- (all detects) UJ (all non-detects)	P	Surrogate recovery (%R) (s)
R0903051	RSA12-0.5B RSAI3-0.5B RSAJ5-0.5B RSAK5-0.5B SA76-0.5B SA76009-0.5B RSAL3-0.5B SA100-0.5B RSAM3-0.5B RSAM2-0.5B	Nitrite as N	None	P	Sample result verification

SDG	Sample	Analyte	Flag	A or P	Reason
R0903051	RSA12-0.5B RSAI3-0.5B RSAJ5-0.5B RSAK5-0.5B SA76-0.5B SA76009-0.5B RSAL3-0.5B SA100-0.5B RSAM3-0.5B RSAM2-0.5B SA189-0.5B SA88-0.5B SA152-0.5B SA152009-0.5B RSAJ2-0.5B RSAJ3-0.5B SA202-0.5B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0903051	SA76-0.5B SA76009-0.5B SA152-0.5B SA152009-0.5B	Total organic carbon	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 R0903051

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903051	RSA12-0.5B	Ammonia as N Chloride Surfactants	0.53U mg/Kg 21U mg/Kg 2.1U mg/Kg	A	bl
R0903051	RSAI3-0.5B	Surfactants	2.1U mg/Kg	A	bl
R0903051	RSAK5-0.5B	Ammonia as N	0.54U mg/Kg	A	bl
R0903051	SA76-0.5B	Ammonia as N Surfactants	0.53U mg/Kg 2.1U mg/Kg	A	bl
R0903051	SA76009-0.5B	Ammonia as N Surfactants	0.54U mg/Kg 2.2U mg/Kg	A	bl
R0903051	RSAL3-0.5B	Ammonia as N Surfactants	0.52U mg/Kg 2.1U mg/Kg	A	bl
R0903051	SA100-0.5B	Ammonia as N	0.51U mg/Kg	A	bl
R0903051	RSAM2-0.5B	Ammonia as N	0.52U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903051	SA152-0.5B	Ammonia as N	0.52U mg/Kg	A	bl
R0903051	SA202-0.5B	Ammonia as N	0.53U mg/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0903051

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903051	RSA12-0.5B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.53U mg/Kg 21U mg/Kg 5.6J+ mg/Kg 21U mg/Kg 2.1U mg/Kg	A	bf
R0903051	RSAI3-0.5B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	1.05J+ mg/Kg 67J+ mg/Kg 8.3J+ mg/Kg 51J+ mg/Kg 2.1U mg/Kg	A	bf
R0903051	RSAJ5-0.5B	Ammonia as N Chloride Nitrate as N Sulfate	0.59J+ mg/Kg 55J+ mg/Kg 7.5J+ mg/Kg 236J+ mg/Kg	A	bf
R0903051	RSAK5-0.5B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.54U mg/Kg 164J+ mg/Kg 11.1J+ mg/Kg 438J+ mg/Kg 2.2J+ mg/Kg	A	bf
R0903051	SA76-0.5B	Ammonia as N Chloride Nitrate as N Surfactants	0.53U mg/Kg 655J+ mg/Kg 41.8J+ mg/Kg 2.1U mg/Kg	A	bf
R0903051	SA76009-0.5B	Ammonia as N Chloride Nitrate as N Surfactants	0.54U mg/Kg 846J+ mg/Kg 52.2J+ mg/Kg 2.2U mg/Kg	A	bf
R0903051	RSAL3-0.5B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.52U mg/Kg 24J+ mg/Kg 7.6J+ mg/Kg 66J+ mg/Kg 2.1U mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903051	SA100-0.5B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.51U mg/Kg 30J+ mg/Kg 8.7J+ mg/Kg 46J+ mg/Kg 2.4J+ mg/Kg	A	bf
R0903051	RSAM3-0.5B	Ammonia as N Chloride Nitrate as N Sulfate	1.72J+ mg/Kg 756J+ mg/Kg 6.3J+ mg/Kg 48J+ mg/Kg	A	bf
R0903051	RSAM2-0.5B	Ammonia as N Nitrate as N Sulfate	0.52U mg/Kg 14.0J+ mg/Kg 298J+ mg/Kg	A	bf
R0903051	SA189-0.5B	Chloride Nitrate as N Sulfate	879J+ mg/Kg 14.2J+ mg/Kg 67.0J+ mg/Kg	A	bf
R0903051	SA88-0.5B	Nitrate as N Surfactants	29.2J+ mg/Kg 2.1U mg/Kg	A	bf
R0903051	SA152-0.5B	Ammonia as N Chloride Nitrate as N Sulfate	0.52U mg/Kg 5.8J+ mg/Kg 2.85J+ mg/Kg 26.9J+ mg/Kg	A	bf
R0903051	SA152009-0.5B	Chloride Nitrate as N Sulfate	6.4J+ mg/Kg 3.18J+ mg/Kg 33.1J+ mg/Kg	A	bf
R0903051	RSAJ2-0.5B	Ammonia as N Nitrate as N	2.49J+ mg/Kg 26.6J+ mg/Kg	A	bf
R0903051	RSAJ3-0.5B	Ammonia as N Nitrate as N	4.22J+ mg/Kg 14.4J+ mg/Kg	A	bf
R0903051	SA202-0.5B	Ammonia as N Nitrate as N Sulfate Surfactants	0.53U mg/Kg 14.1J+ mg/Kg 396J+ mg/Kg 2.1U mg/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495C6
SDG #: R0903051
Laboratory: Columbia Analytical Services

Date: 9/20/09
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Nitrite-N, Sulfate (EPA SW846 Method 9056), Chlorate (EPA ~~SW846 Method 9056M~~), Cyanide (EPA SW846 Method 9012A), ~~Dissolved Hexavalent Chromium (EPA Method 218.6)~~, Hexavalent Chromium (EPA SW846 Method 7199), 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~~), TDS (SM2540C), TSS (SM2540D) 300.1 Nitrate as N (EPA 353.2)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/1/09 – 6/4/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW	
III.	Blanks	SW	
IV	Matrix Spike/Matrix Spike Duplicates	A SW	
V	Duplicates	SW	
VI.	Laboratory control samples	A	LCS
VII.	Sample result verification	SW	
VIII.	Overall assessment of data	SW	
IX.	Field duplicates	SW	(5,6) (13,14)
X.	Field blanks	SW	FB = FB 070209-SO (SDG R0904016)

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: SW

1	RSA12-0.5B	11	SA189-0.5B	21	~~SA189-0.5B MS~~	31	RSAK5-0.5B MS
2	RSAI3-0.5B	12	SA88-0.5B	22	↓ Dup	32	↓ Dup
3	RSAJ5-0.5B	13	SA152-0.5B	23	RSAI3-0.5B MS	33	RSAM3-0.5B MS
4	RSAK5-0.5B	14	SA152009-0.5B	24	↓ Dup	34	↓ Dup
5	SA76-0.5B	15	RSAJ2-0.5B	25	SA202-0.5B MS	35	MB
6	SA76009-0.5B	16	RSAJ3-0.5B	26	↓ Dup	36	
7	RSAL3-0.5B	17	SA202-0.5B	27	RSAJ5-0.5B Dup	37	
8	SA100-0.5B	18	RSA12-0.5BMS	28	SA76-0.5B Dup	38	
9	RSAM3-0.5B	19	RSA12-0.5BMSD	29	RSAL3-0.5B MS	39	MB
10	RSAM2-0.5B	20	RSA12-0.5BDUP	30	↓ Dup	40	

Notes: Surrogates = SW

LDC #: 21495C6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

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

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-17	Soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
1-4,7,9,10,13-17	Soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
18-20	Soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
18,20		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
21,22		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
23,24		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
25,26		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
20,24,27,28		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
29,30		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
31,32		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
33,34		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 21495C6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: MH
2nd Reviewer:

METHOD: Inorganics, EPA Method See cover

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

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

LEVEL IV/D ONLY:

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

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
1	6/5/09	CCV	TOC	89.1	1-9, ~~22, 24~~	J-/UJ/P (C)
2	6/9/09	CCV (beginning)	~~Surfact~~ Surfactants	112	11-17	J+/UJ/P (C)
2	↓	CCV (closing)	↓	115	↓	↓

Comments:

LDC #: 21495C6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer:
2nd Reviewer: amy

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

M N N/A Were all samples associated with a given method blank?
S 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:** T-P*1: 1, T-P*2:2-17 (>RL)

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB												
T-P*1	1.9	0.0111											
T-P*2	2.3	0.0147											

Conc. units: mg/Kg **Associated Samples:** 1-10 except ICB/CCB: NH3-N: 1-4

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB			1	2	4	5	6	7	8	10		
Total Alk	10	1.0											
Bicarb. Alk	10												
NH3-N	0.05	0.0074		0.52 / 0.53		0.47 / 0.54	0.27 / 0.53	0.49 / 0.54	0.17 / 0.52	0.33 / 0.51	0.37 / 0.52		
Cl	9	0.098		19 / 21									
NO3-N	4.5	0.046											
Surfactants	1.3			0.9 / 2.1	1.2 / 2.1		1.4 / 2.1	1.5 / 2.2	1.4 / 2.1				

LDC #: 21495C6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: W
2nd Reviewer: L

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?
N 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: 11-17 except Cl*1: ICB/CCB: 13,14, Cl*2:11,12,15-17

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB			13	17								
Total AlK	11	1.0											
Bicarb. AlK	11												
Cl*1	1.1	0.112											
Cl*2	0.94	0.098											
NH3-N		0.0051		0.06 / 0.52	0.16 / 0.53								

LDC #: 21495C6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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?

Reason Code: bf

Blank units: mg/L **Associated sample units:** mg/Kg
Sampling date: 7/21/09 Soil factor applied 10X
Field blank type: (circle one) Field Blank / Rinsate / Other: FB

Associated Samples: All ~~Soil~~ W

Analyte	Blank ID	Sample Identification									
	FB072109-SO	Action Level	1	2	3	4	5	6	7	8	9
Ammonia as N	0.191	19.1	0.52 / 0.53	1.05 J+	0.59 J+	0.47 / 0.54	0.27 / 0.53	0.49 / 0.54	0.17 / 0.52	0.33 / 0.51	1.72 J+
TOC (average)	0.5										
Cl	9.7	970	19 / 21	67 J+	55 J+	164 J+	655 J+	846 J+	24 J+	30 J+	756 J+
Nitrate as N	1.76	176	5.6 J+	8.3 J+	7.5 J+	11.1 J+	41.8 J+	52.2 J+	7.6 J+	8.7 J+	6.3 J+
pH (pH Units)	3.36										
Total Phosphorus	0.01										
Sulfate	5.5	550	17 / 21	51 J+	236 J+	438 J+			66 J+	46 J+	48 J+
Surfactants	0.159	15.9	0.9 / 2.1	1.2 / 2.1		2.2 J+	1.4 / 2.1	1.5 / 2.2	1.4 / 2.1	2.4 J+	

Analyte	Blank ID	Sample Identification									
	FB072109-SO	Action Level	10	11	12	13	14	15	16	17	
Ammonia as N	0.191	19.1	0.37 / 0.52			0.06 / 0.52		2.49 J+	4.22 J+	0.16 / 0.53	
TOC (average)	0.5										
Cl	9.7	970		879 J+		5.8 J+	6.4 J+				
Nitrate as N	1.76	176	14.0 J+	14.2 J+	29.2 J+	2.85 J+	3.18 J+	26.6 J+	14.4 J+	14.1 J+	
pH (pH Units)	3.36										
Total Phosphorus	0.01										
Sulfate	5.5	550	298 J+	67.0 J+		26.9 J+	33.1 J+			396 J+	
Surfactants	0.159	15.9			0.9 / 2.1					1.3 / 2.1	

LDC #: 21495C6
SDG #: See cover

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

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

METHOD: Chlorate (EPA 300.1)
Are surrogates required by the method? Yes ✓ or No____.
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
(Y) N N/A Were surrogates spiked into all samples and blanks?
Y (N) N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Date	Lab ID/Reference	Column	Surrogate Compound	%R (Limits)	Associated Samples	Qualifications
1		16	[illegible]	A	72.4 (90-115)		J-/UJ/P (S)
					( )		
					( )		
					( )		
					( )		
					( )		
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					( )		
					( )		

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	Dichloroacetate			
B				

LDC #: 21495C6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

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

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

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

(Y) N N/A Was a duplicate sample analyzed for each matrix in this SDG? 20%

Y (N) N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤ ~~35%~~ for soil samples? If no, see qualifications below. A control limit of ±R.L. (±2X R.L for soil) was used for sample values that were <5X the R.L., including the case when only one of the duplicate sample values was <5X R.L.. If field blanks were used for laboratory duplicates, note in the Overall Assessment.

LEVEL IV ONLY:

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

#	Duplicate ID	Matrix	Analyte	RPD (Limits)	Difference (Limits)	Associated Samples	Qualifications
1	20	Soil	CrO4	34 (≤20)		All	J/UJ/A (ed)
2	~~32~~	~~Soil~~	~~T-P~~	~~40~~		2-17	~~J/UJ/A~~

Comments:

LDC #: 21495E6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: MM
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

#	Sample ID	Analyte	Lab Reporting Limit (units)	~~RDL (units)~~ MRL	Finding	Qualifications
1	1-10 ~~All Soil~~	NO_2-N	1.2 mg/kg	0.1 mg/kg	lab limit > MRL limit	un/p
2	~~All All~~	NO_2-N	~~0.01 mg/L~~	~~0.12 mg/L~~	↓	↓ un

Comments: _____

LDC #: 41495C6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: MH
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
1		5,6,8,11,12	CN was not analyzed due to a laboratory error		Tech.

Comments: _____

LDC#: 21495C6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: L
2nd Reviewer: [illegible]

Inorganics, Method See Cover

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

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	5	6				
Ammonia as N	0.27	0.49		0.22	(≤0.54)	
Total Alkalinity	258	323	22			
Bicarbonate Alkalinity	253	310	20			
Carbonate Alkalinity	4	13		9	(≤22)	
Chloride	655	846	25			
Hexavalent Chromium	0.46	0.69		0.23	(≤0.42)	
Hexavalent Chromium	0.49	0.68		0.19	(≤0.42)	
Nitrate as N	41.8	52.2	22			
Nitrite as N	1.3U	2.3		1	(≤5.4)	
pH (pH Units)	8.70	9.21	6			
Sulfate	746	815	9			
Surfactants	1.4	1.5		0.1	(≤2.2)	
TOC	1870	3580		1710	(≤620)	J det / A (fd)
Total Phosphorus	1110	1140	3			
Chlorate (ug/Kg)	930000	832000	11			
Perchlorate (ug/Kg)	329000	305000	8			

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	13	14				
Ammonia as N	0.06	0.05U		0.01	(≤0.52)	

LDC#: 21495C6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer:
2nd Reviewer:

Inorganics, Method See Cover

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

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	13	14				
Total Alkalinity	466	448	4			
Bicarbonate Alkalinity	437	419	4			
Carbonate Alkalinity	29	29		0	(≤21)	
Chloride	5.8	6.4		0.6	(≤2.1)	
Nitrate as N	2.85	3.18	11			
pH (pH Units)	9.85	9.91	1			
Sulfate	26.9	33.1	21			
TOC	1750	3270		1520	(≤640)	J det / A (fd)
Total Phosphorus	985	854	14			
Chlorate (ug/Kg)	414	366		48	(≤210)	
Perchlorate (ug/Kg)	352	354	1			

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Collection Date:	June 9 through June 16, 2009
LDC Report Date:	September 29, 2009
Matrix:	Water
Parameters:	Wet Chemistry
Validation Level:	Stage 2B
Laboratory:	Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903243

Sample Identification

H-28AB
AW-BW-02B
M-142B
M-130B
M-29B

Introduction

This data review covers 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 353.2 for Nitrite as Nitrogen, EPA 300.1 for Chlorate, EPA Method 120.1 for Conductivity, EPA SW 846 Method 9012A for Cyanide, EPA Method 218.6 for Dissolved Hexavalent Chromium, 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, Standard Method 2540C for Total Dissolved Solids, 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.

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.

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

Sample	Analyte	Finding	Criteria	Flag	A or P
H-28AB	Cyanide	Analysis was performed on unpreserved sample (pH was 10 units).	Analysis must be performed on a preserved aliquot at ≥12 pH units.	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

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

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
7/2/09	CCV (22:09)	Bromide	174 (90-110)	M-29B	R (all detects)	P
6/13/09	CCV beginning	Surfactants	114 (90-110)	M-142B	J+ (all detects)	P
6/13/09	CCV closing	Surfactants	114 (90-110)	M-142B	J+ (all detects)	P
6/17/09	CCV closing	Surfactants	89 (90-110)	M-29B	J- (all detects) UJ (all non-detects)	P

III. Blanks

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

Method Blank ID	Analyte	Concentration	Associated Samples
MB	Alkalinity, total Alkalinity, bicarbonate	1.0 mg/L 1.0 mg/L	All samples in SDG R0903243
ICB/CCB	Alkalinity, total	1.0 mg/L	All samples in SDG R0903243

Method Blank ID	Analyte	Concentration	Associated Samples
MB	Bromide	0.08 mg/L	H-28AB
MB	Bromide	0.06 mg/L	M-29B
MB	Total phosphorus	0.011 mg/L	H-28AB AW-BW-02B M-142B M-130B
MB	Total phosphorus	0.013 mg/L	M-29B
ICB/CCB	Total phosphorus	0.011 mg/L	H-28AB AW-BW-02B M-142B M-130B
ICB/CCB	Total phosphorus	0.013 mg/L	M-29B
MB	Chloride	0.1 mg/L	M-142B M-130B
ICB/CCB	Chloride	0.097 mg/L	M-142B M-130B
MB	Nitrate as N	0.066 mg/L	M-130B
MB	Chloride	0.1 mg/L	M-29B

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
H-28AB	Bromide	0.9 mg/L	1.0U mg/L
M-29B	Bromide	1 mg/L	1.0U mg/L

Sample FB060409 (from SDG R0903006) 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
FB060409	6/4/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Conductivity pH Total phosphorus	1.9 mg/L 1.9 mg/L 0.102 mg/L 0.4 mg/L 1.81 umhos/cm 6.08 units 0.020 mg/L	H-28AB AW-BW-02B M-142B M-130B

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

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
H-28AB	Ammonia as N	0.325 mg/L	0.325J+ mg/L
AW-BW-02B	Ammonia as N	0.015 mg/L	0.050U mg/L
M-142B	Ammonia as N	0.097 mg/L	0.097J+ mg/L
M-130B	Ammonia as N	0.709 mg/L	0.709J+ mg/L

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

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

VI. Laboratory Control Samples

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

VII. Surrogates

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 R0903243	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 R0903243

SDG	Sample	Analyte	Flag	A or P	Reason
R0903243	H-28AB	Cyanide	J- (all detects) R (all non-detects)	P	Sample condition (preservation) (pH)
R0903243	M-29B	Bromide	R (all detects)	P	Calibration (CCV %R) (c)
R0903243	M-142B	Surfactants	J+ (all detects)	P	Calibration (CCV %R) (c)
R0903243	M-29B	Surfactants	J- (all detects) UJ (all non-detects)	P	Calibration (CCV %R) (c)
R0903243	H-28AB AW-BW-02B M-142B M-130B M-29B	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 R0903243

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903243	H-28AB	Bromide	1.0U mg/L	A	bl
R0903243	M-29B	Bromide	1.0U mg/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0903243

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903243	H-28AB	Ammonia as N	0.325J+ mg/L	A	bf
R0903243	AW-BW-02B	Ammonia as N	0.050U mg/L	A	bf
R0903243	M-142B	Ammonia as N	0.097J+ mg/L	A	bf
R0903243	M-130B	Ammonia as N	0.709J+ mg/L	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495D6
SDG #: R0903243
Laboratory: Columbia Analytical Services

Date: 9/26/09
Page: 1 of 11
Reviewer: cw
2nd Reviewer:

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Nitrite-N (EPA Method 353.2), Chlorate (EPA Method 300.1), Conductivity (EPA Method 120.1), Cyanide (EPA SW846 Method 9012A), Dissolved Hexavalent Chromium (EPA Method 218.6), pH (EPA SW846 Method 9040B), Surfactants (SM5540C), Perchlorate (EPA Method 314.0), Total Phosphorus (EPA Method 365.1), TDS (SM2540C), TSS (SM2540D), TOC (EPA SW846 Method 9060), ~~Cation-Anion Balance Difference, Calculated TDS/EC Ratio, Measured TDS/EC Ratio, Conductivity Ratio, TDS Ratio (SM1030E)~~

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 ~~SW~~	Sampling dates: 6/9/09 - 6/16/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW	
III.	Blanks	SW	
IV	Surrogate	A	
V	Matrix Spike/Matrix Spike Duplicates	N	3 Client specific
VI.	Duplicates	N	
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	SW	Filter Blank=MC-3B-FILT (R0902886), FB=FB060409 (R0903006)

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

Validated Samples: All

1	H-28AB	11	MB	21		31	
2	AW-BW-02B	12		22		32	
3	M-142B	13		23		33	
4	M-130B	14		24		34	
5	M-29B	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 21495D4

SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1

Reviewer: [initials]

2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-5	Aq	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
1-4	↓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio

Comments:

LDC #: 14958b
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: W
2nd reviewer:

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:		9012A					
Parameters:		CN					
Technical holding time:							
Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
1		pH=10	(7-12)				J-/k/p (pH)

LDC #: 21495B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: MH
2nd Reviewer:

METHOD: Inorganics, EPA Method See cover

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

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

LEVEL IV/D ONLY:

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

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
1	7/2/09	ccv (2209)	Br	114	✓ * 5	R J+/P (C)
2	6/13/09	~~Surfactants~~ ccv (bigsky)	surfactants	114	3	J+ J+/P (C)
3	6/13/09	ccv (closky)	↓	114	↓	↓ ↓
4	6/17/09	ccv (closky)	Surfactant	89	5	J-/UJ/P (C)

Comments:

LDC #: 21495D6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: [illegible]
2nd Reviewer:

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?

(N) 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 (>RL)

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB												
Total Alk	1.0	1.0											
Bicar Alk	1.0												

Conc. units: mg/L **Associated Samples:** Br*1:1, Br*2: 5

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB			1	5								
Br*1	0.08			0.9 / 1.0									
Br*2	0.06				1 / 1.0								

Conc. units: mg/L **Associated Samples:** T-P*1:1-4, T-P*2:5 (ND or >RL)

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB												
T-P*1	0.011	0.011											
T-P*2	0.013	0.013											

Conc. units: mg/L **Associated Samples:** 3,4 (>RL)

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB												
Cl	0.1	0.097											

LDC #: 21495D6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer:
2nd Reviewer:

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:** 4 (>10X)

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB												
NO3-N	0.066		0.66										

Conc. units: mg/L **Associated Samples:** 5 (>RL)

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB												
Cl	0.1												

LDC #: 21495D6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer:

METHOD: Inorganics, Method See Cover
(Y) N N/A Were field blanks identified in this SDG?
(Y) N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 6/4/09 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: FB Associated Samples: 1-4

Reason Code: bf

Analyte	Blank ID	Sample Identification								
	FB060409	Action Level	1	2	3	4				
Total Alkalinity	1.9									
Bicarbonate Alkalinity	1.9									
Ammonia as N	0.102	1.02	0.325 J+	0.015 / 0.050	0.097 J+	0.709 J+				
TOC (average)	0.4									
Conductivity (umhos/cm)	1.81									
pH (pH Units)	6.08									
Total Phosphorus	0.020									

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 17 through June 24, 2009

LDC Report Date: September 28, 2009

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903404

Sample Identification

M-78B
M-128B
H-38B
M-19B
M-19BRE
M-34B
M-34BRE
M-125B
M-22AB
M-17AB
M-125BMS
M-125BDUP
M-125BTRP

Introduction

This data review covers 13 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 353.2 for Nitrite as Nitrogen, EPA 300.1 for Chlorate, EPA Method 120.1 for Conductivity, EPA SW 846 Method 9012A for Cyanide, EPA Method 218.6 for Dissolved Hexavalent Chromium, 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, Standard Method 2540C Total Dissolved Solids, 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.

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-19BRE	Nitrate as N	53 hours	48 hours	J- (all detects) UJ (all non-detects)	A
M-34BRE	Nitrate as N	48.75 hours	48 hours	J- (all detects) UJ (all non-detects)	A
H-38B	Hexavalent chromium	24.5 hours	24 hours	J- (all detects) UJ (all non-detects)	P
M-19B	Hexavalent chromium	75.25 hours	24 hours	J- (all detects) R (all non-detects)	P
M-34B	Hexavalent chromium	72.5 hours	24 hours	J- (all detects) R (all non-detects)	P

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

Sample	Analyte	Finding	Criteria	Flag	A or P
M-125B	Cyanide	Analysis was performed on unpreserved sample (pH was 7 units).	Analysis must be performed on a preserved aliquot at ≥12 pH units.	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

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

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
7/2/09	CCV (22:09)	Bromide	174 (90-110)	M-19B	R (all detects)	P
6/25/09	CCV beginning	Surfactants	112 (90-110)	M-22AB M-17AB	J+ (all detects)	P

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
6/25/09	CCV closing	Surfactants	112 (90-110)	M-22AB M-17AB	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
MB	Alkalinity, total Alkalinity, bicarbonate	1.0 mg/L 1.0 mg/L	M-78B
ICB/CCB	Alkalinity, total	1.0 mg/L	M-78B M-128B H-38B M-19B M-34B M-125B M-22AB M-17AB
MB	Total dissolved solids	7 mg/L	M-78B M-128B H-38B M-19B M-34B
MB	Total phosphorus	0.013 mg/L	M-78B M-128B H-38B
MB	Total phosphorus	0.008 mg/L	M-19B M-34B M-125B M-22AB M-17AB
ICB/CCB	Total phosphorus	0.013 mg/L	M-78B M-128B H-38B
ICB/CCB	Total phosphorus	0.008 mg/L	M-19B M-34B M-125B M-22AB M-17AB

Method Blank ID	Analyte	Concentration	Associated Samples
MB	Chloride Nitrate as N	0.1 mg/L 0.063 mg/L	M-78B
MB	Bromide	0.06 mg/L	M-19B
MB	Chloride	0.1 mg/L	M-19B M-34B
ICB/CCB	Chloride	0.1 mg/L	M-19B M-34B
ICB/CCB	Nitrate as N	0.062 mg/L	M-19BRE M-34BRE
ICB/CCB	Chloride	0.095 mg/L	M-125B

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-78B	Total phosphorus	0.032 mg/L	0.050U mg/L
M-19B	Total phosphorus Bromide	0.022 mg/L 0.9 mg/L	0.050U mg/L 1.0U mg/L
M-34B	Total phosphorus	0.032 mg/L	0.050U mg/L
M-125B	Total phosphorus	0.032 mg/L	0.050U mg/L
M-22AB	Total phosphorus	0.044 mg/L	0.050U mg/L
M-17AB	Total phosphorus	0.037 mg/L	0.050U mg/L

Sample FB060409 (from SDG R0903006) 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
FB060409	6/4/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Conductivity pH Total phosphorus	1.9 mg/L 1.9 mg/L 0.102 mg/L 0.4 mg/L 1.81 umhos/cm 6.08 units 0.020 mg/L	M-78B M-128B H-38B M-125B

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

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-78B	Total phosphorus	0.032 mg/L	0.050U mg/L
M-128B	Ammonia as N	0.047 mg/L	0.050U mg/L
H-38B	Ammonia as N	0.090 mg/L	0.090J+ mg/L
M-125B	Ammonia as N Total organic carbon Total phosphorus	0.008 mg/L 0.8 mg/L 0.032 mg/L	0.050U mg/L 1.0U mg/L 0.050U mg/L

IV. Matrix Spike/Matrix Spike Duplicates

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

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
M-125BMS (M-78B M-128B H-38B M-125B)	Total organic carbon	69 (75-125)	J- (all detects) UJ (all non-detects)	A
M-125BMS (M-78B M-128B H-38B M-125B)	Cyanide	0 (75-125)	J- (all detects) R (all non-detects)	A

V. Duplicates/Triplicates

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

VI. Laboratory Control Samples

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

VII. Surrogates

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 R0903404	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	Compound	Flag	A or P
M-19BRE M-34BRE	Nitrate as N	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 R0903404

SDG	Sample	Analyte	Flag	A or P	Reason
R0903404	M-19BRE M-34BRE	Nitrate as N	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
R0903404	H-38B	Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0903404	M-19B M-34B	Hexavalent chromium	J- (all detects) R (all non-detects)	P	Technical holding times (h)
R0903404	M-125B	Cyanide	J- (all detects) R (all non-detects)	P	Sample condition (preservation) (ph)
R0903404	M-19B	Bromide	R (all detects)	P	Calibration (CCV %R) (c)
R0903404	M-22AB M-17AB	Surfactants	J+ (all detects)	P	Calibration (CCV %R) (c)
R0903404	M-78B M-128B H-38B M-125B	Total organic carbon	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0903404	M-78B M-128B H-38B M-125B	Cyanide	J- (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0903404	M-78B M-128B H-38B M-19B M-19BRE M-34B M-34BRE M-125B M-22AB M-17AB	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0903404	M-19BRE M-34BRE	Nitrate as N	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0903404

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903404	M-78B	Total phosphorus	0.050U mg/L	A	bl
R0903404	M-19B	Total phosphorus Bromide	0.050U mg/L 1.0U mg/L	A	bl
R0903404	M-34B	Total phosphorus	0.050U mg/L	A	bl
R0903404	M-125B	Total phosphorus	0.050U mg/L	A	bl
R0903404	M-22AB	Total phosphorus	0.050U mg/L	A	bl
R0903404	M-17AB	Total phosphorus	0.050U mg/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0903404

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903404	M-78B	Total phosphorus	0.050U mg/L	A	bf
R0903404	M-128B	Ammonia as N	0.050U mg/L	A	bf
R0903404	H-38B	Ammonia as N	0.090J+ mg/L	A	bf
R0903404	M-125B	Ammonia as N Total organic carbon Total phosphorus	0.050U mg/L 1.0U mg/L 0.050U mg/L	A	bf

LDC #: 21495E6
SDG #: R0903404
Laboratory: Columbia Analytical Services

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 9/26/09
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Nitrite-N (EPA Method 353.2), Chlorate (EPA Method 300.1), Conductivity (EPA Method 120.1), Cyanide (EPA SW846 Method 9012A), Dissolved Hexavalent Chromium (EPA Method 218.6), pH (EPA SW846 Method 9040B), Surfactants (SM5540C), Perchlorate (EPA Method 314.0), Total Phosphorus (EPA Method 365.1), TDS (SM2540C), TSS (SM2540D), TOC (EPA SW846 Method 9060), ~~Cation-Anion Balance Difference,~~ Calculated TDS/EC Ratio, Measured ~~TDS/EC Ratio, Conductivity Ratio, TDS Ratio (SM1030E)~~

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 6/17/09 - 6/24/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW	
III.	Blanks	SW	
IV	Surrogate	A	
V	Matrix Spike/Matrix Spike Duplicates	SW	MS / Dup / Triplicates
VI.	Duplicates	A	Dup: T-P <5X RL, difference <RL
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	~~SW~~ N	
IX.	Overall assessment of data	SW	
X.	Field duplicates	N	
XI.	Field blanks	SW	Filter Blank=MC-3B-FILT (R0902886), FB=FB060409 (R0903006)

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: Aq

1 ✓	M-78B	11	M-125BMS	21	MB	31	
2 ✓	M-128B	12	M-125BDUP	22		32	
3 ✓	H-38B	13	M-125BTRP	23		33	
4	M-19B	14		24		34	
5	M-19B~~DL~~ RE	15		25		35	
6	M-34B	16		26		36	
7	M-34B~~DL~~ RE	17		27		37	
8 ✓	M-125B	18		28		38	
9	M-22AB	19		29		39	
10	M-17AB	20		30		40	

Notes:

LDC #: 21495E6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

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

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-4,6,8-10	Aq	(Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4)
5,7	Aq	Alk pH Br Cl (NO_3) NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
11,12	Aq	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 (ClO_4)
11	↓	(Alk) pH Br Cl NO_3 NO_2 SO_4 (NH_3) (TOC) (CN) Cr^{6+} (T-P) (MBAS) TDS TSS Cond ClO_3 ClO_4
12	↓	(Alk) (pH) Br Cl NO_3 NO_2 SO_4 (NH_3) (TOC) (CN) Cr^{6+} (T-P) (MBAS) (TDS) TSS (Cond) ClO_3 ClO_4
13	↓	Alk (pH) Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS (Cond) ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
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		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio

Comments:

LDC #: 21495Z6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

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

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

Method:		9056		218.6			
Parameters:		NO_3-N		CrVI			
Technical holding time:		48hr		24hr* (not preserved)			
Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
5	6/19/09 910	6/22/09 1408	(53hr)				J-/UJ/A (h)
7	6/19/09 1140	6/22/09 1205	(48.75hr)				↓ (new)
3	6/18/09 1440		6/19/09 1306	(24.5hr) (pH=8.76)			J-/UJ/P (h)
4	6/19/09 910		6/22/09 1345 pH=8.52		(75.5hr)		J-/R/P (h)
6	6/19/09 1140		6/22/09 1414 pH=8.76		(72.5hr)		↓ ↓

LDC #: 31495B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: MG
2nd reviewer: [illegible]

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

Method:	9012A					
Parameters:	CN					
Technical holding time:						

Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
8	6/23/09	pH=7 (2 hr)					J-/R/P (pH)

LDC #: 31495C6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Calibration

Reviewer: MH
2nd Reviewer:

METHOD: Inorganics, EPA Method See cover

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

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

LEVEL IV/D ONLY:

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

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
1	6/18/09	ICV	NO_3-N	89.2	1	~~J-/UJ/P (C)~~
2	6/18/09	CCV (1558)	↓	87.3	↓	↓
3	6/20/09	CCV (1143)	↓	87.7	4, 6	↓
4	↓	~~CCV (1149)~~	↓	~~87.8~~	↓	↓
5	7/2/09	CCV (0309)	Br	154	4	~~R J-~~ R J-/P (C)
6	6/25/09	CCV (beginning)	Sulfate, TS	112	9, 10	J+ J+/P (C)
7	↓	↓ (closing)	↓	112	↓	↓

Comments:

LDC #: 21495E6
SDG #: See Cover

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:** MB:1, ICB/CCB:1-4,6,8-10 (>RL)

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB												
Total Alk	1.0	1.0											
Bicar Alk	1.0												

Conc. units: mg/L **Associated Samples:** 1-4,6 (>RL)

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB												
TDS	7												

Conc. units: mg/L **Associated Samples:** T-P*1:1-3, T-P*2: 4,6,8-10

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB			1	4	6	8	9	10				
T-P*1	0.013	0.013		0.032 / 0.050									
T-P*2	0.008	0.008			0.022 / 0.050	0.032 / 0.050	0.032 / 0.050	0.044 / 0.050	0.037 / 0.050				

Conc. units: mg/L **Associated Samples:** 1 (>RL)

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB												
Cl	0.1												
NO3-N	0.063												

LDC #: 21495E6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer:
2nd Reviewer:

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

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:** 4

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB			4									
Br	0.06			0.9 / 1.0									

Conc. units: mg/L **Associated Samples:** Cl: 4,6, NO3-N:5,7 (>RL or 1X)

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB												
Cl	0.1	0.1											
NO3-N		0.062	0.062										

Conc. units: mg/L **Associated Samples:** 8 (>RL)

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB												
Cl		0.095											

LDC #: 21495E6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: ~
2nd Reviewer: ~

METHOD: Inorganics, Method See Cover
(Y) N N/A Were field blanks identified in this SDG?
(Y) N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 6/4/09 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: FB

Reason Code: bf

Associated Samples: 1-3,8

Analyte	Blank ID	Sample Identification								
	FB060409	Action Level	1	2	3	8				
Total Alkalinity	1.9									
Bicarbonate Alkalinity	1.9									
Ammonia as N	0.102	1.02		0.047 / 0.050	0.090 J+	0.008 / 0.050				
TOC (average)	0.4					0.8 / 1.0				
Conductivity (umhos/cm)	1.81									
pH (pH Units)	6.08									
Total Phosphorus	0.020		0.032 / 0.050			0.032 / 0.050				

LDC #: 21495b6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Page: 1 of 1
Reviewer: MC
2nd Reviewer: A

METHOD: Inorganics, Method See cover

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

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

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

LEVEL IV ONLY:

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

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
1	11	AL	TOC	69	1-3, 8	J-/UJ/A (m)
			CN	0	↓	J-/R/A ↓

Comments:

LDC #: 21495J6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: MH
2nd Reviewer: e

METHOD: Inorganics, Method See cover

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
1		5, 7 MW3	out side HT. + confirmation for orginal analysis.		X/(o)/A

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 5 through June 11, 2009

LDC Report Date: September 28, 2009

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903184

Sample Identification

SA127-0.5B
RSAJ6-0.5B
RSAK6-0.5B
RSAK8-0.5B
RSAL7-0.5B
RSAL8-0.5B
SA35-0.5B
SA55-0.5B
SA56-0.5B
SA176-0.5B
RSAO3-0.5B
SA182-0.5B
SA201-0.5B
SA166-0.5B
RSAK4-0.5B
RSAK4009-0.5B
SA134-0.5B
SA127-0.5BMS
SA127-0.5BMSD
SA127-0.5BDUP

Introduction

This data review covers 20 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 353.2 for Nitrite as Nitrogen, EPA 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, 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

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
6/10/09	CCV	Total organic carbon	89.1 (90-110)	SA127-0.5B RSAJ6-0.5B RSAK6-0.5B RSAK8-0.5B RSAL7-0.5B RSAL8-0.5B SA127-0.5BMS SA127-0.5BDUP	J- (all detects) UJ (all non-detects)	P
6/12/09	CCV	Total organic carbon	86.4 (90-110)	SA35-0.5B SA55-0.5B SA56-0.5B SA176-0.5B RSAO3-0.5B	J- (all detects) UJ (all non-detects)	P
6/18/09	CCV	Total organic carbon	88.0 (90-110)	SA182-0.5B SA201-0.5B SA166-0.5B RSAK4-0.5B RSAK4009-0.5B SA134-0.5B	J- (all detects) UJ (all non-detects)	P

III. Blanks

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

Method Blank ID	Analyte	Concentration	Associated Samples
MB	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Total organic carbon	16 mg/Kg 16 mg/Kg 1.0 mg/Kg 0.47 mg/Kg 40 mg/Kg	SA127-0.5B RSAJ6-0.5B RSAK6-0.5B RSAK8-0.5B RSAL7-0.5B RSAL8-0.5B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Alkalinity, total	1.0 mg/L	SA127-0.5B RSAJ6-0.5B RSAK6-0.5B RSAK8-0.5B RSAL7-0.5B RSAL8-0.5B
MB	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Sulfate	11 mg/Kg 11 mg/Kg 1 mg/Kg 0.47 mg/Kg 1.8 mg/Kg	SA35-0.5B SA55-0.5B SA56-0.5B SA176-0.5B RSAO3-0.5B SA182-0.5B SA201-0.5B SA166-0.5B RSAK4-0.5B RSAK4009-0.5B SA134-0.5B
MB	Total organic carbon	40 mg/Kg	SA35-0.5B SA55-0.5B SA56-0.5B SA176-0.5B RSAO3-0.5B
MB	Total organic carbon	50 mg/Kg	SA182-0.5B SA201-0.5B SA166-0.5B RSAK4-0.5B RSAK4009-0.5B SA134-0.5B
ICB/CCB	Alkalinity, total	1.0 mg/L	SA35-0.5B SA55-0.5B SA56-0.5B SA176-0.5B RSAO3-0.5B SA182-0.5B SA201-0.5B SA166-0.5B RSAK4-0.5B RSAK4009-0.5B SA134-0.5B
MB	Total, phosphorus	2.3 mg/Kg	SA127-0.5B RSAJ6-0.5B RSAK6-0.5B RSAK8-0.5B
MB	Total, phosphorus	2.2 mg/Kg	RSAL7-0.5B RSAL8-0.5B

Method Blank ID	Analyte	Concentration	Associated Samples
MB	Total, phosphorus	1.7 mg/Kg	SA35-0.5B SA55-0.5B SA56-0.5B SA176-0.5B RSAO3-0.5B SA182-0.5B SA201-0.5B SA166-0.5B RSAK4-0.5B RSAK4009-0.5B SA134-0.5B
ICB/CCB	Total, phosphorus	0.0147 mg/L	SA127-0.5B RSAJ6-0.5B RSAK6-0.5B RSAK8-0.5B
ICB/CCB	Total, phosphorus	0.0147 mg/L	RSAL7-0.5B RSAL8-0.5B
ICB/CCB	Total, phosphorus	0.0107 mg/L	SA35-0.5B SA55-0.5B SA56-0.5B SA176-0.5B RSAO3-0.5B SA182-0.5B SA201-0.5B SA166-0.5B RSAK4-0.5B RSAK4009-0.5B SA134-0.5B
ICB/CCB	Chloride	0.122 mg/L	SA127-0.5B RSAK6-0.5B RSAK8-0.5B RSAL7-0.5B RSAL8-0.5B
ICB/CCB	Chloride	0.098 mg/L	RSAJ6-0.5B
ICB/CCB	Chloride	0.095 mg/L	SA35-0.5B SA55-0.5B RSAO3-0.5B
ICB/CCB	Chloride	0.104 mg/L	RSAK4-0.5B RSAK4009-0.5B
ICB/CCB	Chloride	0.100 mg/L	SA56-0.5B SA182-0.5B SA166-0.5B
ICB/CCB	Chloride	0.106 mg/L	SA134-0.5B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Chloride	0.098 mg/L	SA176-0.5B

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
SA35-0.5B	Chloride Sulfate	1.1 mg/Kg 2.0 mg/Kg	2.1U mg/Kg 2.1U mg/Kg

Sample FB072109-SO (from SDG R0904016) 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
FB072109-SO	7/21/09	Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Sulfate Surfactants	0.191 mg/L 0.5 mg/L 9.7 mg/L 1.76 mg/L 3.36 mg/L 0.01 mg/L 5.5 mg/L 0.159 mg/L	All samples in SDG R0903184

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
SA127-0.5B	Chloride Nitrate as N Sulfate	62.6 mg/Kg 5.99 mg/Kg 102 mg/Kg	62.6J+ mg/Kg 5.99J+ mg/Kg 102J+ mg/Kg
RSAJ6-0.5B	Nitrate as N Surfactants	34.7 mg/Kg 2.5 mg/Kg	34.7J+ mg/Kg 2.5J+ mg/Kg
RSAK6-0.5B	Chloride Nitrate as N Sulfate Surfactants	18.6 mg/Kg 5.27 mg/Kg 162 mg/Kg 0.8 mg/Kg	18.6J+ mg/Kg 5.27J+ mg/Kg 162J+ mg/Kg 2.1U mg/Kg
RSAK8-0.5B	Chloride Nitrate as N	37.2 mg/Kg 4.42 mg/Kg	37.2J+ mg/Kg 4.42J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAL7-0.5B	Chloride Nitrate as N Sulfate Surfactants	5.0 mg/Kg 1.26 mg/Kg 22.8 mg/Kg 1.2 mg/Kg	5.0J+ mg/Kg 1.26J+ mg/Kg 22.8J+ mg/Kg 2.1U mg/Kg
RSAL8-0.5B	Chloride Nitrate as N Surfactants	37.0 mg/Kg 3.44 mg/Kg 1.1 mg/Kg	37.0J+ mg/Kg 3.44J+ mg/Kg 2.1U mg/Kg
SA35-0.5B	Chloride Nitrate as N Sulfate	1.1 mg/Kg 0.81 mg/Kg 2.0 mg/Kg	2.1U mg/Kg 0.81J+ mg/Kg 2.1U mg/Kg
SA55-0.5B	Chloride Nitrate as N Sulfate	31.5 mg/Kg 3.96 mg/Kg 84.1 mg/Kg	31.5J+ mg/Kg 3.96J+ mg/Kg 84.1J+ mg/Kg
SA56-0.5B	Ammonia as N Chloride Nitrate as N Surfactants	0.09 mg/Kg 406 mg/Kg 64.7 mg/Kg 2.5 mg/Kg	0.52U mg/Kg 406J+ mg/Kg 64.7J+ mg/Kg 2.5J+ mg/Kg
SA176-0.5B	Nitrate as N	67.2 mg/Kg	67.2J+ mg/Kg
RSAO3-0.5B	Chloride Nitrate as N Sulfate	14.6 mg/Kg 2.89 mg/Kg 68.5 mg/Kg	14.6J+ mg/Kg 2.89J+ mg/Kg 68.5J+ mg/Kg
SA182-0.5B	Ammonia as N Nitrate as N Sulfate	0.19 mg/Kg 28.9 mg/Kg 189 mg/Kg	0.60U mg/Kg 28.9J+ mg/Kg 189J+ mg/Kg
SA201-0.5B	Chloride Nitrate as N Sulfate	439 mg/Kg 4.42 mg/Kg 200 mg/Kg	439J+ mg/Kg 4.42J+ mg/Kg 200J+ mg/Kg
SA166-0.5B	Chloride Nitrate as N	267 mg/Kg 17.4 mg/Kg	267J+ mg/Kg 17.4J+ mg/Kg
RSAK4-0.5B	Chloride Nitrate as N Sulfate	15.1 mg/Kg 2.38 mg/Kg 37.5 mg/Kg	15.1J+ mg/Kg 2.38J+ mg/Kg 37.5J+ mg/Kg
RSAK4009-0.5B	Chloride Nitrate as N Sulfate	14.0 mg/Kg 2.24 mg/Kg 36.9 mg/Kg	14.0J+ mg/Kg 2.24J+ mg/Kg 36.9J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA134-0.5B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.09 mg/Kg 762 mg/Kg 51.1 mg/Kg 499 mg/Kg 0.25 mg/Kg	0.52U mg/Kg 762J+ mg/Kg 51.1J+ mg/Kg 499J+ mg/Kg 0.25J+ 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
SA127-0.5BMS (All samples in SDG R0903184)	Surfactants	48 (75-125)	-	-	J- (all detects) UJ (all non-detects)	A

V. Duplicates

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

VI. Laboratory Control Samples

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

LCS ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
LCS	Bromide	111 (90-110)	RSAK6-0.5B RSAK8-0.5B RSAL7-0.5B RSAL8-0.5B	J+ (all detects)	P

VII. Surrogates

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 R0903184	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 RSAK4-0.5B and RSAK4009-0.5B 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)	Flag	A or P
	RSAK4-0.5B	RSAK4009-0.5B				
Alkalinity, total	714 mg/Kg	725 mg/Kg	2 (≤50)	-	-	-
Alkalinity, bicarbonate	669 mg/Kg	690 mg/Kg	3 (≤50)	-	-	-
Alkalinity, carbonate	44 mg/Kg	35 mg/Kg	-	9 (≤21)	-	-
Chloride	15.1 mg/Kg	14.0 mg/Kg	8 (≤50)	-	-	-
Nitrate as N	2.38 mg/Kg	2.24 mg/Kg	-	0.14 (≤0.51)	-	-
pH	10.00 units	9.85 units	2 (≤50)	-	-	-
Sulfate	37.5 mg/Kg	36.9 mg/Kg	2 (≤50)	-	-	-
Total organic carbon	1660 mg/Kg	960 mg/Kg	-	700 (≤300)	J (all detects)	A
Total phosphorus	910 mg/Kg	981 mg/Kg	8 (≤50)	-	-	-
Chlorate	270 ug/Kg	291 ug/Kg	-	21 (≤210)	-	-
Perchlorate	649 ug/Kg	663 ug/Kg	2 (≤50)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R0903184

SDG	Sample	Analyte	Flag	A or P	Reason
R0903184	SA127-0.5B RSAJ6-0.5B RSAK6-0.5B RSAK8-0.5B RSAL7-0.5B RSAL8-0.5B SA35-0.5B SA55-0.5B SA56-0.5B SA176-0.5B RSAO3-0.5B SA182-0.5B SA201-0.5B SA166-0.5B RSAK4-0.5B RSAK4009-0.5B SA134-0.5B	Total organic carbon	J- (all detects) UJ (all non-detects)	P	Calibration (CCV %R) (c)
R0903184	SA127-0.5B RSAJ6-0.5B RSAK6-0.5B RSAK8-0.5B RSAL7-0.5B RSAL8-0.5B SA35-0.5B SA55-0.5B SA56-0.5B SA176-0.5B RSAO3-0.5B SA182-0.5B SA201-0.5B SA166-0.5B RSAK4-0.5B RSAK4009-0.5B SA134-0.5B	Surfactants	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0903184	RSAK6-0.5B RSAK8-0.5B RSAL7-0.5B RSAL8-0.5B	Bromide	J+ (all detects)	P	Laboratory control samples (%R) (l)

SDG	Sample	Analyte	Flag	A or P	Reason
R0903184	SA127-0.5B RSAJ6-0.5B RSAK6-0.5B RSAK8-0.5B RSAL7-0.5B RSAL8-0.5B SA35-0.5B SA55-0.5B SA56-0.5B SA176-0.5B RSAO3-0.5B SA182-0.5B SA201-0.5B SA166-0.5B RSAK4-0.5B RSAK4009-0.5B SA134-0.5B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0903184	RSAK4-0.5B RSAK4009-0.5B	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 R0903184

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903184	SA35-0.5B	Chloride Sulfate	2.1U mg/Kg 2.1U mg/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0903184

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903184	SA127-0.5B	Chloride Nitrate as N Sulfate	62.6J+ mg/Kg 5.99J+ mg/Kg 102J+ mg/Kg	A	bf
R0903184	RSAJ6-0.5B	Nitrate as N Surfactants	34.7J+ mg/Kg 2.5J+ mg/Kg	A	bf
R0903184	RSAK6-0.5B	Chloride Nitrate as N Sulfate Surfactants	18.6J+ mg/Kg 5.27J+ mg/Kg 162J+ mg/Kg 2.1U mg/Kg	A	bf
R0903184	RSAK8-0.5B	Chloride Nitrate as N	37.2J+ mg/Kg 4.42J+ mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903184	RSAL7-0.5B	Chloride Nitrate as N Sulfate Surfactants	5.0J+ mg/Kg 1.26J+ mg/Kg 22.8J+ mg/Kg 2.1U mg/Kg	A	bf
R0903184	RSAL8-0.5B	Chloride Nitrate as N Surfactants	37.0J+ mg/Kg 3.44J+ mg/Kg 2.1U mg/Kg	A	bf
R0903184	SA35-0.5B	Chloride Nitrate as N Sulfate	2.1U mg/Kg 0.81J+ mg/Kg 2.1U mg/Kg	A	bf
R0903184	SA55-0.5B	Chloride Nitrate as N Sulfate	31.5J+ mg/Kg 3.96J+ mg/Kg 84.1J+ mg/Kg	A	bf
R0903184	SA56-0.5B	Ammonia as N Chloride Nitrate as N Surfactants	0.52U mg/Kg 406J+ mg/Kg 64.7J+ mg/Kg 2.5J+ mg/Kg	A	bf
R0903184	SA176-0.5B	Nitrate as N	67.2J+ mg/Kg	A	bf
R0903184	RSAO3-0.5B	Chloride Nitrate as N Sulfate	14.6J+ mg/Kg 2.89J+ mg/Kg 68.5J+ mg/Kg	A	bf
R0903184	SA182-0.5B	Ammonia as N Nitrate as N Sulfate	0.60U mg/Kg 28.9J+ mg/Kg 189J+ mg/Kg	A	bf
R0903184	SA201-0.5B	Chloride Nitrate as N Sulfate	439J+ mg/Kg 4.42J+ mg/Kg 200J+ mg/Kg	A	bf
R0903184	SA166-0.5B	Chloride Nitrate as N	267J+ mg/Kg 17.4J+ mg/Kg	A	bf
R0903184	RSAK4-0.5B	Chloride Nitrate as N Sulfate	15.1J+ mg/Kg 2.38J+ mg/Kg 37.5J+ mg/Kg	A	bf
R0903184	RSAK4009-0.5B	Chloride Nitrate as N Sulfate	14.0J+ mg/Kg 2.24J+ mg/Kg 36.9J+ mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903184	SA134-0.5B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.52U mg/Kg 762J+ mg/Kg 51.1J+ mg/Kg 499J+ mg/Kg 0.25J+ mg/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495F6
SDG #: R0903184
Laboratory: Columbia Analytical Services

Date: 9/21/09
Page: 1 of 1
Reviewer: W
2nd Reviewer: F

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Nitrite-N (EPA Method 353.2), Chlorate (EPA Method 300.1), Cyanide (EPA SW846 Method 9012A), Hexavalent Chromium (EPA SW846 Method 7199), 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: 6/5/09 - 6/11/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW	
III.	Blanks	SW	
IV	Matrix Spike/Matrix Spike Duplicates	SW	MS/MSD/DUP
V	Duplicates	A	
VI.	Laboratory control samples	SW	LCS
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	(15,16)
X	Field blanks	SW	FB= FB072109-SO (SDG R0904016)

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	SA127-0.5B	11	RSA[illegible]3-0.5B	21	MB	31	
2	RSAJ6-0.5B	12	SA182-0.5B	22		32	
3	RSAK6-0.5B	13	SA201-0.5B	23		33	
4	RSAK8-0.5B	14	SA166-0.5B	24		34	
5	RSAL7-0.5B	15	RSAK4-0.5B	25		35	
6	RSAL8-0.5B	16	RSAK4009-0.5B	26		36	
7	SA35-0.5B	17	SA134-0.5B	27		37	
8	SA55-0.5B	18	SA127-0.5BMS	28		38	
9	SA56-0.5B	19	SA127-0.5BMSD	29		39	
10	SA176-0.5B	20	SA127-0.5BDUP	30		40	

Notes: Surrogate = A

LDC #: 21495F6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: [initials]
2nd reviewer: [initials]

All circled methods are applicable to each sample.

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

Comments:

LDC #: 21495F6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Calibration

Reviewer: MH
2nd Reviewer:

METHOD: Inorganics, EPA Method See cover

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

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

LEVEL IV/D ONLY:

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

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
1	6/10/09	CCV	TOC	89.1 %	1-6, 18, 20	J-/UJ/P (c)
2	6/12/09	CCV	TOC	86.4	7-11	J-/UJ/P (c)
3	6/18/09	CCV	TOC	88.0	12-17	J-/UJ/P (c)
~~4~~	~~6/19/09~~	~~CCV (11:37)~~	~~NO3-N~~	~~89~~	~~15-17~~	~~J-/UJ/P (c)~~

Comments:

LDC #: 21495F6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: LA
2nd Reviewer: JK

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/Kg **Associated Samples:** 1-6 (>RL)

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB												
Total AlK	16	1.0											
Bicarb. AlK	16												
Cl	1.0												
NO3-N	0.47												
TOC	40												

Conc. units: mg/Kg **Associated Samples:** 7-17 except TOC*1: 7-11, TOC*2: 12-17

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB			7									
Total AlK	11	1.0											
Bicarb. AlK	11												
Cl	1			1.1 / 2.1									
NO3-N	0.47												
SO4	1.8			2.0 / 2.1									
TOC*1	40												
TOC*2	50												

LDC #: 21495F6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

METHOD: Inorganics, Method See Cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". 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/Kg **Associated Samples:** T-P*1: 1-4, T-P*2: 5,6, T-P*3: 7-17 (>RL)

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB												
T-P*1	2.3	0.0147											
T-P*2	2.2	0.0147											
T-P*3	1.7	0.0107											

Conc. units: mg/Kg **Associated Samples:** Cl*1: 1,3-6, Cl*2: 2 ,Cl*3:7,8,11, Cl*4:15,16, Cl*5:9,12-14, Cl*6:17, Cl*7:10

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB			7									
Cl*1		0.122											
Cl*2		0.098											
Cl*3		0.095		1.1 / 2.1									
Cl*4		0.104											
Cl*5		0.100											
Cl*6		0.106											
Cl*7		0.098											

LDC #: 21495F6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

METHOD: Inorganics, Method See Cover
(Y) N N/A Were field blanks identified in this SDG?
(Y) N N/A Were target analytes detected in the field blanks? Reason Code: bf
Blank units: mg/L **Associated sample units:** mg/Kg
Sampling date: 7/21/09 Soil factor applied 10X
Field blank type: (circle one) Field Blank / Rinsate / Other: FB Associated Samples: All

Analyte	Blank ID	Sample Identification									
	FB072109-SO	Action Level	1	2	3	4	5	6	7	8	9
Ammonia as N	0.191	19.1									0.09 / 0.52
TOC (average)	0.5										
Cl	9.7	970	62.6 J+		18.6 J+	37.2 J+	5.0 J+	37.0 J+	1.1 / 2.1	31.5 J+	406 J+
Nitrate as N	1.76	176	5.99 J+	34.7 J+	5.27 J+	4.42 J+	1.26 J+	3.44 J+	0.81 J+	3.96 J+	64.7 J+
pH (pH Units)	3.36										
Total Phosphorus	0.01										
Sulfate	5.5	550	102 J+		162 J+		22.8 J+		2.0 / 2.1	84.1 J+	
Surfactants	0.159	15.9		2.5 J+	0.8 / 2.1		1.2 / 2.1	1.1 / 2.1			2.5 J+

Analyte	Blank ID	Sample Identification									
	FB072109-SO	Action Level	10	11	12	13	14	15	16	17	
Ammonia as N	0.191	19.1			0.19 / 0.60					0.09 / 0.52	
TOC (average)	0.5										
Cl	9.7	970		14.6 J+		439 J+	267 J+	15.1 J+	14.0 J+	762 J+	
Nitrate as N	1.76	176	67.2 J+	2.89 J+	28.9 J+	4.42 J+	17.4 J+	2.38 J+	2.24 J+	51.1 J+	
pH (pH Units)	3.36										
Total Phosphorus	0.01										
Sulfate	5.5	550		68.5 J+	189 J+	200 J+		37.5 J+	36.9 J+	499 J+	
Surfactants	0.159	15.9								0.25 J+	

LDC #: 21495T6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Reviewer: W
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

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

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

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

LEVEL IV ONLY:

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

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
1	18	Soil	Surfactants	48	W ~~T6~~ A11	J-/UJ/A (M)

Comments:

LDC #: 21495T6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: MH
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

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

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

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

LEVEL IV ONLY:

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

#	LCS ID	Matrix	Analyte	%R (limits)	Associated Samples	Qualifications
1	LCS	Soil	Br	111 (90-110)	3-6	J+ UJ/P (L)

Comments:

LDC#: 21495F6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer:
2nd Reviewer:

Inorganics, Method See Cover

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

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	15	16				
Total Alkalinity	714	725	2			
Bicarbonate Alkalinity	669	690	3			
Carbonate Alkalinity	44	35		9	(≤21)	
Chloride	15.1	14.0	8			
Nitrate as N	2.38	2.24		0.14	(≤0.51)	
pH (pH Units)	10.00	9.85	2			
Sulfate	37.5	36.9	2			
TOC	1660	960		700	(≤300)	J det / A (fd)
Total Phosphorus	910	981	8			
Chlorate (ug/Kg)	270	291		21	(≤210)	
Perchlorate (ug/Kg)	649	663	2			

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 19 through June 24, 2009

LDC Report Date: September 29, 2009

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903443

Sample Identification

SA197-0.5B
SA198-0.5B
SA64-0.5B
SA104-0.5B
SA129-0.5B
SA70-0.5B
SA60-0.5B
SA150-0.5B
RSAN5-0.5B
SA53-0.5B
SA201-10B
SA201-28B
SA201009-28B
SA43009-0.5B
SA40-0.5B
SA200-0.5B
RSAO6-0.5B
SA51-0.5B
SA43-0.5B
SA150-0.5BMS
SA150-0.5BMSD
SA150-0.5BDUP
RSAN5-0.5BMS
RSAN5-0.5BDUP

Introduction

This data review covers 24 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 353.2 for Nitrite as Nitrogen, EPA 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, 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

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
6/30/09	CCV	Total organic carbon	89.3 (90-110)	SA201-10B SA201-28B SA201009-28B SA40-0.5B SA200-0.5B RSAO6-0.5B SA51-0.5B SA43-0.5B	J- (all detects) UJ (all non-detects)	P

III. Blanks

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

Method Blank ID	Analyte	Concentration	Associated Samples
MB	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Chloride Nitrate as N	20 mg/Kg 20 mg/Kg 0.18 mg/Kg 0.9 mg/Kg 0.45 mg/Kg	SA197-0.5B SA198-0.5B SA64-0.5B SA104-0.5B SA129-0.5B SA70-0.5B
ICB/CCB	Alkalinity, total	1.1 mg/L	SA197-0.5B SA198-0.5B SA64-0.5B SA104-0.5B SA129-0.5B SA70-0.5B
MB	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	10 mg/Kg 10 mg/Kg 0.9 mg/Kg 0.45 mg/Kg	SA60-0.5B SA150-0.5B RSAN5-0.5B SA53-0.5B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Alkalinity, total	0.5 mg/L	SA60-0.5B SA150-0.5B RSAN5-0.5B SA53-0.5B
MB	Alkalinity, total Alkalinity, bicarbonate Chloride	15 mg/L 15 mg/L 1 mg/L	SA201-10B SA201-28B SA201009-28B SA43009-0.5B SA40-0.5B SA200-0.5B RSAO6-0.5B SA51-0.5B SA43-0.5B
ICB/CCB	Ammonia as N	0.0094 mg/L	SA60-0.5B SA150-0.5B RSAN5-0.5B SA53-0.5B SA201-10B SA201-28B SA201009-28B SA43009-0.5B SA40-0.5B SA200-0.5B RSAO6-0.5B SA43-0.5B
ICB/CCB	Alkalinity, total	0.5 mg/L	SA201-10B SA201-28B SA201009-28B SA43009-0.5B SA40-0.5B SA200-0.5B
ICB/CCB	Alkalinity, total	1.0 mg/L	RSAO6-0.5B SA51-0.5B SA43-0.5B
MB	Total phosphorus	1.3 mg/Kg	All samples in SDG R0903443
MB	Total organic carbon	60 mg/Kg	SA197-0.5B SA198-0.5B SA64-0.5B SA104-0.5B SA129-0.5B SA70-0.5B SA60-0.5B SA150-0.5B RSAN5-0.5B SA53-0.5B

Method Blank ID	Analyte	Concentration	Associated Samples
MB	Total organic carbon	50 mg/Kg	SA201-10B SA201-28B SA201009-28B SA40-0.5B SA200-0.5B RSAO6-0.5B SA51-0.5B SA43-0.5B
MB	Total organic carbon	50 mg/Kg	SA43009-0.5B
ICB/CCB	Total organic carbon	45.0 mg/Kg	SA197-0.5B SA198-0.5B SA64-0.5B SA104-0.5B SA129-0.5B SA70-0.5B SA60-0.5B SA150-0.5B RSAN5-0.5B SA53-0.5B
ICB/CCB	Total organic carbon	58.1 mg/Kg	SA43009-0.5B
ICB/CCB	Chloride	0.153 mg/L	SA197-0.5B SA198-0.5B SA64-0.5B SA104-0.5B
ICB/CCB	Chloride	0.097 mg/L	SA129-0.5B SA70-0.5B
ICB/CCB	Chloride	0.099 mg/L	SA60-0.5B SA150-0.5B RSAN5-0.5B SA53-0.5B
ICB/CCB	Chloride	0.169 mg/L	SA201-10B SA43009-0.5B SA40-0.5B RSAO6-0.5B SA43-0.5B
ICB/CCB	Chloride	0.109 mg/L	SA201-28B SA201009-28B SA200-0.5B SA51-0.5B
ICB/CCB	Bromide	0.052 mg/L	SA197-0.5B SA198-0.5B SA64-0.5B SA104-0.5B SA129-0.5B SA70-0.5B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Bromide	0.045 mg/L	SA60-0.5B SA150-0.5B RSAN5-0.5B SA53-0.5B
ICB/CCB	Bromide	0.064 mg/L	SA201-10B SA201-28B SA201009-28B SA43009-0.5B SA40-0.5B SA200-0.5B RSAO6-0.5B

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
SA197-0.5B	Ammonia as N Chloride	0.13 mg/Kg 2.0 mg/Kg	0.54U mg/Kg 2.2U mg/Kg
SA64-0.5B	Ammonia as N	0.08 mg/Kg	0.53U mg/Kg
SA201-10B	Ammonia as N	0.11 mg/Kg	0.54U mg/Kg
SA201-28B	Total organic carbon	270 mg/Kg	290U mg/Kg
SA201009-28B	Total organic carbon	270 mg/Kg	290U mg/Kg
SA200-0.5B	Bromide	0.3 mg/Kg	1.1U mg/Kg

Sample FB072109-SO (from SDG R0904016) 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
FB072109-SO	7/21/09	Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Sulfate Surfactants	0.191 mg/L 0.5 mg/L 9.7 mg/L 1.76 mg/L 3.36 mg/L 0.01 mg/L 5.5 mg/L 0.159 mg/L	SA201-10B SA201-28B SA201009-28B

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
SA201-10B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.11 mg/Kg 62.2 mg/Kg 173 mg/Kg 103 mg/Kg 2.5 mg/Kg	0.54U mg/Kg 62.2J+ mg/Kg 173J+ mg/Kg 103J+ mg/Kg 2.5J+ mg/Kg
SA201-28B	Ammonia as N Total organic carbon Chloride Sulfate Surfactants	0.91 mg/Kg 270 mg/Kg 128 mg/Kg 465 mg/Kg 1.4 mg/Kg	0.91J+ mg/Kg 290U mg/Kg 128J+ mg/Kg 465J+ mg/Kg 2.5U mg/Kg
SA201009-28B	Ammonia as N Total organic carbon Chloride Sulfate	0.82 mg/Kg 270 mg/Kg 123 mg/Kg 483 mg/Kg	0.82J+ mg/Kg 290U mg/Kg 123J+ mg/Kg 483J+ 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) were within QC limits.

VII. Surrogates

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
SA70-0.5B	Dichloroacetate	76 (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 R0903443	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 SA201-28B and SA201009-28B and samples SA43009-0.5B and SA43-0.5B 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)	Flag	A or P
	SA201-28B	SA201009-28B				
Ammonia as N	0.91 mg/Kg	0.82 mg/Kg	-	0.09 (≤0.64)	-	-
Alkalinity, total	685 mg/Kg	739 mg/Kg	8 (≤50)	-	-	-
Alkalinity, bicarbonate	675 mg/Kg	725 mg/Kg	7 (≤50)	-	-	-
Alkalinity, carbonate	10 mg/Kg	13 mg/Kg	-	3 (≤25)	-	-
Chloride	128 mg/Kg	123 mg/Kg	4 (≤50)	-	-	-
Nitrate as N	213 mg/Kg	212 mg/Kg	0 (≤50)	-	-	-
Nitrite as N	1.56 mg/Kg	1.62 mg/Kg	4 (≤50)	-	-	-
pH	8.33 units	8.37 units	0 (≤50)	-	-	-
Sulfate	465 mg/Kg	483 mg/Kg	4 (≤50)	-	-	-
Surfactants	1.4 mg/Kg	0.7U mg/Kg	-	0.7 (≤2.5)	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA201-28B	SA201009-28B				
Total organic carbon	270 mg/Kg	270 mg/Kg	-	0 (≤290)	-	-
Total phosphorus	606 mg/Kg	650 mg/Kg	7 (≤50)	-	-	-
Chlorate	2610 ug/Kg	2920 ug/Kg	11 (≤50)	-	-	-
Perchlorate	63500 ug/Kg	72800 ug/Kg	14 (≤50)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA43009-0.5B	SA43-0.5B				
Alkalinity, total	1510 mg/Kg	434 mg/Kg	111 (≤50)	-	J (all detects)	A
Alkalinity, bicarbonate	1430 mg/Kg	427 mg/Kg	108 (≤50)	-	J (all detects)	A
Alkalinity, carbonate	82 mg/Kg	7 mg/Kg	-	75 (≤22)	J (all detects)	A
Chloride	37.8 mg/Kg	37.3 mg/Kg	1 (≤50)	-	-	-
Hexavalent chromium	0.34 mg/Kg	0.19U mg/Kg	-	0.15 (≤0.43)	-	-
Hexavalent chromium	0.31 mg/Kg	0.19U mg/Kg	-	0.12 (≤0.43)	-	-
Nitrate as N	7.49 mg/Kg	7.01 mg/Kg	7 (≤50)	-	-	-
pH	9.50 units	9.49 units	0 (≤50)	-	-	-
Sulfate	350 mg/Kg	329 mg/Kg	6 (≤50)	-	-	-
Surfactants	1.9 mg/Kg	2.4 mg/Kg	-	0.5 (≤2.2)	-	-
Total organic carbon	7600 mg/Kg	25300 mg/Kg	-	17700 (≤2100)	J (all detects)	A
Total phosphorus	413 mg/Kg	514 mg/Kg	22 (≤50)	-	-	-
Chlorate	2080 ug/Kg	2040 ug/Kg	2 (≤50)	-	-	-
Perchlorate	4410 ug/Kg	4230 ug/Kg	4 (≤50)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R0903443

SDG	Sample	Analyte	Flag	A or P	Reason
R0903443	SA201-10B SA201-28B SA201009-28B SA40-0.5B SA200-0.5B RSAO6-0.5B SA51-0.5B SA43-0.5B	Total organic carbon	J- (all detects) UJ (all non-detects)	P	Calibration (CCV %R) (c)
R0903443	SA70-0.5B	Chlorate	J- (all detects) UJ (all non-detects)	A	Surrogate recovery (%R) (s)
R0903443	SA197-0.5B SA198-0.5B SA64-0.5B SA104-0.5B SA129-0.5B SA70-0.5B SA60-0.5B SA150-0.5B RSAN5-0.5B SA53-0.5B SA201-10B SA201-28B SA201009-28B SA43009-0.5B SA40-0.5B SA200-0.5B RSAO6-0.5B SA51-0.5B SA43-0.5B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0903443	SA43009-0.5B SA43-0.5B	Alkalinity, total Alkalinity, bicarbonate	J (all detects) J (all detects)	A	Field duplicates (RPD) (fd)
R0903443	SA43009-0.5B SA43-0.5B	Alkalinity, carbonate Total organic carbon	J (all detects) 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 R0903443

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R093443	SA197-0.5B	Ammonia as N Chloride	0.54U mg/Kg 2.2U mg/Kg	A	bl
R093443	SA64-0.5B	Ammonia as N	0.53U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R093443	SA201-10B	Ammonia as N	0.54U mg/Kg	A	bl
R093443	SA201-28B	Total organic carbon	290U mg/Kg	A	bl
R093443	SA201009-28B	Total organic carbon	290U mg/Kg	A	bl
R093443	SA200-0.5B	Bromide	1.1U mg/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0903443

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903443	SA201-10B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.54U mg/Kg 62.2J+ mg/Kg 173J+ mg/Kg 103J+ mg/Kg 2.5J+ mg/Kg	A	bf
R0903443	SA201-28B	Ammonia as N Total organic carbon Chloride Sulfate Surfactants	0.91J+ mg/Kg 290U mg/Kg 128J+ mg/Kg 465J+ mg/Kg 2.5U mg/Kg	A	bf
R0903443	SA201009-28B	Ammonia as N Total organic carbon Chloride Sulfate	0.82J+ mg/Kg 290U mg/Kg 123J+ mg/Kg 483J+ mg/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495G6
SDG #: R0903443
Laboratory: Columbia Analytical Services

Date: 9/24/09
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Nitrite-N (EPA Method 353.2), Chlorate (EPA Method 300.1), Cyanide (EPA SW846 Method 9012A), Hexavalent Chromium (EPA SW846 Method 7199), 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: 6/19/09 - 6/24/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW	
III.	Blanks	SW	
IV	Surrogate	SW	
V	Matrix Spike/Matrix Spike Duplicates	A	3 MS/MSD/MP
VI.	Duplicates	A	
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(12,13) (14,19)
XI	Field blanks	SW	FB=FB072109-SO (SDG: R0904016)

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: 40

1	SA197-0.5B	11	SA201-10B	21	SA150-0.5BMSD	31	MB
2	SA198-0.5B	12	SA201-28B	22	SA150-0.5BDUP	32	
3	SA64-0.5B	13	SA201009-28B	23	RSAN5-0.5BMS	33	
4	SA104-0.5B	14	SA43009-0.5B	24	RSAN5-0.5BDUP	34	
5	SA129-0.5B	15	SA40-0.5B	25		35	
6	SA70-0.5B	16	SA200-0.5B	26		36	
7	SA60-0.5B	17	RSAO6-0.5B	27		37	
8	SA150-0.5B	18	SA51-0.5B	28		38	
9	RSAN5-0.5B	19	SA43-0.5B	29		39	
10	SA53-0.5B	20	SA150-0.5BMS	30		40	

Notes:

LDC #: 21495G6

SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1

Reviewer: ~

2nd reviewer: g

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-19	Soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
1-13, 15	Soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
20-22	Soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
22	↓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
24		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
20		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
23	↓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 21496G6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: MH
2nd Reviewer:

METHOD: Inorganics, EPA Method See cover

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

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

LEVEL IV/D ONLY:

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

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
1	6/30/09	CCV	TOC	89.3	11-13, 15-19	J-/UJ/P (C)
2	~~6/26/09~~	~~CCV (15:11)~~	~~NO2-N~~	~~87~~	~~7,8,9,10,20,22~~	~~J-/UJ/P (C)~~
3	~~6/26/09~~	~~CCV (15:36)~~	↓	88	↓	↓

Comments:

CAL6

LDC #: 21495G6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

METHOD: Inorganics, Method See Cover

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

(Y) N N/A Were all samples associated with a given method blank?
(N) 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:** 1-6

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB			1	3								
Total AlK	20	1.1	200										
Bicarb. AlK	20		200										
NH3-N	0.18			0.13 / 0.54	0.08 / 0.53								
Cl	0.9			2.0 / 2.2									
NO3-N	0.45												

Conc. units: mg/Kg **Associated Samples:** 7-10 (>RL)

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB												
Total AlK	10	0.5											
Bicarb. AlK	10												
Cl	0.9												
NO3-N	0.45												

LDC #: 21495G6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer:
2nd Reviewer:

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/Kg **Associated Samples:** 11-19 except Total Alk*1: 11-16, Total Alk*2: 17-19, NH3-N: 7-17,19

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB			11									
Total AlK*1	15	0.5											
Total AlK*2		1.0											
Bicarb. AlK	15												
Cl	1												
NH3-N		0.0094		0.11 / 0.54									

Conc. units: mg/Kg **Associated Samples:** T-P: All, TOC*1: 1-10, TOC*2:11-13, 15-19, TOC*3:14

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB			12	13								
T-P	1.3												
TOC*1	60	45.0 mg/Kg											
TOC*2	50			270 / 290	270 / 290								
TOC*3	50	58.1 mg/Kg											

LDC #: 21495G6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer:
2nd Reviewer:

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/Kg **Associated Samples:** Cl*1:1-4,Cl*2: 5,6,Cl*3:7-10, Cl*4:11,14,15,17,19, Cl*5:12,13,16,18

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB			1									
Cl*1		0.153		2.0 / 2.2									
Cl*2		0.097											
Cl*3		0.099											
Cl*4		0.169											
Cl*5		0.109											

Conc. units: mg/Kg **Associated Samples:** Br*1:1-6, Br*2:7-10,Br*3:11-17

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB			16									
Br*1		0.052											
Br*2		0.045											
Br*3		0.064		0.3 / 1.1									

LDC #: 21495G6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

METHOD: Inorganics, Method See Cover
(Y) N N/A Were field blanks identified in this SDG?
(Y) N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/Kg Reason Code: bf
Sampling date: 7/21/09 Soil factor applied 10X
Field blank type: (circle one) Field Blank / Rinsate / Other: FB Associated Samples: 11-13

Analyte	Blank ID	Sample Identification									
	FB072109-SO	Action Level	11	12	13						
Ammonia as N	0.191	19.1	0.11 / 0.54	0.91 J+	0.82 J+						
TOC (average)	0.5			270 / 290	270 / 290						
Cl	9.7	970	62.2 J+	128 J+	123 J+						
Nitrate as N	1.76	176	173 J+								
pH (pH Units)	3.36										
Total Phosphorus	0.01										
Sulfate	5.5	550	103 J+	465 J+	483 J+						
Surfactants	0.159	15.9	2.5 J+	1.4 / 2.5							

LDC #: 21495G6
SDG #: See cover

Reviewer: my
2nd Reviewer: ℓ

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

METHOD: Chlorate (EPA 300.1)
Are surrogates required by the method? Yes ✓ or No____.
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
(Y) N N/A Were surrogates spiked into all samples and blanks?
Y (N) N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Date	Lab ID/Reference	Column	Surrogate Compound	%R (Limits)	Associated Samples	Qualifications
1	7/8/09	6		~~DCA~~ A	76 (90-115)		J/UJ/A (S) (new)
					( )		
					( )		
					( )		
					( )		
					( )		
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Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
(A)	Dichloroacetate			
B				

LDC#: 21495G6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer:
2nd Reviewer:

Inorganics, Method See Cover

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

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	12	13				
Ammonia as N	0.91	0.82		0.09	(≤0.64)	
Total Alkalinity	685	739	8			
Bicarbonate Alkalinity	675	725	7			
Carbonate Alkalinity	10	13		3	(≤25)	
Chloride	128	123	4			
Nitrate as N	213	212	0			
Nitrite as N	1.56	1.62	4			
pH (pH Units)	8.33	8.37	0			
Sulfate	465	483	4			
Surfactants	1.4	0.7U		0.7	(≤2.5)	
TOC	270	270		0	(≤290)	
Total Phosphorus	606	650	7			
Chlorate (ug/Kg)	2610	2920	11			
Perchlorate (ug/Kg)	63500	72800	14			

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	14	19				
Total Alkalinity	1510	434	111			J det / A (fd)
Bicarbonate Alkalinity	1430	427	108			J det / A (fd)
Carbonate Alkalinity	82	7		75	(≤22)	J det / A (fd)

LDC#: 21495G6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: LW
2nd Reviewer: JL

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)
	14	19				
Chloride	37.8	37.3	1			
Hexavalent Chromium	0.34	0.19U		0.15	(≤0.43)	
Hexavalent Chromium	0.31	0.19U		0.12	(≤0.43)	
Nitrate as N	7.49	7.01	7			
pH (pH Units)	9.50	9.49	0			
Sulfate	350	329	6			
Surfactants	1.9	2.4		0.5	(≤2.2)	
TOC	7600	25300		17700	(≤2100)	J det / A (fd)
Total Phosphorus	413	514	22			
Chlorate (ug/Kg)	2080	2040	2			
Perchlorate (ug/Kg)	4410	4230	4			

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 29 through June 30, 2009

LDC Report Date: October 5, 2009

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903615

Sample Identification

SA45-0.5B
SA452009-0.5B
SA187-0.5B
SA153-0.5B
SA186-0.5B
SA185-0.5B
RSAO5-0.5B
SA152-10B
SA152-20B
SA152-34B
SA50-0.5B
SA54-0.5B
SA106-0.5B
SA106-0.5BRE
SA102-0.5B
SA109-0.5B
SA106-0.5BMS
SA106-0.5BMSD
SA106-0.5BDUP
SA106-0.5BREMS
SA106-0.5BREDUP

Introduction

This data review covers 21 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 353.2 for Nitrite as Nitrogen, EPA 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, 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

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

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
7/9/09	CCV	Total organic carbon	85.6 (90-110)	SA152-34B SA50-0.5B SA54-0.5B SA106-0.5B SA102-0.5B SA109-0.5B SA106-0.5BMS SA106-0.5BDUP	J- (all detects) UJ (all non-detects)	P
7/7/09	CCV	Surfactants	114 (90-110)	SA45-0.5B SA452009-0.5B SA187-0.5B SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA152-10B SA152-20B SA152-34B	J+ (all detects)	P
7/7/09	CCV	Surfactants	112 (90-110)	SA45-0.5B SA452009-0.5B SA187-0.5B SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA152-10B SA152-20B SA152-34B	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
MB	Alkalinity, total Alkalinity, bicarbonate Chloride	12 mg/Kg 12 mg/Kg 0.9 mg/Kg	SA45-0.5B SA452009-0.5B SA187-0.5B SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA152-10B SA152-20B SA152-34B
ICB/CCB	Alkalinity, total	1.0 mg/L	SA45-0.5B SA452009-0.5B SA187-0.5B SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA152-10B SA152-20B SA152-34B SA50-0.5B SA54-0.5B
MB	Total phosphorus	1.3 mg/Kg	SA45-0.5B SA452009-0.5B
MB	Total phosphorus	1.6 mg/Kg	SA187-0.5B SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA152-10B SA152-20B SA152-34B SA50-0.5B SA54-0.5B SA106-0.5B SA102-0.5B SA109-0.5B
MB	Total organic carbon	120 mg/Kg	SA45-0.5B SA452009-0.5B SA187-0.5B SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA152-10B SA152-20B
MB	Total organic carbon	130 mg/Kg	SA152-34B SA50-0.5B SA54-0.5B SA106-0.5B SA102-0.5B SA109-0.5B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Total organic carbon	76.3 mg/Kg	SA45-0.5B SA452009-0.5B SA187-0.5B SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA152-10B SA152-20B
ICB/CCB	Total organic carbon	143 mg/Kg	SA152-34B SA50-0.5B SA54-0.5B SA106-0.5B SA102-0.5B SA109-0.5B
MB	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	15 mg/Kg 15 mg/Kg 1.1 mg/Kg 0.45 mg/Kg	SA50-0.5B SA54-0.5B SA106-0.5B SA102-0.5B SA109-0.5B
ICB/CCB	Alkalinity, total	0.9 mg/L	SA106-0.5B SA102-0.5B SA109-0.5B
ICB/CCB	Chloride	0.098 mg/L	SA185-0.5B
ICB/CCB	Chloride	0.106 mg/L	SA54-0.5B SA109-0.5B
ICB/CCB	Chloride	0.130 mg/L	SA45-0.5B SA452009-0.5B SA187-0.5B SA186-0.5B
ICB/CCB	Chloride	0.137 mg/L	RSAO5-0.5B SA152-10B SA152-34B SA50-0.5B SA106-0.5B
ICB/CCB	Chloride	0.131 mg/L	SA153-0.5B SA152-20B
ICB/CCB	Chloride	0.139 mg/L	SA102-0.5B

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

Sample FB072109-SO (from SDG R0904016) 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
FB072109-SO	7/21/09	Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Sulfate Surfactants	0.191 mg/L 0.5 mg/L 9.7 mg/L 1.76 mg/L 3.36 mg/L 0.01 mg/L 5.5 mg/L 0.159 mg/L	SA152-10B SA152-20B SA152-34B

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
SA152-10B	Chloride Nitrate as N Sulfate Surfactants	257 mg/Kg 5.13 mg/Kg 110 mg/Kg 1.5 mg/Kg	257J+ mg/Kg 5.13J+ mg/Kg 110J+ mg/Kg 2.2U mg/Kg
SA152-20B	Chloride Nitrate as N Sulfate Surfactants	395 mg/Kg 1.12 mg/Kg 121 mg/Kg 1.4 mg/Kg	395J+ mg/Kg 1.12J+ mg/Kg 121J+ mg/Kg 2.1U mg/Kg
SA152-34B	Nitrate as N Surfactants	1.47 mg/Kg 1.8 mg/Kg	1.47J+ mg/Kg 3.0U 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
SA106-0.5BMS (SA45-0.5B SA452009-0.5B SA187-0.5B SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA50-0.5B SA54-0.5B SA106-0.5B SA102-0.5B SA109-0.5B)	Cyanide	0 (75-125)	-	-	J- (all detects) R (all non-detects)	A
SA106-0.5BMS (SA45-0.5B SA452009-0.5B SA187-0.5B SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA50-0.5B SA54-0.5B SA106-0.5B SA102-0.5B SA109-0.5B)	Total phosphorus	72 (75-125)	-	-	J- (all detects) UJ (all non-detects)	A
SA106-0.5BMS (SA106-0.5B)	Hexavalent chromium (7/16/09 12:04) Hexavalent chromium (7/16/09 11:54)	132 (75-125) 136 (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 with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
SA106-0.5BDUP (SA106-0.5B)	Hexavalent chromium (7/16/09 10:10)	33 (≤20)	-	J (all detects) UJ (all non-detects)	A
	Hexavalent chromium (7/16/09 10:20)	34 (≤20)	-	J (all detects) UJ (all non-detects)	

VI. Laboratory Control Samples

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

LCS ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
LCS2	Bromide	111 (90-110)	SA50-0.5B SA54-0.5B SA106-0.5B SA102-0.5B SA109-0.5B	J+ (all detects)	P

VII. Surrogates

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 R0903615	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	Compound	Flag	A or P
SA106-0.5B	Hexavalent chromium	X	A

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

X. Field Duplicates

Samples SA45-0.5B and SA452009-0.5B 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)	Flag	A or P
	SA45-0.5B	SA452009-0.5B				
Ammonia as N	2.53 mg/Kg	2.42 mg/Kg	-	0.11 (≤0.53)	-	-
Alkalinity, total	147 mg/Kg	134 mg/Kg	9 (≤50)	-	-	-
Alkalinity, bicarbonate	147 mg/Kg	134 mg/Kg	9 (≤50)	-	-	-
Chloride	2960 mg/Kg	2860 mg/Kg	3 (≤50)	-	-	-
Hexavalent chromium	0.78 mg/Kg	2.93 mg/Kg	-	2.15 (≤0.42)	J (all detects)	A
Hexavalent chromium	0.82 mg/Kg	3.34 mg/Kg	-	2.52 (≤0.42)	J (all detects)	A
Nitrate as N	40.6 mg/Kg	41.1 mg/Kg	1 (≤50)	-	-	-
Nitrite as N	0.14 mg/Kg	0.15 mg/Kg	-	0.01 (≤0.11)	-	-
pH	8.17 units	8.11 units	1 (≤50)	-	-	-
Sulfate	6190 mg/Kg	6250 mg/Kg	1 (≤50)	-	-	-
Surfactants	8.5 mg/Kg	6.0 mg/Kg	34 (≤50)	-	-	-
Total cyanide	0.42U mg/Kg	0.7 mg/Kg	-	0.28 (≤1.0)	-	-
Total organic carbon	5400 mg/Kg	4800 mg/Kg	-	600 (≤1700)	-	-
Total phosphorus	856 mg/Kg	956 mg/Kg	11 (≤50)	-	-	-
Chlorate	8720000 ug/Kg	8010000 ug/Kg	8 (≤50)	-	-	-
Perchlorate	481000 ug/Kg	450000 ug/Kg	7 (≤50)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R0903615

SDG	Sample	Analyte	Flag	A or P	Reason
R0903615	SA152-34B SA50-0.5B SA54-0.5B SA106-0.5B SA102-0.5B SA109-0.5B	Total organic carbon	J- (all detects) UJ (all non-detects)	P	Calibration (CCV %R) (c)
R0903615	SA45-0.5B SA452009-0.5B SA187-0.5B SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA152-10B SA152-20B SA152-34B	Surfactants	J+ (all detects)	P	Calibration (CCV %R) (c)
R0903615	SA45-0.5B SA452009-0.5B SA187-0.5B SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA50-0.5B SA54-0.5B SA106-0.5B SA102-0.5B SA109-0.5B	Cyanide	J- (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0903615	SA45-0.5B SA452009-0.5B SA187-0.5B SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA50-0.5B SA54-0.5B SA106-0.5B SA102-0.5B SA109-0.5B	Total phosphorus	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0903615	SA106-0.5B	Hexavalent chromium (7/16/09 12:04) Hexavalent chromium (7/16/09 11:54)	J+ (all detects) J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0903615	SA106-0.5B	Hexavalent chromium (7/16/09 10:10) Hexavalent chromium (7/16/09 10:20)	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (Id)

SDG	Sample	Analyte	Flag	A or P	Reason
R0903615	SA50-0.5B SA54-0.5B SA106-0.5B SA102-0.5B SA109-0.5B	Bromide	J+ (all detects)	P	Laboratory control samples (%R) (l)
R0903615	SA45-0.5B SA452009-0.5B SA187-0.5B SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA152-10B SA152-20B SA152-34B SA50-0.5B SA54-0.5B SA106-0.5B SA106- 0.5BRE SA102-0.5B SA109-0.5B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0903615	SA106-0.5B	Hexavalent chromium	X	A	Overall assessment of data (o)
R0903615	SA45-0.5B SA452009-0.5B	Hexavalent chromium	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 R0903615

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0903615

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903615	SA152-10B	Chloride Nitrate as N Sulfate Surfactants	257J+ mg/Kg 5.13J+ mg/Kg 110J+ mg/Kg 2.2U mg/Kg	A	bf
R0903615	SA152-20B	Chloride Nitrate as N Sulfate Surfactants	395J+ mg/Kg 1.12J+ mg/Kg 121J+ mg/Kg 2.1U mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903615	SA152-34B	Nitrate as N Surfactants	1.47J+ mg/Kg 3.0U mg/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495H6
SDG #: R0903615
Laboratory: Columbia Analytical Services

Date: 9/23/09
Page: 1 of 1
Reviewer: CW
2nd Reviewer: JK

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Nitrite-N (EPA Method 353.2), Chlorate (EPA Method 300.1), Cyanide (EPA SW846 Method 9012A), Hexavalent Chromium (EPA SW846 Method 7199), 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: 6/29/09, 6/30/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW	
III.	Blanks	SW	
IV	Matrix Spike/Matrix Spike Duplicates	SW	3 MS/MSD/MSP
V	Duplicates	SW	
VI.	Laboratory control samples	SW	LCS
VII.	Sample result verification	N	
VIII.	Overall assessment of data	SW	
IX.	Field duplicates	SW	(1,2)
X	Field blanks	SW	FB=FB072109-SO (SDG: R0904016)

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	SA45-0.5B	11	SA50-0.5B	21	~~SA106-0.5BRE~~	31	MW
2	SA452009-0.5B	12	SA54-0.5B	22	SA106-0.5BRE MS	32	
3	SA187-0.5B	13	SA106-0.5B	23	" Dup	33	
4	SA153-0.5B	14	SA106-0.5BRE	24		34	
5	SA186-0.5B	15	SA102-0.5B	25		35	
6	SA185-0.5B	16	SA109-0.5B	26		36	
7	RSA05-0.5B	17	SA106-0.5BMS	27		37	
8	SA152-10B	18	SA106-0.5BMSD	28		38	
9	SA152-20B	19	SA106-0.5BDUP	29		39	
10	SA152-34B	20	~~REPS~~	30		40	

Notes: Surrogate = A

LDC #: 21495H6

SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1

Reviewer: [signature]

2nd reviewer: [signature]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-13,15,16	Soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
14	↓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
17-19	Soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
~~20,24~~		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN ~~Cr^{6+}~~ T-P MBAS TDS TSS Cond ClO_3 ClO_4
19		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
17	↓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
20-23	↓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: >1495H6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Calibration

Reviewer: MH
2nd Reviewer: R

METHOD: Inorganics, EPA Method See cover

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

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

LEVEL IV/D ONLY:

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

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
1	7/9/09	CCV	TOC	85.6	10-13, 15, 16, 18, 19	J-/UJ/P (c)
2	7/7/09	CCV ~~Surfactants~~	Surfactants	114	1-10	J-/UJ/P (c)
3	↓	↓	↓	112	↓	↓

Comments:

LDC #: 21495H6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: V
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". 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/Kg **Associated Samples:** MB: 1-10, ICB/CCB: 1-12 (>RL)

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB												
Total AlK	12	1.0											
Bicarb. AlK	12												
Cl	0.9												

Conc. units: mg/Kg **Associated Samples:** T-P*1:1,2 T-P*2:3-13,15,16, TOC*1:1-9, TOC*2: 10-13,15,16 (>RL),

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB												
T-P*1	1.3												
T-P*2	1.6												
TOC*1	120	76.3 mg/Kg											
TOC*2	130	143 mg/Kg											

Conc. units: mg/Kg **Associated Samples:** MB:11-13,15,16, ICB/CCB: 13, 15,16 (>RL)

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB												
Total AlK	15	0.9											
Bicarb. AlK	15												
Cl	1.1												
NO3-N	0.45												

LDC #: 21495H6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: LW
2nd Reviewer: R

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/Kg

Associated Samples: Cl*1:6, Cl*2:12 ,16, Cl*3:1,2,3,5, Cl*4:7,8,10,11,13 Cl*5:4,9, Cl*6:15 (>RL)

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB												
Cl*1		0.098											
Cl*2		0.106											
Cl*3		0.130											
Cl*4		0.137											
Cl*5		0.131											
Cl*6		0.139											

LDC #: 21495H6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: L
2nd Reviewer: R

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: bf
Sampling date: 7/21/09 Soil factor applied 10X
Field blank type: (circle one) Field Blank / Rinsate / Other: FB Associated Samples: 8-10

Analyte	Blank ID	Sample Identification									
	FB072109-SO	Action Level	8	9	10						
Ammonia as N	0.191	19.1									
TOC (average)	0.5										
Cl	9.7	970	257 J+	395 J+							
Nitrate as N	1.76	176	5.13 J+	1.12 J+	1.47 J+						
pH (pH Units)	3.36										
Total Phosphorus	0.01										
Sulfate	5.5	550	110 J+	121 J+							
Surfactants	0.159	15.9	1.5 / 2.2	1.4 / 2.1	1.8 / 3.0						

LDC #: 21495H6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

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

METHOD: Inorganics, Method See Cover

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

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

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

LEVEL IV ONLY:

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

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
1	17 *	Soil	CN	0	1-7, 11-13, 15, 16	J-/R/A (ms)
			T-P	72	↓	J-/ms/A ↓
			Cr6+	132 ** (7/16/09 1204)	↓ 13 ↓	J+ ↓/A ↓
			↓	136 ** (7/16/09 1154)	↓ ↓	↓ ↓

Comments: * parent is an Area 2 sample — ~~** from raw data~~ recovery within control limits.

MS.6

LDC #: 24495H6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Page: 1 of 1
Reviewer: MH
2nd Reviewer:

METHOD: Inorganics, Method See cover

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

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

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

LEVEL IV ONLY:

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

#	Duplicate ID	Matrix	Analyte	RPD (Limits) ≤20	Associated Samples	Qualifications
1	19	Soil	Cr+6	33 (7/16/09 10:10)	13	J/UJ/A (fd)
				34 (7/16/09 10:00)		

Comments: parent is not an Area 2 Sample, rerun within limits

LDC #: 21495H6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: MH
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

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

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

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

LEVEL IV ONLY:

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

#	LCS ID	Matrix	Analyte	%R (limits)	Associated Samples	Qualifications
1	LCS2	Soil	Br	111 (90-110)	11-13, 15, 16	J+ UJ/A (L)

Comments:

LDC #: 21495A6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: MH
2nd Reviewer: [signature]

METHOD: Inorganics, Method See cover

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
1		13	CV 6+ (MS/Dup failed) (# RPD MS/Dup within control limits)		X (o)

Comments:

LDC#: 21495H6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer:
2nd Reviewer:

Inorganics, Method See Cover

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

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	1	2				
Ammonia as N	2.53	2.42		0.11	(≤0.53)	
Total Alkalinity	147	134	9			
Bicarbonate Alkalinity	147	134	9			
Chloride	2960	2860	3			
Hexavalent Chromium	0.78	2.93		2.15	(≤0.42)	J det / A (fd)
Hexavalent Chromium	0.82	3.34		2.52	(≤0.42)	J det / A (fd)
Nitrate as N	40.6	41.1	1			
Nitrite as N	0.14	0.15		0.01	(≤0.11)	
pH (pH Units)	8.17	8.11	1			
Sulfate	6190	6250	1			
Surfactants	8.5	6.0	34			
Total Cyanide	0.42U	0.7		0.28	(≤1.0)	
TOC	5400	4800		600	(≤1700)	
Total Phosphorus	856	956	11			
Chlorate (ug/Kg)	8720000	8010000	8			
Perchlorate (ug/Kg)	481000	450000	7			

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: July 1 through July 2, 2009

LDC Report Date: September 28, 2009

Matrix: Soil/Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903678

Sample Identification

EB070109-SO1
SA114-0.5B
SA114009-0.5B
RSAN6-0.5B
SA82-0.5B
SA82-10B
SA82-29B
RSAL3-10B
RSAL3-30B
SA134-10B
SA134-20B
SA134-31B
SA134009-31B
SA88-10B
SA88-20B
SA88-32B
RSAK3-0.5B
RSAK3-10B
RSAK3-20B
RSAK3-31B
SA82-0.5BMS
SA82-0.5BMSD
SA82-0.5BDUP
RSAL3-30BMS
RSAL3-30BDUP
RSAK3-31BMS
RSAK3-31BMSD
RSAK3-31BDUP

Introduction

This data review covers 27 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 353.2 for Nitrite as Nitrogen, EPA 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, 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 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

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

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
7/9/09	CCV	Total organic carbon	85.6 (90-110)	SA114-0.5B SA114009-0.5B RSAN6-0.5B SA82-0.5B SA82-10B SA82-29B RSAL3-10B RSAL3-30B SA134-10B SA134-20B SA134-31B SA82-0.5BMS SA82-0.5BDUP	J- (all detects) UJ (all non-detects)	P

III. Blanks

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

Method Blank ID	Analyte	Concentration	Associated Samples
MB	Alkalinity, total Alkalinity, bicarbonate Chloride Total phosphorus	1.0 mg/L 1.0 mg/L 0.13 mg/L 0.005 mg/L	EB070109-SO1
ICB/CCB	Alkalinity, total Total phosphorus Ammonia as N	1.0 mg/L 0.0052 mg/L 0.0107 mg/L	EB070109-SO1
MB	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	15 mg/Kg 15 mg/Kg 1.1 mg/Kg 0.45 mg/Kg	SA114-0.5B SA114009-0.5B RSAN6-0.5B SA82-10B SA82-29B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Alkalinity, total Ammonia as N	0.9 mg/L 0.0077 mg/L	SA114-0.5B SA114009-0.5B RSAN6-0.5B SA82-10B SA82-29B
MB	Alkalinity, total Alkalinity, bicarbonate Chloride	10 mg/Kg 10 mg/Kg 1.3 mg/Kg	SA82-0.5B RSAL3-10B RSAL3-30B SA134-10B SA134-20B SA134-31B SA134009-31B SA88-10B SA88-20B SA88-32B
ICB/CCB	Alkalinity, total	1.0 mg/L	SA82-0.5B RSAL3-10B RSAL3-30B SA134-10B SA134-20B SA134-31B SA134009-31B SA88-10B SA88-20B SA88-32B
MB	Alkalinity, total Alkalinity, bicarbonate Chloride Surfactants	11 mg/Kg 11 mg/Kg 1.3 mg/Kg 1.2 mg/Kg	RSAK3-0.5B RSAK3-10B RSAK3-20B RSAK3-31B
ICB/CCB	Alkalinity, total	1.0 mg/L	RSAK3-0.5B RSAK3-10B RSAK3-20B RSAK3-31B
MB	Total organic carbon Total phosphorus	130 mg/Kg 1.6 mg/Kg	All samples in SDG R0903678
ICB/CCB	Total phosphorus	0.0066 mg/L	All samples in SDG R0903678
ICB/CCB	Total organic carbon	143 mg/Kg	SA114-0.5B SA114009-0.5B RSAN6-0.5B SA82-0.5B SA82-10B SA82-29B RSAL3-10B RSAL3-30B SA134-10B SA134-20B SA134-31B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Total organic carbon	127 mg/Kg	SA134009-31B SA88-10B SA88-20B SA88-32B RSAK3-0.5B RSAK3-10B RSAK3-20B
ICB/CCB	Total organic carbon	85.1 mg/Kg	RSAK3-31B
ICB/CCB	Chloride	0.106 mg/L	SA114-0.5B SA114009-0.5B RSAN6-0.5B SA82-10B
ICB/CCB	Chloride	0.135 mg/L	SA82-0.5B SA134-10B
ICB/CCB	Chloride	0.137 mg/L	SA82-29B RSAL3-10B
ICB/CCB	Chloride	0.136 mg/L	RSAL3-30B SA134-20B SA134-31B SA134009-31B SA88-10B SA88-20B SA88-32B RSAK3-0.5B RSAK3-10B RSAK3-20B RSAK3-31B

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
EB070109-SO1	Chloride Total phosphorus Ammonia as N	1.7 mg/L 0.014 mg/L 0.034 mg/L	2.0U mg/L 0.050U mg/L 0.050U mg/L
SA114-0.5B	Ammonia as N	0.48 mg/Kg	0.54U mg/Kg
SA82-10B	Ammonia as N	0.15 mg/Kg	0.35U mg/Kg
RSAK3-0.5B	Surfactants	1.1 mg/Kg	2.2U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAK3-10B	Surfactants	1.3 mg/Kg	2.2U mg/Kg
RSAK3-20B	Surfactants	1.7 mg/Kg	2.7U mg/Kg
RSAK3-31B	Surfactants	3.1 mg/Kg	3.5U mg/Kg

Sample EB070109-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
EB070109-SO1	7/1/09	Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus	0.034 mg/L 0.6 mg/L 1.7 mg/L 0.88 mg/L 4.25 mg/L 0.014 mg/L	No associated samples in this SDG

Sample FB072109-SO (from SDG R0904016) 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
FB072109-SO	7/21/09	Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Sulfate Surfactants	0.191 mg/L 0.5 mg/L 9.7 mg/L 1.76 mg/L 3.36 mg/L 0.01 mg/L 5.5 mg/L 0.159 mg/L	SA82-0.5B SA82-10B SA82-29B RSAL3-10B RSAL3-30B SA134-10B SA134-20B SA134-31B SA134009-31B SA88-10B SA88-20B SA88-32B RSAK3-0.5B RSAK3-10B RSAK3-20B RSAK3-31B

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
SA82-0.5B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.22 mg/Kg 37.3 mg/Kg 2.82 mg/Kg 175 mg/Kg 1.2 mg/Kg	0.51U mg/Kg 37.3J+ mg/Kg 2.82J+ mg/Kg 175J+ mg/Kg 2.1U mg/Kg
SA82-10B	Ammonia as N Chloride Nitrate as N Surfactants	0.15 mg/Kg 64.1 mg/Kg 2.43 mg/Kg 1.4 mg/Kg	0.53U mg/Kg 64.1J+ mg/Kg 2.43J+ mg/Kg 2.1U mg/Kg
SA82-29B	Nitrate as N Surfactants	2.60 mg/Kg 3.7 mg/Kg	2.60J+ mg/Kg 3.7J+ mg/Kg
RSAL3-10B	Chloride Nitrate as N Surfactants	138 mg/Kg 3.09 mg/Kg 1.4 mg/Kg	138J+ mg/Kg 3.09J+ mg/Kg 2.2U mg/Kg
RSAL3-30B	Nitrate as N Surfactants	3.32 mg/Kg 1.9 mg/Kg	3.32J+ mg/Kg 3.2U mg/Kg
SA134-10B	Chloride Nitrate as N Sulfate Surfactants	71.9 mg/Kg 3.65 mg/Kg 203 mg/Kg 1.1 mg/Kg	71.9J+ mg/Kg 3.65J+ mg/Kg 203J+ mg/Kg 2.2U mg/Kg
SA134-20B	Chloride Nitrate as N Surfactants	138 mg/Kg 2.20 mg/Kg 3.4 mg/Kg	138J+ mg/Kg 2.20J+ mg/Kg 3.4J+ mg/Kg
SA134-31B	Nitrate as N Surfactants	7.52 mg/Kg 2.7 mg/Kg	7.52J+ mg/Kg 3.0U mg/Kg
SA134009-31B	Nitrate as N Surfactants	7.73 mg/Kg 1.8 mg/Kg	7.73J+ mg/Kg 3.1U mg/Kg
SA88-10B	Ammonia as N Nitrate as N Sulfate Surfactants	0.33 mg/Kg 6.78 mg/Kg 89.2 mg/Kg 0.9 mg/Kg	0.55U mg/Kg 6.78J+ mg/Kg 89.2J+ mg/Kg 2.2U mg/Kg
SA88-20B	Nitrate as N Surfactants	5.72 mg/Kg 1.7 mg/Kg	5.72J+ mg/Kg 2.9U mg/Kg
SA88-32B	Ammonia as N Nitrate as N Surfactants	0.27 mg/Kg 2.44 mg/Kg 3.9 mg/Kg	0.85U mg/Kg 2.44J+ mg/Kg 3.9J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAK3-0.5B	Chloride Nitrate as N Sulfate Surfactants	939 mg/Kg 10.8 mg/Kg 442 mg/Kg 1.1 mg/Kg	939J+ mg/Kg 10.8J+ mg/Kg 442J+ mg/Kg 2.2U mg/Kg
RSAK3-10B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.37 mg/Kg 189 mg/Kg 3.19 mg/Kg 26.2 mg/Kg 1.3 mg/Kg	0.55U mg/Kg 189J+ mg/Kg 3.19J+ mg/Kg 26.2J+ mg/Kg 2.2U mg/Kg
RSAK3-20B	Chloride Nitrate as N Surfactants	517 mg/Kg 7.55 mg/Kg 1.7 mg/Kg	517J+ mg/Kg 7.55J+ mg/Kg 2.7U mg/Kg
RSAK3-31B	Nitrate as N Surfactants	2.78 mg/Kg 3.1 mg/Kg	2.78J+ mg/Kg 3.5U 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
SA82-0.5BMS/MSD (SA82-0.5B)	Chlorate	-	128 (75-125)	-	J+ (all detects)	A
SA82-0.5BMS (SA82-0.5B)	Surfactants	64 (75-125)	-	-	J- (all detects) UJ (all non-detects)	A

V. Duplicates

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

VI. Laboratory Control Samples

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

LCS ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
LCS	Bromide	111 (90-110)	SA114-0.5B SA114009-0.5B RSAN6-0.5B SA82-10B SA82-29B	J+ (all detects)	P

VII. Surrogates

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 R0903678	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 SA114-0.5B and SA114009-0.5B and samples SA134-31B and SA134009-31B 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)	Flag	A or P
	SA114-0.5B	SA114009-0.5B				
Ammonia as N	0.48 mg/Kg	4.64 mg/Kg	-	4.16 (≤0.55)	J (all detects)	A
Alkalinity, total	4750 mg/Kg	4610 mg/Kg	3 (≤50)	-	-	-
Alkalinity, bicarbonate	4340 mg/Kg	4260 mg/Kg	2 (≤50)	-	-	-
Alkalinity, carbonate	412 mg/Kg	346 mg/Kg	17 (≤50)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA114-0.5B	SA114009-0.5B				
Chloride	205 mg/Kg	203 mg/Kg	1 (≤50)	-	-	-
Hexavalent chromium	0.19U mg/Kg	18.9 mg/Kg	-	18.71 (≤0.43)	J (all detects) UJ (all non-detects)	A
Hexavalent chromium	0.19U mg/Kg	19.1 mg/Kg	-	18.91 (≤0.43)	J (all detects) UJ (all non-detects)	A
Nitrate as N	12.4 mg/Kg	12.3 mg/Kg	1 (≤50)	-	-	-
Nitrite as N	0.72 mg/Kg	0.67 mg/Kg	7 (≤50)	-	-	-
pH	9.66 units	9.43 units	2 (≤50)	-	-	-
Sulfate	299 mg/Kg	350 mg/Kg	16 (≤50)	-	-	-
Surfactants	6.7 mg/Kg	6.8 mg/Kg	1 (≤50)	-	-	-
Total organic carbon	71800 mg/Kg	71900 mg/Kg	0 (≤50)	-	-	-
Total phosphorus	451 mg/Kg	402 mg/Kg	11 (≤50)	-	-	-
Chlorate	416000 ug/Kg	411000 ug/Kg	1 (≤50)	-	-	-
Perchlorate	34100 ug/Kg	34900 ug/Kg	2 (≤50)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA134-31B	SA134009-31B				
Alkalinity, total	368 mg/Kg	370 mg/Kg	1 (≤50)	-	-	-
Alkalinity, bicarbonate	368 mg/Kg	370 mg/Kg	1 (≤50)	-	-	-
Bromide	2.0 mg/Kg	2.2 mg/Kg	-	0.2 (≤1.5)	-	-
Chloride	1780 mg/Kg	1880 mg/Kg	5 (≤50)	-	-	-
Nitrate as N	7.52 mg/Kg	7.73 mg/Kg	3 (≤50)	-	-	-
pH	7.94 units	7.89 units	1 (≤50)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA134-31B	SA134009-31B				
Sulfate	2510 mg/Kg	2630 mg/Kg	5 (≤50)	-	-	-
Surfactants	2.7 mg/Kg	1.8 mg/Kg	-	0.9 (≤3.1)	-	-
Total organic carbon	950 mg/Kg	1010 mg/Kg	-	60 (≤880)	-	-
Total Phosphorus	435 mg/Kg	473 mg/Kg	8 (≤50)	-	-	-
Chlorate	1870 ug/Kg	1870 ug/Kg	0 (≤50)	-	-	-
Perchlorate	31300 ug/Kg	34200 ug/Kg	9 (≤50)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R0903678

SDG	Sample	Analyte	Flag	A or P	Reason
R0903678	SA114-0.5B SA114009-0.5B RSAN6-0.5B SA82-0.5B SA82-10B SA82-29B RSAL3-10B RSAL3-30B SA134-10B SA134-20B SA134-31B	Total organic carbon	J- (all detects) UJ (all non-detects)	P	Calibration (CCV %R) (c)
R0903678	SA82-0.5B	Chlorate	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0903678	SA82-0.5B	Surfactants	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0903678	SA114-0.5B SA114009-0.5B RSAN6-0.5B SA82-10B SA82-29B	Bromide	J+ (all detects)	P	Laboratory control samples (%R) (l)
R0903678	EB070109-SO1 SA114-0.5B SA114009-0.5B RSAN6-0.5B SA82-0.5B SA82-10B SA82-29B RSAL3-10B RSAL3-30B SA134-10B SA134-20B SA134-31B SA134009-31B SA88-10B SA88-20B SA88-32B RSAK3-0.5B RSAK3-10B RSAK3-20B RSAK3-31B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0903678	SA114-0.5B SA114009-0.5B	Ammonia as N	J (all detects)	A	Field duplicates (Difference) (fd)
R0903678	SA114-0.5B SA114009-0.5B	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 R0903678

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903678	EB070109-SO1	Chloride Total phosphorus Ammonia as N	2.0U mg/L 0.050U mg/L 0.050U mg/L	A	bl
R0903678	SA114-0.5B	Ammonia as N	0.54U mg/Kg	A	bl
R0903678	SA82-10B	Ammonia as N	0.35U mg/Kg	A	bl
R0903678	RSAK3-0.5B	Surfactants	2.2U mg/Kg	A	bl
R0903678	RSAK3-10B	Surfactants	2.2U mg/Kg	A	bl
R0903678	RSAK3-20B	Surfactants	2.7U mg/Kg	A	bl
R0903678	RSAK3-31B	Surfactants	3.5U mg/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0903678

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903678	SA82-0.5B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.51U mg/Kg 37.3J+ mg/Kg 2.82J+ mg/Kg 175J+ mg/Kg 2.1U mg/Kg	A	bf
R0903678	SA82-10B	Ammonia as N Chloride Nitrate as N Surfactants	0.53U mg/Kg 64.1J+ mg/Kg 2.43J+ mg/Kg 2.1U mg/Kg	A	bf
R0903678	SA82-29B	Nitrate as N Surfactants	2.60J+ mg/Kg 3.7J+ mg/Kg	A	bf
R0903678	RSAL3-10B	Chloride Nitrate as N Surfactants	138J+ mg/Kg 3.09J+ mg/Kg 2.2U mg/Kg	A	bf
R0903678	RSAL3-30B	Nitrate as N Surfactants	3.32J+ mg/Kg 3.2U mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903678	SA134-10B	Chloride Nitrate as N Sulfate Surfactants	71.9J+ mg/Kg 3.65J+ mg/Kg 203J+ mg/Kg 2.2U mg/Kg	A	bf
R0903678	SA134-20B	Chloride Nitrate as N Surfactants	138J+ mg/Kg 2.20J+ mg/Kg 3.4J+ mg/Kg	A	bf
R0903678	SA134-31B	Nitrate as N Surfactants	7.52J+ mg/Kg 3.0U mg/Kg	A	bf
R0903678	SA134009-31B	Nitrate as N Surfactants	7.73J+ mg/Kg 3.1U mg/Kg	A	bf
R0903678	SA88-10B	Ammonia as N Nitrate as N Sulfate Surfactants	0.55U mg/Kg 6.78J+ mg/Kg 89.2J+ mg/Kg 2.2U mg/Kg	A	bf
R0903678	SA88-20B	Nitrate as N Surfactants	5.72J+ mg/Kg 2.9U mg/Kg	A	bf
R0903678	SA88-32B	Ammonia as N Nitrate as N Surfactants	0.85U mg/Kg 2.44J+ mg/Kg 3.9J+ mg/Kg	A	bf
R0903678	RSAK3-0.5B	Chloride Nitrate as N Sulfate Surfactants	939J+ mg/Kg 10.8J+ mg/Kg 442J+ mg/Kg 2.2U mg/Kg	A	bf
R0903678	RSAK3-10B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.55U mg/Kg 189J+ mg/Kg 3.19J+ mg/Kg 26.2J+ mg/Kg 2.2U mg/Kg	A	bf
R0903678	RSAK3-20B	Chloride Nitrate as N Surfactants	517J+ mg/Kg 7.55J+ mg/Kg 2.7U mg/Kg	A	bf
R0903678	RSAK3-31B	Nitrate as N Surfactants	2.78J+ mg/Kg 3.5U mg/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495I6
SDG #: R0903678
Laboratory: Columbia Analytical Services

Date: 9/14/09
Page: 1 of 1
Reviewer: MC
2nd Reviewer: [illegible]

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Nitrite-N (EPA Method 353.2), Chlorate (EPA Method 300.1), Cyanide (EPA SW846 Method 9012A), Hexavalent Chromium (EPA SW846 Method 7199), 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: 07/01/09, 07/02/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW	
III.	Blanks	SW	
IV	Surrogate	A	
V	Matrix Spike/Matrix Spike Duplicates	SW	MS/MSD/MS
VI.	Duplicates	A	
VII.	Laboratory control samples	SW	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(2,3) (12,13)
XI	Field blanks	SW	FB=FB072109-SO (SDG: R0904016), TB=1

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 A2

1	EB070109-SO1	11	SA134-20B	21	SA82-0.5BMS	31	MB
2	SA114-0.5B	12	SA134-31B	22	SA82-0.5BMSD	32	
3	SA114009-0.5B	13	SA134009-31B	23	SA82-0.5BDUP	33	
4	RSAN6-0.5B	14	SA88-10B	24	RSAL3-30BMS	34	
5	SA82-0.5B	15	SA88-20B	25	RSAL3-30BDUP	35	
6	SA82-10B	16	SA88-32B	26	RSAK3-31BMS	36	
7	SA82-29B	17	RSAK3-0.5B	27	RSAK3-31BMSD	37	
8	RSAL3-10B	18	RSAK3-10B	28	RSAK3-31BDUP	38	
9	RSAL3-30B	19	RSAK3-20B	29		39	
10	SA134-10B	20	RSAK3-31B	30		40	

Notes: _____

LDC #: 21495[illegible]
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

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

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-20	soil/[illegible]	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
1-3, 5-20	soil/[illegible]	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
21-23, 26-28	soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
21		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
26		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
23		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
24, 25		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
28		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 21495J6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Calibration

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

METHOD: Inorganics, EPA Method See cover

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

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

LEVEL IV/D ONLY:

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

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
1	7/9/09	CCV	TOC	85.6	2-12, 2-1, 2-3	J-/UJ/P (CC)

Comments:

LDC #: 21495I6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer:
2nd Reviewer:

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?

(N) 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/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB			1									
Total AlK	1.0	1.0											
Bicarb. AlK	1.0												
Cl	0.13			1.7 / 2.0									
T-P	0.005	0.0052		0.014 / 0.050									
NH3-N		0.0107		0.034 / 0.050									

Conc. units: mg/Kg **Associated Samples:** 2-4, 6,7

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB			2	6								
Total AlK	15	0.9											
Bicarb. AlK	15												
Cl	1.1												
NO3-N	0.45												
NH3-N		0.0077		0.48 / 0.54	0.15 / 0.35								

LDC #: 21495I6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer:
2nd Reviewer:

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/Kg **Associated Samples:** 5, 8-16 (>RL)

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB												
Total Alk	10	1.0											
Bicarb. Alk	10												
Cl	1.3												

Conc. units: mg/Kg **Associated Samples:** 17-20

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB			17	18	19	20						
Total Alk	11	1.0											
Bicarb. Alk	11												
Cl	1.3												
Surfactants	1.2			1.1 / 2.2	1.3 / 2.2	1.7 / 2.7	3.1 / 3.5						

Conc. units: mg/Kg **Associated Samples:** All except TOC*1: 2-12, TOC*2:13-19, TOC*3:20 (>RL)

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB												
TOC	130												
T-P	1.6	0.0066											
TOC*1		143 mg/Kg											
TOC*2		127 mg/Kg											
TOC*3		85.1 mg/Kg											

LDC #: 21495I6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer:
2nd Reviewer:

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/Kg **Associated Samples:** Cl*1:2-4,6,Cl*2: 5,10,Cl*3:7,8 Cl*4:9,11-20 (>RL)

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB												
Cl*1		0.106											
Cl*2		0.135											
Cl*3		0.137											
Cl*4		0.136											

LDC #: 21495I6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

METHOD: Inorganics, Method See Cover
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/Kg Reason Code: be
Sampling date: 7/01/09 Soil factor applied 10X
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: None (EB is not from area 1)

Analyte	Blank ID	Sample Identification									
	1	Action Level									
Ammonia as N	0.034										
TOC (average)	0.6										
Cl	1.7										
Nitrate as N	0.88	88									
pH (pH Units)	4.25										
Total Phosphorus	0.014										

LDC #: 21495I6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

METHOD: Inorganics, Method See Cover
(Y) N N/A Were field blanks identified in this SDG?
(Y) N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/Kg Reason Code: bf
Sampling date: 7/21/09 Soil factor applied 10X
Field blank type: (circle one) Field Blank / Rinsate / Other: FB Associated Samples: 5-20

Analyte	Blank ID	Sample Identification									
	FB072109-SO	Action Level	5	6	7	8	9	10	11	12	13
Ammonia as N	0.191	19.1	0.22 / 0.51	0.15 / 0.53							
TOC (average)	0.5										
Cl	9.7	970	37.3 J+	64.1 J+		138 J+		71.9 J+	138 J+		
Nitrate as N	1.76	176	2.82 J+	2.43 J+	2.60 J+	3.09 J+	3.32 J+	3.65 J+	2.20 J+	7.52 J+	7.73 J+
pH (pH Units)	3.36										
Total Phosphorus	0.01										
Sulfate	5.5	550	175 J+					203 J+			
Surfactants	0.159	15.9	1.2 / 2.1	1.4 / 2.1	3.7 J+	1.4 / 2.2	1.9 / 3.2	1.1 / 2.2	3.4 J+	2.7 / 3.0	1.8 / 3.1

Analyte	Blank ID	Sample Identification									
	FB072109-SO	Action Level	14	15	16	17	18	19	20		
Ammonia as N	0.191	19.1	0.33 / 0.55		0.27 / 0.85		0.37 / 0.55				
TOC (average)	0.5										
Cl	9.7	970				939 J+	189 J+	517 J+			
Nitrate as N	1.76	176	6.78 J+	5.72 J+	2.44 J+	10.8 J+	3.19 J+	7.55 J+	2.78 J+		
pH (pH Units)	3.36										
Total Phosphorus	0.01										
Sulfate	5.5	550	89.2 J+			442 J+	26.2 J+				
Surfactants	0.159	15.9	0.9 / 2.2	1.7 / 2.9	3.9 J+	1.1 / 2.2	1.3 / 2.2	1.7 / 2.7	3.1 / 3.5		

LDC #: 21495J6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: MW
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See cover

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

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

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

(Y) N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

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

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
1	21/22	Soil	Chloride		128		5	J+/UJ/A (MS) (26/27 in control)
2	21	Soil	Surfactants	64			5	J-/UJ/A (MS) (#26 in control)

Comments:

LDC #: 21495I6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: MH
2nd Reviewer:

METHOD: Inorganics, Method See cover

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

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

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

LEVEL IV ONLY:

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

Lab limits

#	LCS ID	Matrix	Analyte	%R (limits)	Associated Samples	Qualifications
1	LCS	Soil	Br	111 (90-110)	2-4, 6, 7	J+ UJ/R (P)

Comments:

LDC#: 21495I6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer:
2nd Reviewer:

Inorganics, Method See Cover

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

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	2	3				
Ammonia as N	0.48	4.64		4.16	(≤0.55)	J det / A (fd)
Total Alkalinity	4750	4610	3			
Bicarbonate Alkalinity	4340	4260	2			
Carbonate Alkalinity	412	346	17			
Chloride	205	203	1			
Hexavalent Chromium	0.19U	18.9		18.71	(≤0.43)	J / UJ / A (fd)
Hexavalent Chromium	0.19U	19.1		18.91	(≤0.43)	J / UJ / A (fd)
Nitrate as N	12.4	12.3	1			
Nitrite as N	0.72	0.67	7			
pH (pH Units)	9.66	9.43	2			
Sulfate	299	350	16			
Surfactants	6.7	6.8	1			
TOC	71800	71900	0			
Total Phosphorus	451	402	11			
Chlorate (ug/Kg)	416000	411000	1			
Perchlorate (ug/Kg)	34100	34900	2			

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	12	13				
Total Alkalinity	368	370	1			

LDC#: 21495I6 **VALIDATION FINDINGS WORKSHEET** Page: 1 of 1
SDG#: See Cover **Field Duplicates** Reviewer: V
2nd Reviewer: [illegible]

Inorganics, Method See Cover

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

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	12	13				
Bicarbonate Alkalinity	368	370	1			
Bromide	2.0	2.2		0.2	(≤1.5)	
Chloride	1780	1880	5			
Nitrate as N	7.52	7.73	3			
pH (pH Units)	7.94	7.89	1			
Sulfate	2510	2630	5			
Surfactants	2.7	1.8		0.9	(≤3.1)	
TOC	950	1010		60	(≤880)	
Total Phosphorus	435	473	8			
Chlorate (ug/Kg)	1870	1870	0			
Perchlorate (ug/Kg)	31300	34200	9			

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 25 through July 1, 2009

LDC Report Date: September 29, 2009

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903561

Sample Identification

M-75B
M-13AB
M-13009AB
M-64B
M-111AB
EB062909-GW1
M-25B
M-12AB
M-110B
I-ARB
M-111ABMS
M-111ABMSD
M-111ABDUP

Introduction

This data review covers 13 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 353.2 for Nitrite as Nitrogen, EPA 300.1 for Chlorate, EPA Method 120.1 for Conductivity, EPA SW 846 Method 9012A for Cyanide, EPA Method 218.6 for Dissolved Hexavalent Chromium, 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, Standard Method 2540C for Total Dissolved Solids, 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.

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-75B	Perchlorate	34	28 days	J- (all detects) UJ (all non-detects)	P
M-13AB M-13009AB M-64B	Perchlorate	33	28 days	J- (all detects) UJ (all non-detects)	P
M-111AB M-111ABMS M-111ABMSD M-111ABDUP	Perchlorate	30	28 days	J- (all detects) UJ (all non-detects)	P
EB062909-GW1 M-25B	Perchlorate	29	28 days	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

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
MB	Alkalinity, total Alkalinity, bicarbonate	1.0 mg/L 1.0 mg/L	All samples in SDG R0903561
ICB/CCB	Alkalinity, total	1.0 mg/L	All samples in SDG R0903561
MB	Total organic carbon	0.2 mg/L	M-75B M-13AB M-13009AB M-64B

Method Blank ID	Analyte	Concentration	Associated Samples
MB	Total phosphorus	0.008 mg/L	M-75B M-13AB M-13009AB M-64B
MB	Total phosphorus	0.005 mg/L	M-111AB EB062909-GW1 M-25B M-12AB M-110B I-ARB
ICB/CCB	Total phosphorus	0.008 mg/L	M-75B M-13AB M-13009AB M-64B
ICB/CCB	Total phosphorus	0.005 mg/L	M-111AB EB062909-GW1 M-25B M-12AB M-110B I-ARB
MB	Chloride	0.13 mg/L	EB062909-GW1
ICB/CCB	Chloride	0.13 mg/L	EB062909-GW1
MB	Chloride	0.13 mg/L	M-25B M-12AB M-110B
ICB/CCB	Chloride	0.14 mg/L	M-25B M-12AB
MB	Chloride	0.16 mg/L	M-64B M-111AB I-ARB
ICB/CCB	Chloride	0.14 mg/L	M-64B M-111AB I-ARB

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-75B	Total phosphorus	0.026 mg/L	0.050U mg/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
M-13AB	Total phosphorus	0.021 mg/L	0.050U mg/L
M-13009AB	Total phosphorus	0.019 mg/L	0.050U mg/L
M-64B	Total phosphorus	0.035 mg/L	0.050U mg/L
M-111AB	Total phosphorus	0.029 mg/L	0.050U mg/L
EB062909-GW1	Total phosphorus Chloride	0.015 mg/L 1.9 mg/L	0.050U mg/L 2.0U mg/L
M-25B	Total phosphorus	0.029 mg/L	0.050U mg/L
M-110B	Total phosphorus	0.021 mg/L	0.050U mg/L
I-ARB	Total phosphorus	0.021 mg/L	0.050U mg/L

Sample EB062909-GW1 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
EB062909-GW1	6/29/09	Ammonia as N Total organic carbon Chloride Conductivity Nitrate as N pH Total phosphorus	0.012 mg/L 0.2 mg/L 1.9 mg/L 3.06 umhos/cm 0.84 mg/L 5.16 units 0.015 mg/L	No associated samples in this SDG

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

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

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. Surrogates

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 R0903561	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 M-13AB and M-13009AB 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)	Flag	A or P
	M-13AB	M-13009AB				
Ammonia as N	0.035 mg/L	0.155 mg/L	-	0.12 (≤0.05)	J (all detects)	A
Alkalinity, total	118 mg/L	116 mg/L	2 (≤30)	-	-	-
Alkalinity, bicarbonate	118 mg/L	116 mg/L	2 (≤30)	-	-	-
Bromide	0.8 mg/L	0.9 mg/L	-	0.1 (≤1.0)	-	-
Chloride	236 mg/L	286 mg/L	19 (≤30)	-	-	-
Conductivity	4000 umhos/cm	3990 umhos/cm	0 (≤30)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
	M-13AB	M-13009AB				
Cyanide	0.041 mg/L	0.060 mg/L	-	0.019 (≤0.050)	-	-
Hexavalent Chromium	0.714 mg/L	0.720 mg/L	1 (≤30)	-	-	-
Nitrate as N	3.53 mg/L	4.88 mg/L	32 (≤30)	-	J (all detects)	A
pH	7.49 units	7.50 units	0 (≤30)	-	-	-
Sulfate	1440 mg/L	1480 mg/L	3 (≤30)	-	-	-
Surfactants	0.052 mg/L	0.052 mg/L	-	0 (≤0.020)	-	-
Total dissolved solids	3100 mg/L	3120 mg/L	1 (≤30)		-	-
Total organic carbon	1.4 mg/L	1.3 mg/L	-	0.1 (≤1.0)	-	-
Total phosphorus	0.021 mg/L	0.019 mg/L	-	0.002 (≤0.05)	-	-
Chlorate	284000 ug/L	284000 ug/L	0 (≤30)	-	-	-
Perchlorate	18500 ug/L	19500 ug/L	5 (≤30)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R0903561

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0903561	M-75B M-13AB M-13009AB M-64B M-111AB EB062909-GW1 M-25B	Perchlorate	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0903561	M-75B M-13AB M-13009AB M-64B M-111AB EB062909-GW1 M-25B M-12AB M-110B I-ARB	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0903561	M-13AB M-13009AB	Ammonia as N	J (all detects)	A	Field duplicates (Difference) (fd)
R0903561	M-13AB M-13009AB	Nitrate as N	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 R0903561

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903561	M-75B	Total phosphorus	0.050U mg/L	A	bl
R0903561	M-13AB	Total phosphorus	0.050U mg/L	A	bl
R0903561	M-13009AB	Total phosphorus	0.050U mg/L	A	bl
R0903561	M-64B	Total phosphorus	0.050U mg/L	A	bl
R0903561	M-111AB	Total phosphorus	0.050U mg/L	A	bl
R0903561	EB062909-GW1	Total phosphorus Chloride	0.050U mg/L 2.0U mg/L	A	bl
R0903561	M-25B	Total phosphorus	0.050U mg/L	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903561	M-110B	Total phosphorus	0.050U mg/L	A	bl
R0903561	I-ARB	Total phosphorus	0.050U mg/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0903561

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495J6
SDG #: R0903561
Laboratory: Columbia Analytical Services

Date: 9/29/09
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Nitrite-N (EPA Method 353.2), Chlorate (EPA Method 300.1), Conductivity (EPA Method 120.1), Cyanide (EPA SW846 Method 9012A), Dissolved Hexavalent Chromium (EPA Method 218.6), pH (EPA SW846 Method 9040B), Surfactants (SM5540C), Perchlorate (EPA Method 314.0), Total Phosphorus (EPA Method 365.1), TDS (SM2540C), TSS (SM2540D), TOC (EPA SW846 Method 9060), ~~Cation-Anion Balance Difference, Calculated TDS/EC Ratio, Measured TDS/EC Ratio, Conductivity Ratio, TDS Ratio (SM1030E)~~

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 6/25/09 - 7/1/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	~~SW~~ A	
III.	Blanks	SW	
IV	Surrogate	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS/MSD Pump
VI.	Duplicates	A	
VII.	Laboratory control samples	A	LCS/LCSD
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(2,3)
XI.	Field blanks	SW	Filter Blank=MC-3B-FILT (R0902886), EB=6

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

Validated Samples: All

1	M-75B	11	M-111ABMS	21	MW	31	
2	M-13AB	12	M-111ABMSD	22		32	
3	M-13009AB	13	M-111ABDUP	23		33	
4	M-64B	14		24		34	
5	M-111AB	15		25		35	
6	EB062909-GW1	16		26		36	
7	M-25B	17		27		37	
8	M-12AB	18		28		38	
9	M-110B	19		29		39	
10	I-ARB	20		30		40	

Notes:

LDC #: 21495J6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

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

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-10	Aq	(Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4)
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
MH1-13	Aq	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond (ClO_3) (ClO_4)
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio
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		CAB Calculate TDS/EC Measured TDS/EC Cond Ratio TDS Ratio

Comments:

LDC #: 21495J6
SDG #: Silcon

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: W
2nd reviewer: [signature]

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

Method:	7/4.0					
Parameters:	cl04					
Technical holding time:	28 days					

Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
1	6/25/09	7/29/09	(34 days)				J-/UJ/p (CW)
2, 3	↓	7/28/09	(33 days)				
4	6/26/09	7/29/09	(33 days)				
5, 11-13	6/29/09	7/29/09	(30 days)				
6	↓	7/28/09	(29 days)				
7	6/30/09	7/29/09	(29 days)				

LDC #: 21495J6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer:
2nd Reviewer:

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?
(N) 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 (ND or > RL)

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB												
Total Alk	1.0	1.0											
Bicar Alk	1.0												

Conc. units: mg/L **Associated Samples:** 1-4 (>RL)

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB												
TOC	0.2												

Conc. units: mg/L **Associated Samples:** T-P*1:1-4, T-P*2:5-10

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB			1	2	3	4	5	6	7	9	10	
T-P*1	0.008	0.008		0.026 / 0.050	0.021 / 0.050	0.019 / 0.050	0.035 / 0.050						
T-P*2	0.005	0.005						0.029 / 0.050	0.015 / 0.050	0.029 / 0.050	0.021 / 0.050	0.021 / 0.050	

Conc. units: mg/L **Associated Samples:** 6

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB			6									
Cl	0.13	0.13		1.9 / 2.0									

LDC #: 21495J6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: W
2nd Reviewer: R

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:** MB: 7-9, ICB/CCB: 7,8 (>RL)

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB												
Cl	0.13	0.14											

Conc. units: mg/L **Associated Samples:** 4,5,10 (>RL)

Analyte	Blank ID	Maximum ICB/CCB	Blank Action Limit	Sample Identification									
	MB												
Cl	0.16	0.14											

LDC #: 21495J6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

METHOD: Inorganics, Method See Cover
(Y) N N/A Were field blanks identified in this SDG?
(Y) N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/L
Sampling date: 6/29/09 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: EB

Reason Code: be

Associated Samples: ~~6~~ None

Analyte	Blank ID	Sample Identification								
	6	Action Level	~~5~~							
NH3-N	0.012									
TOC (average)	0.2									
Cl	1.9									
Conductivity (umhos/cm)	3.06									
NO3-N	0.84	8.4								
pH (pH Units)	5.16									
Total Phosphorus	0.015		~~0.029 / 0.050~~							

LDC#: 21495J6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer:
2nd Reviewer:

Inorganics, Method See Cover

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

Analyte	Concentration (mg/L)		RPD (≤30)	Difference	Limits	Qualification (Parent only)
	2	3				
Ammonia as N	0.035	0.155		0.12	(≤0.05)	J det / A (fd)
Total Alkalinity	118	116	2			
Bicarbonate Alkalinity	118	116	2			
Bromide	0.8	0.9		0.1	(≤1.0)	
Chloride	236	286	19			
Conductivity (umhos/cm)	4000	3990	0			
Cyanide	0.041	0.060		0.019	(≤0.050)	
Hexavalent Chromium	0.714	0.720	1			
Nitrate as N	3.53	4.88	32			J det / A (fd)
pH (pH Units)	7.49	7.50	0			
Sulfate	1440	1480	3			
Surfactants	0.052	0.052		0	(≤0.020)	
TDS	3100	3120	1			
TOC, Average	1.4	1.3		0.1	(≤1.0)	
Total Phosphorus	0.021	0.019		0.002	(≤0.05)	
Chlorate (ug/L)	284000	284000	0			
Perchlorate (ug/L)	18500	19500	5			

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 25 through June 26, 2009

LDC Report Date: September 28, 2009

Matrix: Soil/Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903584

Sample Identification

SA202-10B	SA202-10BMSD
SA202-28B	SA202-10BDUP
RSAI3-10B	
RSAI3-20B	
RSAI3-32B	
SA188-0.5B	
SA172-0.5B	
SA41-0.5B	
SA44-0.5B	
SA42-0.5B	
RSAI2-10B	
RSAI2009-10B	
RSAI2-20B	
RSAI2-31B	
RSAJ2-10B	
RSAJ2-20B	
RSAJ2-33B	
RSAJ2009-33B	
EB062609-SO	
SA202-10BMS	

Introduction

This data review covers 21 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 353.2 for Nitrite as Nitrogen, EPA 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, 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, Standard Method 2540C for Total Dissolved Solids, Standard Method 2540D for Total suspended Solids, and EPA SW 846 Method 9060 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 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
EB062609-SO	Perchlorate	33 days	28 days	J- (all detects) UJ (all non-detects)	P
	Hexavalent chromium	27 hours	24 hours	J- (all detects) UJ (all non-detects)	

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

II. Calibration

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

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
7/2/09	CCV (22:09)	Bromide	174 (90-110)	EB062609-SO	R (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
MB	Alkalinity, total Alkalinity, bicarbonate Chloride	19 mg/Kg 19 mg/Kg 1 mg/Kg	SA202-10B SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B SA188-0.5B SA172-0.5B SA41-0.5B SA44-0.5B SA42-0.5B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Alkalinity, total Ammonia as N	1.0 mg/L 0.0056 mg/L	SA202-10B SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B SA188-0.5B SA172-0.5B SA41-0.5B SA44-0.5B SA42-0.5B
MB	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	10 mg/Kg 10 mg/Kg 1.0 mg/Kg 0.46 mg/Kg	RSAI2-10B RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B
ICB/CCB	Alkalinity, total	1.0 mg/L	RSAI2-10B RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B
MB	Total organic carbon	50 mg/Kg	SA202-10B SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B SA188-0.5B SA172-0.5B SA41-0.5B SA44-0.5B SA42-0.5B RSAI2-10B RSAI2009-10B RSAI2-20B RSAJ2-10B
MB	Total organic carbon	70 mg/Kg	RSAI2-31B RSAJ2-20B RSAJ2-33B RSAJ2009-33B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Total organic carbon	58 mg/Kg	SA202-10B SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B SA188-0.5B SA172-0.5B SA41-0.5B SA44-0.5B SA42-0.5B RSAI2-10B RSAI2009-10B RSAI2-20B RSAJ2-10B
ICB/CCB	Total organic carbon	71 mg/Kg	RSAI2-31B RSAJ2-20B RSAJ2-33B RSAJ2009-33B
ICB/CCB	Chloride	0.103 mg/L	SA202-10B SA41-0.5B SA44-0.5B SA42-0.5B
ICB/CCB	Chloride	0.094 mg/L	RSAI2-10B RSAI2009-10B RSAI2-20B
ICB/CCB	Chloride	0.106 mg/L	SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B SA188-0.5B
ICB/CCB	Chloride	0.111 mg/L	SA172-0.5B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B
MB	Total phosphorus	1.3 mg/Kg	All samples in SDG R0903584
ICB/CCB	Total phosphorus	0.0073 mg/L	All samples in SDG R0903584
MB	Alkalinity, total Alkalinity, bicarbonate Bromide Chloride Total phosphorus	1.0 mg/L 1.0 mg/L 0.06 mg/L 0.1 mg/L 0.005 mg/L	EB062609-SO

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Alkalinity, total Bromide Chloride Total phosphorus	1.0 mg/L 0.078 mg/L 0.099 mg/L 0.0052 mg/L	EB062609-SO

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
SA202-10B	Ammonia as N	0.39 mg/Kg	0.55U mg/Kg
RSAI3-10B	Ammonia as N	0.43 mg/Kg	0.55U mg/Kg
RSAI3-20B	Ammonia as N	0.21 mg/Kg	0.65U mg/Kg
SA44-0.5B	Ammonia as N	0.11 mg/Kg	0.52U mg/Kg
SA42-0.5B	Ammonia as N	0.13 mg/Kg	0.51U mg/Kg
RSAI2-20B	Chloride	1.6 mg/Kg	2.2U mg/Kg
RSAI3-32B	Total organic carbon	270 mg/Kg	290U mg/Kg
EB062609-SO	Chloride Total phosphorus	1.0 mg/L 0.01 mg/L	2.0U mg/L 0.05U mg/L

Sample EB062609-SO 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
EB062609-SO	6/26/09	Ammonia as N Chloride Nitrate as N pH Total phosphorus Sulfate Surfactants Chlorate	0.087 mg/L 1.0 mg/L 0.62 mg/L 6.27 units 0.01 mg/L 1.5 mg/L 0.016 mg/L 3 ug/L	RSAI2-10B RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B
EB062609-SO	6/26/09	Total dissolved solids	6 mg/L	No associated samples in this SDG

Sample FB072109-SO (from SDG R0904016) 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
FB072109-SO	7/21/09	Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Sulfate Surfactants	0.191 mg/L 0.5 mg/L 9.7 mg/L 1.76 mg/L 3.36 mg/L 0.01 mg/L 5.5 mg/L 0.159 mg/L	SA202-10B SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B RSAI2-10B RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B

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
SA202-10B	Ammonia as N Nitrate as N Sulfate Surfactants	0.39 mg/Kg 6.18 mg/Kg 321 mg/Kg 2.4 mg/Kg	0.55U mg/Kg 6.18J+ mg/Kg 321J+ mg/Kg 2.4J+ mg/Kg
SA202-28B	Chloride Nitrate as N Surfactants	864 mg/Kg 2.65 mg/Kg 1.3 mg/Kg	864J+ mg/Kg 2.65J+ mg/Kg 3.2U mg/Kg
RSAI3-10B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.43 mg/Kg 177 mg/Kg 1.41 mg/Kg 170 mg/Kg 2.5 mg/Kg	0.55U mg/Kg 177J+ mg/Kg 1.41J+ mg/Kg 170J+ mg/Kg 2.5J+ mg/Kg
RSAI3-20B	Ammonia as N Chloride Nitrate as N Surfactants	0.21 mg/Kg 934 mg/Kg 2.29 mg/Kg 3.0 mg/Kg	0.65U mg/Kg 934J+ mg/Kg 2.29J+ mg/Kg 3.0J+ mg/Kg
RSAI3-32B	Nitrate as N Surfactants	2.05 mg/Kg 3.6 mg/Kg	2.05J+ mg/Kg 3.6J+ mg/Kg
RSAI2-10B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.08 mg/Kg 4.5 mg/Kg 1.08 mg/Kg 12.2 mg/Kg 1.3 mg/Kg	0.54U mg/Kg 4.5J+ mg/Kg 1.08J+ mg/Kg 12.2J+ mg/Kg 2.2U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAI2009-10B	Ammonia as N Chloride Nitrate as N Sulfate Chlorate	0.11 mg/Kg 6.8 mg/Kg 0.98 mg/Kg 15.0 mg/Kg 198 ug/Kg	0.54U mg/Kg 6.8J+ mg/Kg 0.98J+ mg/Kg 15.0J+ mg/Kg 220U ug/Kg
RSAI2-20B	Chloride Nitrate as N Surfactants Chlorate	1.6 mg/Kg 0.71 mg/Kg 1.3 mg/Kg 62 ug/Kg	2.2U mg/Kg 0.71J+ mg/Kg 2.2U mg/Kg 220U Ug/Kg
RSAI2-31B	Nitrate as N Surfactants Chlorate	0.93 mg/Kg 2.0 mg/Kg 69 Ug/Kg	0.93J+ mg/Kg 3.2U mg/Kg 320U Ug/Kg
RSAJ2-10B	Ammonia as N Nitrate as N Sulfate Surfactants	0.09 mg/Kg 2.15 mg/Kg 146 mg/Kg 1.3 mg/Kg	0.54U mg/Kg 2.15J+ mg/Kg 146J+ mg/Kg 2.2U mg/Kg
RSAJ2-20B	Ammonia as N Chloride Nitrate as N Surfactants	0.18 mg/Kg 828 mg/Kg 1.20 mg/Kg 1.2 mg/Kg	0.53U mg/Kg 828J+ mg/Kg 1.20J+ mg/Kg 2.1U mg/Kg
RSAJ2-33B	Nitrate as N Surfactants	0.90 mg/Kg 1.9 mg/Kg	0.90J+ mg/Kg 3.4U mg/Kg
RSAJ2009-33B	Ammonia as N Nitrate as N Surfactants Chlorate	0.18 mg/Kg 0.96 mg/Kg 2.5 mg/Kg 71 ug/Kg	0.88U mg/Kg 0.96J+ mg/Kg 3.5U mg/Kg 360U Ug/Kg

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

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
SA202-10BDUP (SA202-10B SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B RSAI2-10B RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B)	Perchlorate	21 (≤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) were within QC limits with the following exceptions:

LCS ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
LCS	Hexavalent chromium	91 (92-110)	All water samples in SDG R0903584	J- (all detects) UJ (all non-detects)	P

VII. Surrogates

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 R0903584	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 RSAI2-10B and RSAI2009-10B and samples RSAJ2-33B and RSAJ2009-33B 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)	Flag	A or P
	RSAI2-10B	RSAI2009-10B				
Ammonia as N	0.08 mg/Kg	0.11 mg/Kg	-	0.03 (≤0.54)	-	-
Alkalinity, total	1700 mg/Kg	1730 mg/Kg	2 (≤50)	-	-	-
Alkalinity, bicarbonate	1560 mg/Kg	1620 mg/Kg	4 (≤50)	-	-	-
Alkalinity, carbonate	139 mg/Kg	113 mg/Kg	21 (≤50)	-	-	-
Chloride	4.5 mg/Kg	6.8 mg/Kg	-	2.3 (≤2.2)	J (all detects)	A
Nitrate as N	1.08 mg/Kg	0.98 mg/Kg	-	0.1 (≤0.54)	-	-
pH	9.89 units	9.8 units	1 (≤50)	-	-	-
Sulfate	12.2 mg/Kg	15 mg/Kg	21 (≤50)	-	-	-
Surfactants	1.3 mg/Kg	0.6U mg/Kg	-	0.7 (≤2.2)	-	-
Total organic carbon	530 mg/Kg	610 mg/Kg	-	80 (≤360)	-	-
Total phosphorus	891 mg/Kg	846 mg/Kg	5 (≤50)	-	-	-
Chlorate	335 ug/Kg	198 ug/Kg	-	137 (≤2204)	-	-
Perchlorate	375 ug/Kg	470 ug/Kg	22 (≤50)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
	RSAJ2-33B	RSAJ2009-33B				
Ammonia as N	0.08U mg/Kg	0.18 mg/Kg	-	0.1(≤0.88)	-	-
Alkalinity, total	366 mg/Kg	416 mg/Kg	13 (≤50)	-	-	-
Alkalinity, bicarbonate	366 mg/Kg	416 mg/Kg	13 (≤50)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flag	A or P
	RSAJ2-33B	RSAJ2009-33B				
Bromide	26.2 mg/Kg	30.8 mg/Kg	16 (≤50)	-	-	-
Chloride	2450 mg/Kg	2660 mg/Kg	8 (≤50)	-	-	-
Nitrate as N	0.90 mg/Kg	0.96 mg/Kg	-	0.06 (≤0.88)	-	-
pH	8.80 units	8.14 units	8 (≤50)		-	-
Sulfate	890 mg/Kg	1030 mg/Kg	15 (≤50)		-	-
Surfactants	1.9 mg/Kg	2.5 mg/Kg	-	0.6 (≤3.5)	-	-
Total organic carbon	540 mg/Kg	520 mg/Kg	-	20 (≤300)	-	-
Total phosphorus	711 mg/Kg	755 mg/Kg	6 (≤50)	-	-	-
Chlorate	69U ug/Kg	71 ug/Kg	-	2 (≤360)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R0903584

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0903584	EB062609-SO	Perchlorate Hexavalent chromium	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0903584	EB062609-SO	Bromide	R (all detects)	P	Calibration (CCV %R) (c)
R0903584	SA202-10B SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B RSAI2-10B RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B	Perchlorate	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (Id)
R0903584	EB062609-SO	Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0903584	SA202-10B SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B SA188-0.5B SA172-0.5B SA41-0.5B SA44-0.5B SA42-0.5B RSAI2-10B RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B EB062609-SO	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0903584	RSAI2-10B RSAI2009-10B	Chloride	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 R0903584

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903584	SA202-10B	Ammonia as N	0.55U mg/Kg	A	bl
R0903584	RSAI3-10B	Ammonia as N	0.55U mg/Kg	A	bl
R0903584	RSAI3-20B	Ammonia as N	0.65U mg/Kg	A	bl
R0903584	SA44-0.5B	Ammonia as N	0.52U mg/Kg	A	bl
R0903584	SA42-0.5B	Ammonia as N	0.51U mg/Kg	A	bl
R0903584	RSAI2-20B	Chloride	2.2U mg/Kg	A	bl
R0903584	RSAI3-32B	Total organic carbon	290U mg/Kg	A	bl
R0903584	EB062609-SO	Chloride Total phosphorus	2.0U mg/L 0.05U mg/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0903584

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903584	SA202-10B	Ammonia as N Nitrate as N Sulfate Surfactants	0.55U mg/Kg 6.18J+ mg/Kg 321J+ mg/Kg 2.4J+ mg/Kg	A	be
R0903584	SA202-28B	Chloride Nitrate as N Surfactants	864J+ mg/Kg 2.65J+ mg/Kg 3.2U mg/Kg	A	be
R0903584	RSAI3-10B	Ammonia as N Chloride Nitrate as N Sulfate Surfactants	0.55U mg/Kg 177J+ mg/Kg 1.41J+ mg/Kg 170J+ mg/Kg 2.5J+ mg/Kg	A	be
R0903584	RSAI3-20B	Ammonia as N Chloride Nitrate as N Surfactants	0.65U mg/Kg 934J+ mg/Kg 2.29J+ mg/Kg 3.0J+ mg/Kg	A	be

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903584	RSAI3-32B	Nitrate as N Surfactants	2.05J+ mg/Kg 3.6J+ mg/Kg	A	be
R0903584	RSAI2-10B	Ammonia as N Nitrate as N Surfactants	0.54U mg/Kg 1.08J+ mg/Kg 2.2U mg/Kg	A	be,bf
R0903584	RSAI2-10B	Chloride Sulfate	4.5J+ mg/Kg 12.2J+ mg/Kg	A	bf
R0903584	RSAI2009-10B	Ammonia as N Nitrate as N Sulfate	0.54U mg/Kg 0.98J+ mg/Kg 15.0J+ mg/Kg	A	be,bf
R0903584	RSAI2009-10B	Chloride	6.8J+ mg/Kg	A	bf
R0903584	RSAI2009-10B	Chlorate	220U ug/Kg	A	be
R0903584	RSAI2-20B	Chloride Nitrate as N Surfactants Chlorate	2.2U mg/Kg 0.71J+ mg/Kg 2.2U mg/Kg 220U Ug/Kg	A	be,bf
R0903584	RSAI2-31B	Nitrate as N Surfactants	0.93J+ mg/Kg 3.2U mg/Kg	A	be
R0903584	RSAI2-31B	Chlorate	320U Ug/Kg	A	be,bf
R0903584	RSAJ2-10B	Ammonia as N Nitrate as N Surfactants	0.54U mg/Kg 2.15J+ mg/Kg 2.2U mg/Kg	A	be,bf
R0903584	RSAJ2-10B	Sulfate	146J+ mg/Kg	A	bf
R0903584	RSAJ2-20B	Ammonia as N Nitrate as N Surfactants	0.53U mg/Kg 1.20J+ mg/Kg 2.1U mg/Kg	A	be,bf
R0903584	RSAJ2-20B	Chloride	828J+ mg/Kg	A	bf
R0903584	RSAJ2-33B	Nitrate as N Surfactants	0.90J+ mg/Kg 3.4U mg/Kg	A	bf
R0903584	RSAJ2009-33B	Ammonia as N Nitrate as N Surfactants	0.88U mg/Kg 0.96J+ mg/Kg 3.5U mg/Kg	A	be,bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903584	RSAJ2009-33B	Chlorate	360U Ug/Kg	A	be

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495K6
SDG #: R0903584
Laboratory: Columbia Analytical Services

Date: 9/24/09
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Nitrite-N (EPA Method 353.2), Chlorate (EPA Method 300.1), Cyanide (EPA SW846 Method 9012A), Hexavalent Chromium (EPA SW846 Method 7199), 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), TDS (SM2540C), TSS (SM2540D)

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 6/25/09, 6/26/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW	
III.	Blanks	SW	
IV	Surrogate	A	
V	Matrix Spike/Matrix Spike Duplicates	A	3 MS/MSD/Dup
VI.	Duplicates	SW	
VII.	Laboratory control samples	SW	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(11,12), (17,18)
XI	Field blanks	SW	FB=FB072109-SO (SDG: R0904016), EB=19

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 # 19 MB

1	SA202-10B	11	RSAI2-10B	21	SA202-10BMSD	31	MB
2	SA202-28B	12	RSAI2009-10B	22	SA202-10BDUP	32	
3	RSAI3-10B	13	RSAI2-20B	23		33	
4	RSAI3-20B	14	RSAI2-31B	24		34	
5	RSAI3-32B	15	RSAJ2-10B	25		35	
6	SA188-0.5B	16	RSAJ2-20B	26		36	
7	SA172-0.5B	17	RSAJ2-33B	27		37	
8	SA41-0.5B	18	RSAJ2009-33B	28		38	
9	SA44-0.5B	19	EB062609-SO	29		39	
10	SA42-0.5B	20	SA202-10BMS	30		40	

Notes:

LDC #: 21495K6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

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

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-18	Soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
19	Aq	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
20-2[illegible]	Soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 21495K6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

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

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

Method:		314.0		9199			
Parameters:		ClO4		CrO4			
Technical holding time:		28 days		24 hrs (unpreserved)			
Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
19	6/26/09	7/29/09	(33 days)				J-/UJ/P (h)
~~19 Cr~~							
19	6/26/09 1330			6/29/09 1628, 1638	(27 hrs)		J-/UJ/P (h)

HT.6

LDC #: 34495k6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Calibration

Reviewer: MH
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See cover

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

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

LEVEL IV/D ONLY:

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

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
1	7/2/09	ccv (2009)	Br	124	19	R J+ (c)

Comments:

LDC #: 21495K6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer:
2nd Reviewer:

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?

N 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 (>RL)

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB			1	3	4	9	10					
Total Alk	19	1.0											
Bicarb. Alk	19												
NH3-N		0.0056		0.39 / 0.55	0.43 / 0.55	0.21 / 0.65	0.11 / 0.52	0.13 / 0.51					
Cl	1												

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

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB			13									
Total Alk	10	1.0											
Bicarb. Alk	10												
Cl	1.0			1.6 / 2.2									
NO3-N	0.46												

Conc. units: mg/Kg **Associated Samples:** TOC*1: 1-13,15, TOC*2:14,16-18

Analyte	Blank ID	Maximum ICB/CCB (mg/Kg)	Blank Action Limit	Sample Identification									
	MB			5									
TOC*1	50	58		270 / 290									
TOC*2	70	71											

LDC #: 21495K6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: V
2nd Reviewer: S

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/Kg **Associated Samples:** Cl*1:1,8-10, Cl*2:11-13, Cl*3:2-6, Cl*4:7,14-18

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB			13									
Cl*1		0.103											
Cl*2		0.094		1.6 / 2.2									
Cl*3		0.106											
Cl*4		0.111											

Conc. units: mg/Kg **Associated Samples:** All Soil (>RL)

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB												
T-P	1.3	0.0073											

Conc. units: mg/L **Associated Samples:** 19

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB			19									
Total AlK	1.0	1.0											
Bicarb. AlK	1.0												
Br	0.06	0.078											
Cl	0.1	0.099		1.0 / 2.0									
T-P	0.005	0.0052		0.01 / 0.05									

LDC #: 21495K6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

METHOD: Inorganics, Method See Cover
Y N N/A Were field blanks identified in this SDG?`
Y N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/Kg Reason Code: be
Sampling date: 6/26/09 Soil factor applied 10X
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 11-18 except TDS:None

Analyte	Blank ID	Sample Identification									
	19	Action Level	11	12	13	14	15	16	17	18	
Ammonia as N	0.087	8.7	0.08 / 0.54	0.11 / 0.54			0.09 / 0.54	0.18 / 0.53		0.18 / 0.88	
Cl	1.0				1.6 / 2.2						
Nitrate as N	0.62	62	1.08 J+	0.98 J+	0.71 J+	0.93 J+	2.15 J+	1.20 J+	0.90 J+	0.96 J+	
pH (pH Units)	6.27										
Total Phosphorus	0.01										
Sulfate	1.5										
Surfactants	0.016		1.3 / 2.2		1.3 / 2.2	2.0 / 3.2	1.3 / 2.2	1.2 / 2.1	1.9 / 3.4	2.5 / 3.5	
TDS	6										

Blank units: ug/L **Associated sample units:** ug/Kg

Analyte	Blank ID	Sample Identification									
	19	Action Level	12	13	14	18					
Chlorate	3		198 / 220	62 / 220	69 / 320	71 / 360					

LDC #: 21495K6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

METHOD: Inorganics, Method See Cover
(Y) N N/A Were field blanks identified in this SDG?
(Y) N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/Kg Reason Code: bf
Sampling date: 7/21/09 Soil factor applied 10X
Field blank type: (circle one) Field Blank / Rinsate / Other: FB Associated Samples: 1-5, 11-18

Analyte	Blank ID	Sample Identification									
	FB072109-SO	Action Level	1	2	3	4	5	11	12	13	14
Ammonia as N	0.191	19.1	0.39 / 0.55		0.43 / 0.55	0.21 / 0.65		0.08 / 0.54	0.11 / 0.54		
TOC (average)	0.5										
Cl	9.7	970		864 J+	177 J+	934 J+		4.5 J+	6.8 J+	1.6 / 2.2	
Nitrate as N	1.76	176	6.18 J+	2.65 J+	1.41 J+	2.29 J+	2.05 J+	1.08 J+	0.98 J+	0.71 J+	0.93 J+
pH (pH Units)	3.36										
Total Phosphorus	0.01										
Sulfate	5.5	550	321 J+		170 J+			12.2 J+	15.0 J+		
Surfactants	0.159	15.9	2.4 J+	1.3 / 3.2	2.5 J+	3.0 J+	3.6 J+	1.3 / 2.2		1.3 / 2.2	2.0 / 3.2

Analyte	Blank ID	Sample Identification									
	FB072109-SO	Action Level	15	16	17	18					
Ammonia as N	0.191	19.1	0.09 / 0.54	0.18 / 0.53		0.18 / 0.88					
TOC (average)	0.5										
Cl	9.7	970		828 J+							
Nitrate as N	1.76	176	2.15 J+	1.20 J+	0.90 J+	0.96 J+					
pH (pH Units)	3.36										
Total Phosphorus	0.01										
Sulfate	5.5	550	146 J+								
Surfactants	0.159	15.9	1.3 / 2.2	1.2 / 2.1	1.9 / 3.4	2.5 / 3.5					

LDC #: 34955K6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Reviewer: MV
2nd Reviewer: R

METHOD: Inorganics, Method see cover

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

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

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

LEVEL IV ONLY:

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

#	Duplicate ID	Matrix	Analyte	RPD (~~Limits~~ ≤ 20)	Associated Samples	Qualifications
1	22	Soil	Cl04	21	1-5, 11-18	J/nJ/A (ld)

Comments:

LDC #: 21495k6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: MH
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

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

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

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

LEVEL IV ONLY:

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

#	LCS ID	Matrix	Analyte	%R (limits)	Associated Samples	Qualifications
1	LCS	Aq	Cr6+	91 (92-110)	All Aq	J-/UJ/R (1)

Comments:

LDC#: 21495K6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer:
2nd Reviewer:

Inorganics, Method See Cover

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

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	11	12				
Ammonia as N	0.08	0.11		0.03	(≤0.54)	
Total Alkalinity	1700	1730	2			
Bicarbonate Alkalinity	1560	1620	4			
Carbonate Alkalinity	139	113	21			
Chloride	4.5	6.8		2.3	(≤2.2)	J det / A (fd)
Nitrate as N	1.08	0.98		0.1	(≤0.54)	
pH (pH Units)	9.89	9.80	1			
Sulfate	12.2	15.0	21			
Surfactants	1.3	0.6U		0.7	(≤2.2)	
TOC	530	610		80	(≤360)	
Total Phosphorus	891	846	5			
Chlorate (ug/Kg)	335	198		137	(≤220)	
Perchlorate (ug/Kg)	375	470	22			

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	17	18				
Ammonia as N	0.08U	0.18		0.1	(≤0.88)	
Total Alkalinity	366	416	13			
Bicarbonate Alkalinity	366	416	13			
Bromide	26.2	30.8	16			

LDC#: 21495K6 **VALIDATION FINDINGS WORKSHEET** Page: 2 of 2
SDG#: See Cover **Field Duplicates** Reviewer:
2nd Reviewer:

Inorganics, Method See Cover

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

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	17	18				
Chloride	2450	2660	8			
Nitrate as N	0.90	0.96		0.06	(≤0.88)	
pH (pH Units)	8.80	8.14	8			
Sulfate	890	1030	15	140	(≤)	
Surfactants	1.9	2.5		0.6	(≤3.5)	
TOC	540	520		20	(≤300)	
Total Phosphorus	711	755	6			
Chlorate (ug/Kg)	69U	71		2	(≤360)	

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: July 6 through July 7, 2009

LDC Report Date: September 29, 2009

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903729

Sample Identification

SA206-0.5B
SA206-10B
SA206-25B
SA206-30B
RSAK4-10B
RSAK4-20B
RSAK4-31B
RSAL4-0.5B
RSAL4009-0.5B
RSAL4-10B
RSAL4-28B
SA100-10B
SA100-30B
SA69-0.5B
SA69-10B
SA69-29B
SA206-30BMS
SA206-30BMSD
SA206-30BDUP

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 353.2 for Nitrite as Nitrogen, EPA 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, 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

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
MB	Alkalinity, total Alkalinity, bicarbonate Chloride Surfactants	11 mg/Kg 11 mg/Kg 1.3 mg/Kg 1.2 mg/Kg	SA206-0.5B SA206-10B SA206-25B
ICB/CCB	Alkalinity, total	1.0 mg/L	SA206-0.5B SA206-10B SA206-25B
MB	Alkalinity, total Alkalinity, bicarbonate Chloride	12 mg/Kg 12 mg/Kg 1.3 mg/Kg	SA206-30B RSAK4-10B RSAK4-20B RSAK4-31B RSAL4-0.5B RSAL4009-0.5B RSAL4-10B RSAL4-28B SA100-10B SA100-30B
ICB/CCB	Alkalinity, total	1.0 mg/L	SA206-30B RSAK4-10B RSAK4-20B RSAK4-31B RSAL4-0.5B RSAL4009-0.5B RSAL4-10B RSAL4-28B SA100-10B SA100-30B

Method Blank ID	Analyte	Concentration	Associated Samples
MB	Alkalinity, total Alkalinity, bicarbonate Chloride	10 mg/Kg 10 mg/Kg 1.3 mg/Kg	SA69-0.5B SA69-10B SA69-29B
ICB/CCB	Alkalinity, total	0.5 mg/L	SA69-0.5B SA69-10B SA69-29B
ICB/CCB	Chloride	0.131 mg/L	SA69-0.5B SA69-10B
MB	Total organic carbon	70 mg/Kg	SA206-0.5B SA206-10B SA206-25B SA206-30B RSAK4-10B RSAK4-20B RSAK4-31B RSAL4-0.5B RSAL4009-0.5B RSAL4-10B RSAL4-28B SA100-10B
MB	Total organic carbon	50 mg/Kg	SA100-30B SA69-0.5B SA69-10B SA69-29B
ICB/CCB	Total organic carbon	65.9 mg/Kg	SA206-0.5B SA206-10B SA206-25B SA206-30B RSAK4-10B RSAK4-20B RSAK4-31B RSAL4-0.5B RSAL4009-0.5B RSAL4-10B RSAL4-28B SA100-10B
ICB/CCB	Total organic carbon	76.2 mg/Kg	SA100-30B SA69-0.5B SA69-10B SA69-29B
MB	Total phosphorus	1.6 mg/Kg	SA206-0.5B

Method Blank ID	Analyte	Concentration	Associated Samples
MB	Total phosphorus	1.4 mg/Kg	SA206-10B SA206-25B SA206-30B RSAK4-10B RSAK4-20B RSAK4-31B RSAL4-0.5B RSAL4009-0.5B RSAL4-10B RSAL4-28B SA100-10B SA100-30B SA69-0.5B SA69-10B SA69-29B
ICB/CCB	Total phosphorus	0.0066 mg/L	SA206-0.5B SA206-10B SA206-25B SA206-30B RSAK4-20B
ICB/CCB	Total phosphorus	0.0094 mg/L	RSAK4-10B RSAK4-31B RSAL4-0.5B RSAL4009-0.5B RSAL4-10B RSAL4-28B SA100-10B SA100-30B SA69-0.5B SA69-10B SA69-29B
ICB/CCB	Chloride	0.148 mg/L	RSAK4-31B RSAL4-0.5B RSAL4009-0.5B RSAL4-10B RSAL4-28B SA69-29B
ICB/CCB	Chloride	0.139 mg/L	SA206-10B
ICB/CCB	Chloride	0.18 mg/L	SA69-0.5B SA69-10B

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
SA206-0.5B	Surfactants	1.9 mg/Kg	2.1U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA206-10B	Surfactants	1.6 mg/Kg	2.2U mg/Kg
SA206-25B	Surfactants	2.0 mg/Kg	3.9U mg/Kg
SA69-10B	Chloride	1.9 mg/Kg	2.2U mg/Kg
SA206-30B	Total organic carbon	250 mg/Kg	290U mg/Kg
RSAL4-28B	Total organic carbon	290 mg/Kg	300U mg/Kg

Sample FB072109-SO (from SDG R0904016) 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
FB072109-SO	7/21/09	Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Sulfate Surfactants	0.191 mg/L 0.5 mg/L 9.7 mg/L 1.76 mg/L 3.36 mg/L 0.01 mg/L 5.5 mg/L 0.159 mg/L	All samples in SDG R0903729

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
SA206-0.5B	Chloride Nitrate as N Sulfate Surfactants	409 mg/Kg 7.77 mg/Kg 475 mg/Kg 1.9 mg/Kg	409J+ mg/Kg 7.77J+ mg/Kg 475J+ mg/Kg 2.1U mg/Kg
SA206-10B	Chloride Nitrate as N Surfactants	880 mg/Kg 2.71 mg/Kg 1.6 mg/Kg	880J+ mg/Kg 2.71J+ mg/Kg 2.2U mg/Kg
SA206-25B	Nitrate as N Surfactants	2.04 mg/Kg 2.0 mg/Kg	2.04J+ mg/Kg 3.9U mg/Kg
SA206-30B	Total organic carbon Nitrate as N Surfactants	250 mg/Kg 1.68 mg/Kg 2.3 mg/Kg	290U mg/Kg 1.68J+ mg/Kg 3.3U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAK4-10B	Nitrate as N Surfactants	14.8 mg/Kg 0.9 mg/Kg	14.8J+ mg/Kg 2.2U mg/Kg
RSAK4-20B	Chloride Nitrate as N Surfactants	336 mg/Kg 2.52 mg/Kg 1.1 mg/Kg	336J+ mg/Kg 2.52J+ mg/Kg 2.2U mg/Kg
RSAK4-31B	Chloride Nitrate as N	284 mg/Kg 4.20 mg/Kg	284J+ mg/Kg 4.20J+ mg/Kg
RSAL4-0.5B	Chloride Nitrate as N Sulfate Surfactants	195 mg/Kg 9.93 mg/Kg 276 mg/Kg 1.3 mg/Kg	195J+ mg/Kg 9.93J+ mg/Kg 276J+ mg/Kg 2.1U mg/Kg
RSAL4009-0.5B	Chloride Nitrate as N Sulfate Surfactants	197 mg/Kg 9.91 mg/Kg 268 mg/Kg 1.2 mg/Kg	197J+ mg/Kg 9.91J+ mg/Kg 268J+ mg/Kg 2.1U mg/Kg
RSAL4-10B	Chloride Nitrate as N Sulfate Surfactants	409 mg/Kg 7.30 mg/Kg 163 mg/Kg 1.5 mg/Kg	409J+ mg/Kg 7.30J+ mg/Kg 163J+ mg/Kg 2.2U mg/Kg
RSAL4-28B	Total organic carbon Chloride Nitrate as N Surfactants	290 mg/Kg 553 mg/Kg 5.27 mg/Kg 1.5 mg/Kg	300U mg/Kg 553J+ mg/Kg 5.27J+ mg/Kg 3.7Umg/Kg
SA100-10B	Nitrate as N Surfactants	2.01 mg/Kg 1.3 mg/Kg	2.01J+ mg/Kg 2.2U mg/Kg
SA100-30B	Nitrate as N Surfactants	2.85 mg/Kg 1.2 mg/Kg	2.85J+ mg/Kg 3.1U mg/Kg
SA69-0.5B	Chloride Nitrate as N Sulfate Surfactants	4.3 mg/Kg 1.42 mg/Kg 175 mg/Kg 1.2 mg/Kg	4.3J+ mg/Kg 1.42J+ mg/Kg 175J+ mg/Kg 2.2U mg/Kg
SA69-10B	Chloride Nitrate as N Sulfate Surfactants	1.9 mg/Kg 1.15 mg/Kg 102 mg/Kg 1.3 mg/Kg	2.2J+ mg/Kg 1.15J+ mg/Kg 102J+ mg/Kg 2.2Umg/Kg
SA69-29B	Chloride Nitrate as N Surfactants	278 mg/Kg 7.36 mg/Kg 1.5 mg/Kg	278J+ mg/Kg 7.36J+ mg/Kg 3.0U 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
SA206-30BMS (All samples in SDG R0903729)	Surfactants	63 (75-125)	-	-	J- (all detects) UJ (all non-detects)	A

V. Duplicates

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

VI. Laboratory Control Samples

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

VII. Surrogates

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 R0903729	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 RSAL4-0.5B and RSAL4009-0.5B 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)	Flag	A or P
	RSAL4-0.5B	RSAL4009-0.5B				
Alkalinity, total	252 mg/Kg	263 mg/Kg	4 (≤50)	-	-	-
Alkalinity, bicarbonate	245 mg/Kg	256 mg/Kg	4 (≤50)	-	-	-
Alkalinity, carbonate	6 mg/Kg	7 mg/Kg	-	1 (≤21)	-	-
Chloride	195 mg/Kg	197 mg/Kg	1 (≤50)	-	-	-
Nitrate as N	9.93 mg/Kg	9.91 mg/Kg	0 (≤50)	-	-	-
pH	8.73 units	8.75 units	0 (≤50)	-	-	-
Sulfate	276 mg/Kg	268 mg/Kg	3 (≤50)	-	-	-
Surfactants	1.3 mg/Kg	1.2 mg/Kg	-	0.1 (≤2.1)	-	-
Total organic carbon	980 mg/Kg	860 mg/Kg	-	120 (≤310)	-	-
Total phosphorus	855 mg/Kg	928 mg/Kg	8 (≤50)	-	-	-
Chlorate	2070 ug/Kg	2340 ug/Kg	12 (≤50)	-	-	-
Perchlorate	91600 ug/Kg	82400 ug/Kg	11 (≤50)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R0903729

SDG	Sample	Analyte	Flag	A or P	Reason
R0903729	SA206-0.5B SA206-10B SA206-25B SA206-30B RSAK4-10B RSAK4-20B RSAK4-31B RSAL4-0.5B RSAL4009-0.5B RSAL4-10B RSAL4-28B SA100-10B SA100-30B SA69-0.5B SA69-10B SA69-29B	Surfactants	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0903729	SA206-0.5B SA206-10B SA206-25B SA206-30B RSAK4-10B RSAK4-20B RSAK4-31B RSAL4-0.5B RSAL4009-0.5B RSAL4-10B RSAL4-28B SA100-10B SA100-30B SA69-0.5B SA69-10B SA69-29B	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 R0903729

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903729	SA206-0.5B	Surfactants	2.1U mg/Kg	A	bl
R0903729	SA206-10B	Surfactants	2.2U mg/Kg	A	bl
R0903729	SA206-25B	Surfactants	3.9U mg/Kg	A	bl
R0903729	SA69-10B	Chloride	2.2U mg/Kg	A	bl
R0903729	SA206-30B	Total organic carbon	290U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903729	RSAL4-28B	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 R0903729

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903729	SA206-0.5B	Chloride Nitrate as N Sulfate Surfactants	409J+ mg/Kg 7.77J+ mg/Kg 475J+ mg/Kg 2.1U mg/Kg	A	bf
R0903729	SA206-10B	Chloride Nitrate as N Surfactants	880J+ mg/Kg 2.71J+ mg/Kg 2.2U mg/Kg	A	bf
R0903729	SA206-25B	Nitrate as N Surfactants	2.04J+ mg/Kg 3.9U mg/Kg	A	bf
R0903729	SA206-30B	Total organic carbon Nitrate as N Surfactants	290U mg/Kg 1.68J+ mg/Kg 3.3U mg/Kg	A	bf
R0903729	RSAK4-10B	Nitrate as N Surfactants	14.8J+ mg/Kg 2.2U mg/Kg	A	bf
R0903729	RSAK4-20B	Chloride Nitrate as N Surfactants	336J+ mg/Kg 2.52J+ mg/Kg 2.2U mg/Kg	A	bf
R0903729	RSAK4-31B	Chloride Nitrate as N	284J+ mg/Kg 4.20J+ mg/Kg	A	bf
R0903729	RSAL4-0.5B	Chloride Nitrate as N Sulfate Surfactants	195J+ mg/Kg 9.93J+ mg/Kg 276J+ mg/Kg 2.1U mg/Kg	A	bf
R0903729	RSAL4009-0.5B	Chloride Nitrate as N Sulfate Surfactants	197J+ mg/Kg 9.91J+ mg/Kg 268J+ mg/Kg 2.1U mg/Kg	A	bf
R0903729	RSAL4-10B	Chloride Nitrate as N Sulfate Surfactants	409J+ mg/Kg 7.30J+ mg/Kg 163J+ mg/Kg 2.2U mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903729	RSAL4-28B	Total organic carbon Chloride Nitrate as N Surfactants	300U mg/Kg 553J+ mg/Kg 5.27J+ mg/Kg 3.7Umg/Kg	A	bf
R0903729	SA100-10B	Nitrate as N Surfactants	2.01J+ mg/Kg 2.2U mg/Kg	A	bf
R0903729	SA100-30B	Nitrate as N Surfactants	2.85J+ mg/Kg 3.1U mg/Kg	A	bf
R0903729	SA69-0.5B	Chloride Nitrate as N Sulfate Surfactants	4.3J+ mg/Kg 1.42J+ mg/Kg 175J+ mg/Kg 2.2U mg/Kg	A	bf
R0903729	SA69-10B	Chloride Nitrate as N Sulfate Surfactants	2.2J+ mg/Kg 1.15J+ mg/Kg 102J+ mg/Kg 2.2Umg/Kg	A	bf
R0903729	SA69-29B	Chloride Nitrate as N Surfactants	278J+ mg/Kg 7.36J+ mg/Kg 3.0U mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903729	SA206-10B	Surfactants	2.2U mg/Kg	A	bl
R0903729	SA206-25B	Surfactants	3.9U mg/Kg	A	bl
R0903729	SA69-10B	Chloride	2.2U mg/Kg	A	bl
R0903729	SA206-30B	Total organic carbon	290U mg/Kg	A	bl
R0903729	RSAL4-28B	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 R0903729

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903729	SA206-0.5B	Chloride Nitrate as N Sulfate Surfactants	409J+ mg/Kg 7.77J+ mg/Kg 475J+ mg/Kg 2.1U mg/Kg	A	bf
R0903729	SA206-10B	Chloride Nitrate as N Surfactants	880J+ mg/Kg 2.71J+ mg/Kg 2.2U mg/Kg	A	bf
R0903729	SA206-25B	Nitrate as N Surfactants	2.04J+ mg/Kg 3.9U mg/Kg	A	bf
R0903729	SA206-30B	Total organic carbon Nitrate as N Surfactants	290U mg/Kg 1.68J+ mg/Kg 3.3U mg/Kg	A	bf
R0903729	RSAK4-10B	Nitrate as N Surfactants	14.8J+ mg/Kg 2.2U mg/Kg	A	bf
R0903729	RSAK4-20B	Chloride Nitrate as N Surfactants	336J+ mg/Kg 2.52J+ mg/Kg 2.2U mg/Kg	A	bf
R0903729	RSAK4-31B	Chloride Nitrate as N	284J+ mg/Kg 4.20J+ mg/Kg	A	bf
R0903729	RSAL4-0.5B	Chloride Nitrate as N Sulfate Surfactants	195J+ mg/Kg 9.93J+ mg/Kg 276J+ mg/Kg 2.1U mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903729	RSAL4009-0.5B	Chloride Nitrate as N Sulfate Surfactants	197J+ mg/Kg 9.91J+ mg/Kg 268J+ mg/Kg 2.1U mg/Kg	A	bf
R0903729	RSAL4-10B	Chloride Nitrate as N Sulfate Surfactants	409J+ mg/Kg 7.30J+ mg/Kg 163J+ mg/Kg 2.2U mg/Kg	A	bf
R0903729	RSAL4-28B	Total organic carbon Chloride Nitrate as N Surfactants	300U mg/Kg 553J+ mg/Kg 5.27J+ mg/Kg 3.7Umg/Kg	A	bf
R0903729	SA100-10B	Nitrate as N Surfactants	2.01J+ mg/Kg 2.2U mg/Kg	A	bf
R0903729	SA100-30B	Nitrate as N Surfactants	2.85J+ mg/Kg 3.1U mg/Kg	A	bf
R0903729	SA69-0.5B	Chloride Nitrate as N Sulfate Surfactants	4.3J+ mg/Kg 1.42J+ mg/Kg 175J+ mg/Kg 2.2U mg/Kg	A	bf
R0903729	SA69-10B	Chloride Nitrate as N Sulfate Surfactants	2.2J+ mg/Kg 1.15J+ mg/Kg 102J+ mg/Kg 2.2Umg/Kg	A	bf
R0903729	SA69-29B	Chloride Nitrate as N Surfactants	278J+ mg/Kg 7.36J+ mg/Kg 3.0U mg/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495L6
SDG #: R0903729
Laboratory: Columbia Analytical Services

Date: 9/x/09
Page: 1 of 1
Reviewer: ca
2nd Reviewer: gw

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Nitrite-N (EPA Method 353.2), Chlorate (EPA Method 300.1), Cyanide (EPA SW846 Method 9012A), Hexavalent Chromium (EPA SW846 Method 7199), 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: 7/06/09, 7/07/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	~~A~~ SW	
III.	Blanks	SW	
IV	Surrogate	A	
V	Matrix Spike/Matrix Spike Duplicates	SW	3 MS/MSD/Dup
VI.	Duplicates	A	For Lithium < RL.
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(8,9)
XI.	Field blanks	SW	FB=FB072109-SO (SDG: R0904016)

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	SA206-0.5B	11	RSAL4-28B	21	MB	31	
2	SA206-10B	12	SA100-10B	22		32	
3	SA206-25B	13	SA100-30B	23		33	
4	SA206-30B	14	SA69-0.5B	24		34	
5	RSAK4-10B	15	SA69-10B	25		35	
6	RSAK4-20B	16	SA69-29B	26		36	
7	RSAK4-31B	17	SA206-30BMS	27		37	
8	RSAL4-0.5B	18	SA206-30BMSD	28		38	
9	RSAL4009-0.5B	19	SA206-30BDUP	29		39	
10	RSAL4-10B	20		30		40	

Notes:

LDC #: 2149526

SDG #: see cover

VALIDATION FINDINGS WORKSHEET

Sample Specific Analysis Reference

Reviewer: [signature]

2nd reviewer: [signature]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-46	Soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
21 17-19	Soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
17	↓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
19	↓	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 21495L6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer:
2nd Reviewer:

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/Kg **Associated Samples:** 1-3

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB			1	2	3							
Total AlK	11	1.0											
Bicarb. AlK	11												
Cl	1.3												
Surfactants	1.2			1.9 / 2.1	1.6 / 2.2	2.0 / 3.9							

Conc. units: mg/Kg **Associated Samples:** 4-13

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB												
Total AlK	12	1.0											
Bicarb. AlK	12												
Cl	1.3												

LDC #: 21495L6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer:
2nd Reviewer:

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/Kg **Associated Samples:** 14-16 except ICB/CCB: Cl:14,15

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB			15									
Total AlK	10	0.5											
Bicarb. AlK	10												
Cl	1.3	0.131		1.9 / 2.2									

Conc. units: mg/Kg **Associated Samples:** TOC*1: 1-12, TOC*2:13-16

Analyte	Blank ID	Maximum ICB/CCB (mg/Kg)	Blank Action Limit	Sample Identification									
	MB			4	11								
TOC*1	70	65.9		250 / 290	290 / 300								
TOC*2	50	76.2											

Conc. units: mg/Kg **Associated Samples:** MB: T-P*1:1, T-P*2: 2-16, ICB/CCB: T-P*1: 1-4,6, T-P*2: 5, 7-16 (>RL)

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB												
T-P*1	1.6	0.0066											
T-P*2	1.4	0.0094											

LDC #: 21495L6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer:
2nd Reviewer:

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/Kg **Associated Samples:** Cl*1:7-11,16, Cl*2: 2, SO4: 14, 15

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	MB												
Cl*1		0.148											
Cl*2		0.139											
SO4		0.18											

LDC #: 21495l6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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: bf
Sampling date: 7/21/09 Soil factor applied 10X
Field blank type: (circle one) Field Blank / Rinsate / Other: FB Associated Samples: All

Analyte	Blank ID	Sample Identification									
	FB072109-SO	Action Level	1	2	3	4	5	6	7	8	9
Ammonia as N	0.191	19.1									
TOC (average)	0.5					250 / 290					
Cl	9.7	970	409 J+	880 J+				336 J+	284 J+	195 J+	197 J+
Nitrate as N	1.76	176	7.77 J+	2.71 J+	2.04 J+	1.68 J+	14.8 J+	2.52 J+	4.20 J+	9.93 J+	9.91 j+
pH (pH Units)	3.36										
Total Phosphorus	0.01										
Sulfate	5.5	550	475 J+							276 J+	268 j+
Surfactants	0.159	15.9	1.9 / 2.1	1.6 / 2.2	2.0 / 3.9	2.3 / 3.3	0.9 / 2.2	1.1 / 2.2		1.3 / 2.1	1.2 / 2.1

Analyte	Blank ID	Sample Identification									
	FB072109-SO	Action Level	10	11	12	13	14	15	16		
Ammonia as N	0.191	19.1									
TOC (average)	0.5			290 / 300							
Cl	9.7	970	409 J+	553 J+			4.3 J+	1.9 / 2.2	278 J+		
Nitrate as N	1.76	176	7.30 J+	5.27 J+	2.01 J+	2.85 J+	1.42 J+	1.15 J+	7.36 J+		
pH (pH Units)	3.36										
Total Phosphorus	0.01										
Sulfate	5.5	550	163 J+				175 J+	102 J+			
Surfactants	0.159	15.9	1.5 / 2.2	1.5 / 3.7	1.3 / 2.2	1.2 / 3.1	1.2 / 2.2	1.3 / 2.2	1.5 / 3.0		

LDC #: 21495L6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Reviewer: W
2nd Reviewer: R

METHOD: Inorganics, Method see cover

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

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

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

LEVEL IV ONLY:

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

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
1	17	Soil	Surfactants	63	All	J-/UJ/A-(MS)

Comments:

LDC#: 21495L6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: V
2nd Reviewer: V

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)
	8	9				
Total Alkalinity	252	263	4			
Bicarbonate Alkalinity	245	256	4			
Carbonate Alkalinity	6	7		1	(≤21)	
Chloride	195	197	1			
Nitrate as N	9.93	9.91	0			
pH (pH Units)	8.73	8.75	0			
Sulfate	276	268	3			
Surfactants	1.3	1.2		0.1	(≤2.1)	
TOC	980	860		120	(≤310)	
Total Phosphorus	855	928	8			
Chlorate (ug/Kg)	2070	2340	12			
Perchlorate (ug/Kg)	91600	82400	11			