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

Metals

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 24, 2009

Matrix: Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0902886

Sample Identification

MC-3B-FILT
MC-3B-FILTMS
MC-3B-FILTDUP

Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

IV. 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	Maximum Concentration	Associated Samples
PB (prep blank)	Antimony Chromium Copper Tungsten	0.02 ug/L 0.7 ug/L 0.8 ug/L 0.08 ug/L	All samples in SDG R0902886
ICB/CCB	Aluminum Barium Boron Beryllium Calcium Iron Molybdenum Manganese Magnesium Strontium Sodium Thallium Tungsten	2.3 ug/L 0.5 ug/L 3.9 ug/L 0.10 ug/L 6.8 ug/L 4.6 ug/L 1.5 ug/L 0.4 ug/L 2.1 ug/L 0.1 ug/L 180 ug/L 0.002 ug/L 0.04 ug/L	All samples in SDG R0902886

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
MC-3B-FILT	Aluminum	5.3 ug/L	50.0U ug/L
	Antimony	0.03 ug/L	0.05U ug/L
	Molybdenum	1.7 ug/L	2.0U ug/L
	Manganese	0.2 ug/L	5.0U ug/L
	Magnesium	2.3 ug/L	20.0U ug/L
	Strontium	0.2 ug/L	10.0U ug/L
	Tungsten	0.06 ug/L	0.10U ug/L

Sample MC-3B-FILT was identified as filter blank. No metal contaminants were found in this blank with the following exceptions:

Filter Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
MC-3B-FILT	5/21/09	Aluminum	5.3 ug/L	No associated samples in this SDG
		Antimony	0.03 ug/L	
		Calcium	116 ug/L	
		Magnesium	2.3 ug/L	
		Manganese	0.2 ug/L	
		Molybdenum	1.7 ug/L	
		Strontium	0.2 ug/L	
		Titanium	0.7 ug/L	
		Tungsten	0.06 ug/L	
		Zinc	2.2 ug/L	

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

XII. 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.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

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

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0902886	MC-3B-FILT	Aluminum Antimony Molybdenum Manganese Magnesium Strontium Tungsten	50.0U ug/L 0.05U ug/L 2.0U ug/L 5.0U ug/L 20.0U ug/L 10.0U ug/L 0.10U ug/L	A	bl

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495A4
SDG #: R0902886
Laboratory: Columbia Analytical Services

Date: 9-17-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

METHOD: Metals (EPA SW 846 Method 6010B/6020/7000)

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
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	A	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	SW	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: water

1	MC-3B-FILT	11	PBW1	21		31	
2	MC-3B-FILTMS	12		22		32	
3	MC-3B-FILTDUP	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: _____

LDC #: 21295A4
SDG #: R0902886

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1	water	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:2,3	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP	W	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS	W	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 21495A4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)
Soil preparation factor applied: NA
Reason Code: bl
Sample Concentration units, unless otherwise noted: ug/L
Associated Samples: All

					Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1									
Al			2.3		5.3 / 50.0									
Sb		0.02			0.03 / 0.05									
Ba			0.5											
B			3.9											
Be			0.10											
Ca			6.8											
Cr		0.7												
Cu		0.8												
Fe			4.6											
Mo			1.5		1.7 / 2.0									
Mn			0.4		0.2 / 5.0									
Mg			2.1		2.3 / 20.0									
Sr			0.1		0.2 / 10.0									
Na			180											
Tl			0.002											
W		0.08	0.04		0.06 / 0.10									

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 21495A4
SDG #: R0902886

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/6020/7000)

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: br

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 5/21/09 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Filter Blank

Associated Samples: None

Analyte	Blank ID	Sample Identification										
	1	Action Level										
Al	5.3											
Sb	0.03											
Ca	116	1160										
Mg	2.3											
Mn	0.2											
Mo	1.7											
Sr	0.2											
Ti	0.7											
W	0.06											
Zn	2.2											

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

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: May 27 through May 28, 2009

LDC Report Date: September 23, 2009

Matrix: Water

Parameters: Metals

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903006

Sample Identification

MC-3B
EB052709
M-127B
M-127BDISS
MC-3BMS
MC-3BDUP
FB060409
FB060409MS
FB060409DUP

Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

The following are definitions of the data qualifiers:

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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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

IV. 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	Maximum Concentration	Associated Samples
PB (prep blank)	Antimony Chromium Copper Tungsten	0.02 ug/L 0.7 ug/L 0.8 ug/L 0.08 ug/L	All samples in SDG R0903006
ICB/CCB	Sodium	295 ug/L	MC-3B EB052709 M-127B M-127BDISS
ICB/CCB	Aluminum Antimony Barium Boron Beryllium Calcium Chromium Iron Molybdenum Manganese Strontium Thallium Tungsten	2.3 ug/L 0.031 ug/L 0.5 ug/L 3.9 ug/L 0.10 ug/L 6.8 ug/L 0.6 ug/L 4.6 ug/L 1.5 ug/L 0.4 ug/L 0.1 ug/L 0.009 ug/L 0.05 ug/L	All samples in SDG R0903006

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Magnesium	2.1 ug/L	EB052709 FB060409
ICB/CCB	Magnesium	3.7 ug/L	MC-3B M-127B M-127BDISS

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
MC-3B	Aluminum Beryllium Copper	10.5 ug/L 0.10 ug/L 3.5 ug/L	50.0U ug/L 0.30U ug/L 10.0U ug/L
EB052709	Aluminum Beryllium Calcium Copper Sodium	2.6 ug/L 0.10 ug/L 14 ug/L 0.8 ug/L 269 ug/L	50.0U ug/L 0.30U ug/L 50U ug/L 10.0U ug/L 300U ug/L
M-127B	Beryllium	0.10 ug/L	0.30U ug/L
M-127BDISS	Thallium	0.103 ug/L	0.200U ug/L
FB060409	Aluminum Beryllium Iron Thallium Tungsten Magnesium	2.8 ug/L 0.10 ug/L 3.8 ug/L 0.008 ug/L 0.04 ug/L 2.3 ug/L	50.0U ug/L 0.30U ug/L 20.0U ug/L 0.200U ug/L 0.10U ug/L 0.05U ug/L

Sample EB052709 was identified as an equipment rinsate. No metal contaminants were found in this blank with the following exceptions:

Equipment Rinsate ID	Sampling Date	Analyte	Concentration	Associated Samples
EB052709	5/27/09	Aluminum Beryllium Calcium Copper Lead Platinum Sodium Thallium Tungsten Uranium Zinc	2.6 ug/L 0.10 ug/L 14 ug/L 0.8 ug/L 0.090 ug/L 0.01 ug/L 269 ug/L 0.075 ug/L 0.11 ug/L 0.010 ug/L 1.2 ug/L	MC-3B

Sample FB060409 was identified as a field blank. No metal contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB060409	6/4/09	Aluminum Beryllium Iron Magnesium Thallium Tungsten Zinc	2.8 ug/L 0.10 ug/L 3.8 ug/L 2.3 ug/L 0.008 ug/L 0.04 ug/L 2.0 ug/L	MC-3B M-127B

Sample MC-3B-FILT (from SDG R0902886) was identified as filter blank. No metal contaminants were found in this blank with the following exceptions:

Filter Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
MC-3B-FILT	5/21/09	Aluminum Antimony Calcium Magnesium Manganese Molybdenum Strontium Titanium Tungsten Zinc	5.3 ug/L 0.03 ug/L 116 ug/L 2.3 ug/L 0.2 ug/L 1.7 ug/L 0.2 ug/L 0.7 ug/L 0.06 ug/L 2.2 ug/L	M-127BDISS

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	Aluminum Beryllium Copper Lead	10.5 ug/L 0.10 ug/L 3.5 ug/L 0.341 ug/L	50.0U ug/L 0.30U ug/L 10.0U ug/L 0.341J+ ug/L
M-127B	Beryllium	0.10 ug/L	0.30U ug/L

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

XII. Sample Result Verification and Project Quantitation Limit

All sample result verifications were acceptable.

The results for the dissolved metals sample analysis were greater than the total metals sample analysis as follows:

Analyte	Concentration (ug/L)	
	M-127B	M-127BDISS
Copper	12.0	29.3

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

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG R0903006

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0903006	MC-3B EB052709 M-127B M-127BDISS	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

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

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903006	MC-3B	Aluminum Beryllium Copper	50.0U ug/L 0.30U ug/L 10.0U ug/L	A	bl
R0903006	EB052709	Aluminum Beryllium Calcium Copper Sodium	50.0U ug/L 0.30U ug/L 50U ug/L 10.0U ug/L 300U ug/L	A	bl
R0903006	M-127B	Beryllium	0.30U ug/L	A	bl
R0903006	M-127BDISS	Thallium	0.200U ug/L	A	bl
R0903006	FB060409	Aluminum Beryllium Iron Thallium Tungsten Magnesium	50.0U ug/L 0.30U ug/L 20.0U ug/L 0.200U ug/L 0.10U ug/L 0.05U ug/L	A	bl

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

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903006	MC-3B	Aluminum Beryllium	50.0U ug/L 0.30U ug/L	A	be,bf
R0903006	MC-3B	Copper Lead	10.0U ug/L 0.341J+ ug/L	A	be

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903006	M-127B	Beryllium	0.30U ug/L	A	be

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 21495B4
SDG #: R0903006
Laboratory: Columbia Analytical Services

Date: 9-17-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: L

METHOD: Metals (EPA SW 846 Method 6010B/6020/7000)

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: 5/27/09 - 5/28/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	A	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	A	(SDG# R0902886)
XII.	Sample Result Verification	SW	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	SW	ER=2, Filter Blank = MC-3B-FILT (SDG# R0902886) FB=7

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

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

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: water

1	MC-3B	11	PBW1	21		31	
2	EB052709	12		22		32	
3	M-127B	13		23		33	
4	M-127BDISS	14		24		34	
5	MC-3BMS	15		25		35	
6	MC-3BDUP	16		26		36	
7	FB060409	17		27		37	
8	↓ MS	18		28		38	
9	↓ Dup	19		29		39	
10		20		30		40	

Notes: _____

LDC #: 21495B4
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

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

Method: Metals (EPA SW 846 Method 6010/7000/6020)

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 isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution < 5%?	✓			
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury and 85-115% for cyanide) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
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. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
IV. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 21495B4
SDG #: see cover

VALIDATION FINDINGS CHECKLIST

Reviewer: ER
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
VI. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
VII. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
VIII. Internal Standards (EPA SW 846 Method 6020)				
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field Duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XIII. Field Blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: 21295B4
SDG #: R0903006

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4,7	water	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:5,6	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:8,9		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP	✓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS	✓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 21495B4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Soil preparation factor applied: NA
Reason Code: bl
Raise to RL unless otherwise noted

Reviewer: CR
2nd Reviewer:

Sample Concentration units, unless otherwise noted: ug/L
Associated Samples: All except Na = 1-4

					Sample Identification									
Analyte	**Maximum PB[a] (ug/l)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**	**RL**	**1**	2	3	4	7					
Al		2.3		50.0	10.5	2.6			2.8					
Sb	0.02	0.031												
Ba		0.5												
B		3.9												
Be		0.10		0.30	0.10	0.10	0.10		0.10					
Ca		6.8		50		14								
Cr	0.7	0.6												
Cu	0.8			10.0	3.5	0.8								
Fe		4.6		20.0					3.8					
Mo		1.5												
Mn		0.4												
Na		295		300		269								
Sr		0.1												
Tl		0.009		0.200				0.103	0.008					
W	0.08	0.05		0.10					0.04					

Sample Concentration units, unless otherwise noted: ug/L
Associated Samples: 2, 7

					Sample Identification									
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum PB[a] (ug/l)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**	**7**									
Mg			2.1	20.0	2.3									

Sample Concentration units, unless otherwise noted: ug/L @10x
Associated Samples: 1, 3, 4

					Sample Identification									
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum PB[a] (ug/l)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**	**No Qualifiers**									
Mg			3.7											

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 21495B4
SDG #: R0903006

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)

(Y) N N/A Were field blanks identified in this SDG?
(Y) N N/A Were target analytes detected in the field blanks? Reason Code: be

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 5/27/09 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: (EB) Associated Samples: 1

Analyte	Blank ID	Sample Identification										
	2	Action Level	1									
Al	2.6		10.5 / 50.0									
Be	0.10		0.10 / 0.30									
Ca	14											
Cu	0.8		3.5 / 10.0									
Pb	0.090	0.900	0.341 J+									
Pt	0.01											
Na	269											
Tl	0.075	0.750										
W	0.11	1.1										
U	0.010											
Zn	1.2											

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

LDC #: 21495B4
SDG #: R0903006

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of
Reviewer: CR
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/7000)

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

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

Reason: bf

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

Sampling date: 6/4/09 Soil factor applied NA

Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: 1, 3

Analyte	Blank ID	Sample Identification										
	7	Action Level	1	3								
Al	2.8		10.5/50 U									
Be	0.10		0.10/0.30	0.10/0.30								
Fe	3.8											
Mg	2.3											
Tl	0.008											
W	0.04											
Zn	2.0											

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

LDC #: 21495B4
SDG #: R0903006

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/6020/7000)

(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: br

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 5/21/09 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Filter Blank Associated Samples: 4

Analyte	Blank ID	Sample Identification										
	MC-3B-FILT (SDG# R0902886)	Action Level	No Qualifiers									
Al	5.3											
Sb	0.03											
Ca	116	1160										
Mg	2.3											
Mn	0.2											
Mo	1.7											
Sr	0.2											
Ti	0.7											
W	0.06											
Zn	2.2											

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

LDC #: 21495B4
SDG #: seecover

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: QR
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

%R = Found x 100 / True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	Cd	1267	1250	101	101	Y
	GFAA (Initial calibration)						
ICV	CVAA (Initial calibration)	Hg	5.20	5.00	104	104	Y
CCV	ICP (Continuing calibration)	Ag	250	250	100	100	Y
	GFAA (Continuing calibration)						
CCV	CVAA (Continuing calibration)	Hg	5.16	5.00	103	103	Y
ICV	ICP/MS (Initial calibration)	W	26.00	25.00	104	104	Y
CCV	ICP/MS (Continuing calibation)	Sb	26.1	25	104	104	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 #: 49534
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

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

Percent recoveries (%R) for an ICP interference check sample, 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

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Cd	904	1000	90	90	Y
LCS	Laboratory control sample	Fe	2340	2500	93.6	93.6	
5	Matrix spike	Pb	(SSR-SR) 192.0	200.0	96.0	96.0	
6	Duplicate	V	13.7	13.6	0.7	0.7	
MC-3B-FILT (SDG # R0902886)	ICP serial dilution	Sr	6.2	0.5	150	150	

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 #: 21495I34
SDG #: seeaver

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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

Detected analyte results for Ca were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:

Raw Data: (303.3mg/L)1000 = 303000 ug/L

Sample ID	Analyte	Reported Concentration (ug/L)	Calculated Concentration (ug/L)	Acceptable (Y/N)
1	Al	10.5	10.5	Y
	Sb	0.59	0.59	
	As	57.1	57.1	
	Ba	34.1	34.4	
	Be	0.10	0.10	
	B	2420	2420	
	Ca	303000	303000	
	Cr	11.0	11.0	
	Co	2.0	2.0	
	Cu	3.5	3.5	
	Fe	237	237	
	Pb	0.341	0.341	
	Mg	417000	417000	
	Mn	465	465	
	Mo	10.5	10.5	
	Ni	13.0	13.0	
	K	71400	71400	
	Na	8480000	8480000	
	Sr	17500	17500	
	W	9.81	9.81	
	U	13.7	13.7	
	V	4.8	4.8	
	Zn	21.8	21.8	

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 24, 2009

Matrix: Soil

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903051

Sample Identification

RSA12-0.5B	RSA12-0.5BDUP
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	
SA76-0.5BMS	
SA76-0.5BDUP	
RSA12-0.5BMS	

Introduction

This data review covers 21 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

IV. 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	Maximum Concentration	Associated Samples
PB (prep blank)	Aluminum Boron Chromium Manganese Tin	0.6 mg/Kg 0.5 mg/Kg 0.09 mg/Kg 0.02 mg/Kg 3.5 mg/Kg	All samples in SDG R0903051
ICB/CCB	Boron Strontium	6.0 ug/L 0.3 ug/L	All samples in SDG R0903051
ICB/CCB	Aluminum	2.0 ug/L	RSAJ3-0.5B SA202-0.5B
ICB/CCB	Barium	0.60 ug/L	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

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Barium	0.30 ug/L	RSA12-0.5B RSAI3-0.5B RSAJ5-0.5B RSAK5-0.5B SA76-0.5B SA76009-0.5B

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	Boron Tin	9.0 mg/Kg 3.6 mg/Kg	10.5U mg/Kg 10.6U mg/Kg
RSAI3-0.5B	Boron Tin	5.9 mg/Kg 3.5 mg/Kg	10.3U mg/Kg 10.3U mg/Kg
RSAJ5-0.5B	Tin	4.1 mg/Kg	11.0U mg/Kg
RSAK5-0.5B	Boron Tin	8.4 mg/Kg 4.3 mg/Kg	10.6U mg/Kg 10.8U mg/Kg
SA76-0.5B	Tin	4.3 mg/Kg	10.5U mg/Kg
SA76009-0.5B	Tin	4.0 mg/Kg	10.8U mg/Kg
RSAL3-0.5B	Tin	3.9 mg/Kg	10.4U mg/Kg
SA100-0.5B	Boron Tin	3.7 mg/Kg 3.5 mg/Kg	10.1U mg/Kg 10.1U mg/Kg
RSAM3-0.5B	Boron Tin	4.2 mg/Kg 3.7 mg/Kg	10.4U mg/Kg 10.3U mg/Kg
RSAM2-0.5B	Boron Tin	3.8 mg/Kg 3.4 mg/Kg	10.3U mg/Kg 10.2U mg/Kg
SA189-0.5B	Boron Tin	6.0 mg/Kg 3.9 mg/Kg	10.4U mg/Kg 10.5U mg/Kg
SA88-0.5B	Boron Tin	8.0 mg/Kg 3.8 mg/Kg	10.6U mg/Kg 10.5U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA152-0.5B	Boron Tin	4.4 mg/Kg 3.6 mg/Kg	10.5U mg/Kg 10.3U mg/Kg
SA152009-0.5B	Boron Tin	4.1 mg/Kg 3.8 mg/Kg	10.3U mg/Kg 10.2U mg/Kg
RSAJ2-0.5B	Tin	8.2 mg/Kg	11.0U mg/Kg
RSAJ3-0.5B	Tin	4.5 mg/Kg	11.3U mg/Kg
SA202-0.5B	Boron Tin	7.3 mg/Kg 4.2 mg/Kg	10.5U mg/Kg 10.4U mg/Kg

Sample FB072109-SO (from SDG R0904016) was identified as a field blank. No metal contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB072109-SO	7/21/09	Aluminum Barium Calcium Iron Lead Magnesium Manganese Potassium Sodium Strontium Tungsten Uranium Zinc	9.4 ug/L 0.5 ug/L 336 ug/L 13.8 ug/L 0.020 ug/L 30.0 ug/L 3.0 ug/L 79.3 ug/L 241 ug/L 4.40 ug/L 0.02 ug/L 0.004 ug/L 8.6 ug/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.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

Matrix spike (MS) samples 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
RSA12-0.5BMS (All samples in SDG R0903051)	Antimony	59.2 (75-125)	J- (all detects) UJ (all non-detects)	A
	Tungsten	65.4 (75-125)	J- (all detects) UJ (all non-detects)	

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
RSA12-0.5BL	Cobalt	11.0 (≤10)	All samples in SDG R0903051	J (all detects) UJ (all non-detects)	A
	Zinc	11.2 (≤10)		J (all detects) UJ (all non-detects)	

XII. 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 R0903051	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. 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 metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA76-0.5B	SA76009-0.5B				
Aluminum	9010	9340	4 (≤50)	-	-	-
Arsenic	2.95	6.05	69 (≤50)	-	J (all detects)	A
Barium	185	206	11 (≤50)	-	-	-
Beryllium	0.407	0.622	42 (≤50)	-	-	-
Boron	33.7	41.5	-	7.8 (≤10.8)	-	-
Cadmium	0.04U	0.09	-	0.05 (≤0.11)	-	-
Calcium	16500	22300	30 (≤50)	-	-	-
Chromium	7.11	11.1	44 (≤50)	-	-	-
Cobalt	8.2	7.0	-	1.2 (≤2.2)	-	-
Copper	20.1	19.8	2 (≤50)	-	-	-
Iron	16700	15300	9 (≤50)	-	-	-
Lead	43.1	52.1	19 (≤50)	-	-	-
Magnesium	13800	14600	6 (≤50)	-	-	-
Manganese	749	951	24 (≤50)	-	-	-
Mercury	0.022	0.037	-	0.015 (≤0.015)	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA76-0.5B	SA76009-0.5B				
Molybdenum	0.85	1.10	-	0.25 (≤0.32)	-	-
Nickel	16.9	15.5	9 (≤50)	-	-	-
Platinum	0.01U	0.01	-	0 (≤0.11)	-	-
Potassium	2250	2480	10 (≤50)	-	-	-
Sodium	1550	1860	18 (≤50)	-	-	-
Strontium	145	200	32 (≤50)	-	-	-
Thallium	0.190	0.313	49 (≤50)	-	-	-
Tin	4.0	4.3	-	0.3 (≤10.8)	-	-
Titanium	781	767	2 (≤50)	-	-	-
Tungsten	1.30	1.00	26 (≤50)	-	-	-
Uranium	0.724	1.20	49 (≤50)	-	-	-
Vanadium	48.4	42.8	12 (≤50)	-	-	-
Zinc	43.9	50.1	13 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA152-0.5B	SA152009-0.5B				
Aluminum	6720	6350	6 (≤50)	-	-	-
Arsenic	1.48	1.34	-	0.14 (≤0.52)	-	-
Barium	133	185	33 (≤50)	-	-	-
Beryllium	0.337	0.316	6 (≤50)	-	-	-
Boron	4.4	4.1	-	0.3 (≤10.5)	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA152-0.5B	SA152009-0.5B				
Calcium	22500	16000	34 (≤50)	-	-	-
Chromium	4.21	4.18	1 (≤50)	-	-	-
Cobalt	5.8	4.9	-	0.9 (≤2.1)	-	-
Copper	12.9	12.8	1 (≤50)	-	-	-
Iron	12200	10600	14 (≤50)	-	-	-
Lead	7.9	7.7	-	0.2 (≤2.1)	-	-
Magnesium	7230	6040	18 (≤50)	-	-	-
Manganese	346	305	13 (≤50)	-	-	-
Mercury	0.006	0.006	-	0 (≤0.016)	-	-
Molybdenum	0.42	0.37	-	0.05 (≤0.31)	-	-
Nickel	14.8	12.6	16 (≤50)	-	-	-
Potassium	2970	3070	3 (≤50)	-	-	-
Sodium	493	516	5 (≤50)	-	-	-
Strontium	104	129	-	25 (≤41.1)	-	-
Thallium	0.080	0.083	-	0.003 (≤0.021)	-	-
Tin	3.6	3.8	-	0.2 (≤10.3)	-	-
Titanium	639	573	11 (≤50)	-	-	-
Tungsten	0.13	0.11	-	0.02 (≤0.10)	-	-
Uranium	0.608	0.560	8 (≤50)	-	-	-
Vanadium	35.4	29.2	19 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA152-0.5B	SA152009-0.5B				
Zinc	26.0	23.8	9 (≤50)	-	-	-

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

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
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	Antimony Tungsten	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
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	Cobalt Zinc	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)
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 (PQL) (sp)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0903051	SA76-0.5B SA76009-0.5B	Arsenic	J (all detects)	A	Field duplicates (RPD) (fd)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0903051

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903051	RSA12-0.5B	Boron Tin	10.5U mg/Kg 10.6U mg/Kg	A	bl
R0903051	RSAI3-0.5B	Boron Tin	10.3U mg/Kg 10.3U mg/Kg	A	bl
R0903051	RSAJ5-0.5B	Tin	11.0U mg/Kg	A	bl
R0903051	RSAK5-0.5B	Boron Tin	10.6U mg/Kg 10.8U mg/Kg	A	bl
R0903051	SA76-0.5B	Tin	10.5U mg/Kg	A	bl
R0903051	SA76009-0.5B	Tin	10.8U mg/Kg	A	bl
R0903051	RSAL3-0.5B	Tin	10.4U mg/Kg	A	bl
R0903051	SA100-0.5B	Boron Tin	10.1U mg/Kg 10.1U mg/Kg	A	bl
R0903051	RSAM3-0.5B	Boron Tin	10.4U mg/Kg 10.3U mg/Kg	A	bl
R0903051	RSAM2-0.5B	Boron Tin	10.3U mg/Kg 10.2U mg/Kg	A	bl
R0903051	SA189-0.5B	Boron Tin	10.4U mg/Kg 10.5U mg/Kg	A	bl
R0903051	SA88-0.5B	Boron Tin	10.6U mg/Kg 10.5U mg/Kg	A	bl
R0903051	SA152-0.5B	Boron Tin	10.5U mg/Kg 10.3U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903051	SA152009-0.5B	Boron Tin	10.3U mg/Kg 10.2U mg/Kg	A	bl
R0903051	RSAJ2-0.5B	Tin	11.0U mg/Kg	A	bl
R0903051	RSAJ3-0.5B	Tin	11.3U mg/Kg	A	bl
R0903051	SA202-0.5B	Boron Tin	10.5U mg/Kg 10.4U mg/Kg	A	bl

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495C4
SDG #: R0903051
Laboratory: Columbia Analytical Services

Date: 9-18-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: LC

METHOD: Metals (EPA SW 846 Method 6010B/6020/7000)

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
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	A	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(5,6), (13,14)
XV	Field Blanks	SW	~~Filter Blank~~ 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: SO: 1

1	RSA12-0.5B	11	SA189-0.5B	21	~~PBS~~ RSA12-0.5BDUP	31	PBS1
2	RSAI3-0.5B	12	SA88-0.5B	22		32	
3	RSAJ5-0.5B	13	SA152-0.5B	23		33	
4	RSAK5-0.5B	14	SA152009-0.5B	24		34	
5	SA76-0.5B	15	RSAJ2-0.5B	25		35	
6	SA76009-0.5B	16	RSAJ3-0.5B	26		36	
7	RSAL3-0.5B	17	SA202-0.5B	27		37	
8	SA100-0.5B	18	SA76-0.5BMS	28		38	
9	RSAM3-0.5B	19	SA76-0.5BDUP	29		39	
10	RSAM2-0.5B	20	RSA12-0.5B MS	30		40	

Notes: _____

LDC #: 21295C4
SDG #: R0903051

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-17	Soil	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC: 18, 19, 20, 21	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC: 18, A	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP	S	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS	S	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 21495C4
SDG #: R0903051
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: mg/Kg

(b1)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x
Associated Samples: All

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**1**	2	3	4	5	6	7	8	9	10	11
Al	0.6													
B	0.5	6.0		9.0 / 10.5	5.9 / 10.3		8.4 / 10.6				3.7 / 10.1	4.2 / 10.4	3.8 / 10.3	6.0 / 10.4
Cr	0.09													
Mn	0.02													
Sn	3.5			3.6 / 10.6	3.5 / 10.3	4.1 / 11.0	4.3 / 10.8	4.3 / 10.5	4.0 / 10.8	3.9 / 10.4	3.5 / 10.1	3.7 / 10.3	3.4 / 10.2	3.9 / 10.5
Sr		0.3												

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**12**	13	14	15	16	17					
Al	0.6													
B	0.5	6.0		8.0 / 10.6	4.4 / 10.5	4.1 / 10.3			7.3 / 10.5					
Cr	0.09													
Mn	0.02													
Sn	3.5			3.8 / 10.5	3.6 / 10.3	3.8 / 10.2	8.2 / 11.0	4.5 / 11.3	4.2 / 10.4					
Sr		0.3												

LDC #: 21495C4
SDG #: R0903051
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x

(b1)

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 16, 17

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Al		2.0												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 7-17

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Ba		0.60												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-6

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Ba		0.30												

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 21495C4
SDG #: R0903051

VALIDATION FINDINGS WORKSHEET
Field Blanks

(CBF)

Reviewer: CR
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/7000)

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

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 7/21/09 Soil factor applied 100x x 2xdil = 200x
Field blank type: (circle one) Field Blank / Rinsate / Other: Filter Blank Associated Samples: All

Analyte	Blank ID	Sample Identification										
	FB072109-SO (SDG#: R0904016)	Action Level	No Qualifiers									
Al	9.4											
Ba	0.5											
Ca	336	672										
Fe	13.8											
Pb	0.020											
Mg	30.0	60										
Mn	3.0											
K	79.3											
Na	241											
Sr	4.40											
W	0.02											
U	0.004											
Zn	8.6											

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

LDC #: 21495C4
SDG #: R0903051

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

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

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 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 Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

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
	18 20	Soil	Sb	59.2	All	J-/UJ/A (m)
			W	65.4	↓	

Comments: _____

MS.4S2

LDC #: 21495C4
SDG #: R090305 1

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

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

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 If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?
Y (N) N/A Were ICP serial dilution percent differences (%D) (≤10%?
Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	1	Soil	Co	11.0	All	J / UJ / A (sd)
			Zn	11.2	↓	↓

Comments: _____

SDIL_4S2

LDC#: 21495C4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg) 5	Concentration (mg/Kg) 6	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Aluminum	9010	9340	4			
Arsenic	2.95	6.05	69			Jdet / A (fd)
Barium	185	206	11			
Beryllium	0.407	0.622	42			
Boron	33.7	41.5		7.8	(≤10.8)	
Cadmium	0.04U	0.09		0.05	(≤0.11)	
Calcium	16500	22300	30			
Chromium	7.11	11.1	44			
Cobalt	8.2	7.0		1.2	(≤2.2)	
Copper	20.1	19.8	2			
Iron	16700	15300	9			
Lead	43.1	52.1	19			
Magnesium	13800	14600	6			
Manganese	749	951	24			
Mercury	0.022	0.037		0.015	(≤0.015)	
Molybdenum	0.85	1.10		0.25	(≤0.32)	
Nickel	16.9	15.5	9			
Platinum	0.01U	0.01		0	(≤0.11)	
Potassium	2250	2480	10			

LDC#: 21495C4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: SR
2nd Reviewer: [illegible]

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg) 5	Concentration (mg/Kg) 6	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Sodium	1550	1860	18			
Strontium	145	200	32			
Thallium	0.190	0.313	49			
Tin	4.0	4.3		0.3	(≤10.8)	
Titanium	781	767	2			
Tungsten	1.30	1.00	26			
Uranium	0.724	1.20	49			
Vanadium	48.4	42.8	12			
Zinc	43.9	50.1	13			

LDC#: 21495C4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg) 7	Concentration (mg/Kg) 8	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Aluminum	6720	6350	6			
Arsenic	1.48	1.34	~~10~~	0.14	(≤0.52)	
Barium	133	185	33			
Beryllium	0.337	0.316	6			
Boron	4.4	4.1		0.3	(≤10.5)	
Calcium	22500	16000	34			
Chromium	4.21	4.18	1			
Cobalt	5.8	4.9		0.9	(≤2.1)	
Copper	12.9	12.8	1			
Iron	12200	10600	14			
Lead	7.9	7.7		0.2	(≤2.1)	
Magnesium	7230	6040	18			
Manganese	346	305	13			
Mercury	0.006	0.006		0	(≤0.016)	
Molybdenum	0.42	0.37		0.05	(≤0.31)	
Nickel	14.8	12.6	16			
Potassium	2970	3070	3			
Sodium	493	516	5			
Strontium	104	129		25	(≤41.1)	
Thallium	0.080	0.083		0.003	(≤0.021)	

LDC#: 21495C4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: 1

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg) 7	Concentration (mg/Kg) 8	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Tin	3.6	3.8		0.2	(≤10.3)	
Titanium	639	573	11			
Tungsten	0.13	0.11		0.02	(≤0.10)	
Uranium	0.608	0.560	8			
Vanadium	35.4	29.2	19			
Zinc	26.0	23.8	9			

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 24, 2009

Matrix: Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903243

Sample Identification

H-28AB
AW-BW-02B
M-142B
M-142BDISS
M-130B
M-130BDISS
M-29B
H-28ABMS
H-28ABDUP
AW-BW-02BMS
AW-BW-02BDUP

Introduction

This data review covers 11 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

IV. 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	Maximum Concentration	Associated Samples
PB (prep blank)	Calcium Iron Manganese Lead	8.8 ug/L 3.5 ug/L 0.4 ug/L 0.076 ug/L	All samples in SDG R0903243
ICB/CCB	Antimony	0.021 ug/L	All samples in SDG R0903243
ICB/CCB	Lead Platinum Thallium Uranium	0.006 ug/L 0.01 ug/L 0.006 ug/L 0.05 ug/L	H-28AB M-142B M-142BDISS M-130B M-130BDISS M-29B
ICB/CCB	Thallium	0.005 ug/L	AW-BW-02B
ICB/CCB	Boron Iron	4.2 ug/L 4.0 ug/L	H-28AB AW-BW-02B M-142B M-142BDISS M-130B M-130BDISS

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Barium Manganese Strontium	0.9 ug/L 0.5 ug/L 0.20 ug/L	H-28AB AW-BW-02B
ICB/CCB	Barium Calcium Magnesium Strontium	1.1 ug/L 11.3 ug/L 6.0 ug/L 0.30 ug/L	M-142B M-142BDISS M-130B M-130BDISS
ICB/CCB	Manganese	0.6 ug/L	M-130B M-130BDISS
ICB/CCB	Manganese	0.3 ug/L	M-142BDISS M-29B
ICB/CCB	Aluminum Boron Barium Calcium Iron Strontium	2.8 ug/L 4.9 ug/L 0.8 ug/L 8.0 ug/L 4.0 ug/L 0.10 ug/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	Antimony	0.35 ug/L	0.50U ug/L
M-142B	Thallium	0.021 ug/L	0.200U ug/L
M-142BDISS	Iron Manganese	10.0 ug/L 2.0 ug/L	20.0U ug/L 5.0U ug/L
M-130B	Antimony Thallium	0.24 ug/L 0.110 ug/L	0.50U ug/L 0.200U ug/L
M-130BDISS	Antimony Iron Thallium	0.34 ug/L 4.5 ug/L 0.082 ug/L	0.50U ug/L 20.0U ug/L 0.200U ug/L
M-29B	Antimony	0.24 ug/L	0.50U ug/L

Sample FB060409 (from SDG R0903006) was identified as a field blank. No metal contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB060409	6/4/09	Aluminum Beryllium Iron Magnesium Thallium Tungsten Zinc	2.8 ug/L 0.10 ug/L 3.8 ug/L 2.3 ug/L 0.008 ug/L 0.04 ug/L 2.0 ug/L	H-28AB AW-BW-02B M-142B M-130B

Sample MC-3B-FILT (from SDG R0902886) was identified as filter blank. No metal contaminants were found in this blank with the following exceptions:

Filter Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
MC-3B-FILT	5/21/09	Aluminum Antimony Calcium Magnesium Manganese Molybdenum Strontium Titanium Tungsten Zinc	5.3 ug/L 0.03 ug/L 116 ug/L 2.3 ug/L 0.2 ug/L 1.7 ug/L 0.2 ug/L 0.7 ug/L 0.06 ug/L 2.2 ug/L	M-142BDISS M-130BDISS

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	Zinc	1.0 ug/L	10.0U ug/L
AW-BW-02B	Aluminum Zinc	23.6 ug/L 1.6 ug/L	50.0U ug/L 10.0U ug/L
M-142B	Thallium Tungsten	0.021 ug/L 0.56 ug/L	0.200U ug/L 1.00U ug/L
M-130B	Barium Thallium Zinc	0.10 ug/L 0.110 ug/L 5.3 ug/L	0.30U ug/L 0.200U ug/L 10.0U ug/L
M-142BDISS	Manganese Tungsten	2.0 ug/L 0.48 ug/L	5.0U ug/L 1.00U ug/L
M-130BDISS	Aluminum Antimony Zinc	3.7 ug/L 0.34 ug/L 2.1 ug/L	50.0U ug/L 0.50U ug/L 10.0U ug/L

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

XII. 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.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG R0903243

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0903243	H-28AB AW-BW-02B M-142B M-142BDISS M-130B M-130BDISS M-29B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0903243

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903243	H-28AB	Antimony	0.50U ug/L	A	bl
R0903243	M-142B	Thallium	0.200U ug/L	A	bl
R0903243	M-142BDISS	Iron Manganese	20.0U ug/L 5.0U ug/L	A	bl
R0903243	M-130B	Antimony Thallium	0.50U ug/L 0.200U ug/L	A	bl
R0903243	M-130BDISS	Antimony Iron Thallium	0.50U ug/L 20.0U ug/L 0.200U ug/L	A	bl
R0903243	M-29B	Antimony	0.50U ug/L	A	bl

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

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903243	H-28AB	Zinc	10.0U ug/L	A	bf
R0903243	AW-BW-02B	Aluminum Zinc	50.0U ug/L 10.0U ug/L	A	bf
R0903243	M-142B	Thallium Tungsten	0.200U ug/L 1.00U ug/L	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903243	M-130B	Barium Thallium Zinc	0.30U ug/L 0.200U ug/L 10.0U ug/L	A	bf
R0903243	M-142BDISS	Manganese Tungsten	5.0U ug/L 1.00U ug/L	A	br
R0903243	M-130BDISS	Aluminum Antimony Zinc	50.0U ug/L 0.50U ug/L 10.0U ug/L	A	br

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495D4
SDG #: R0903243
Laboratory: Columbia Analytical Services

Date: 9-17-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6010B/6020/7000)

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: 6/9/09 - 6/16/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	A	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	SW	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	SW	Filter Blank = MC-3B-FILT (SDG R0902886) FB = FB060409 (SDG 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: water

1	H-28AB	11	AW-BW-02BDUP	21	PBW1	31	
2	AW-BW-02B	12		22		32	
3	M-142B	13		23		33	
4	M-142BDISS	14		24		34	
5	M-130B	15		25		35	
6	M-130BDISS	16		26		36	
7	M-29B	17		27		37	
8	H-28ABMS	18		28		38	
9	H-28ABDUP	19		29		39	
10	AW-BW-02BMS	20		30		40	

Notes: _____

LDC #: 21295D4
SDG #: R0903243

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [signature]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-7	water	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC: 8, 9	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC: 10, 11	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP	W	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS	W	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 21495D4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason Code: bl

Page: 1 of 3
Reviewer: CR
2nd Reviewer:

METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)
Soil preparation factor applied: NA
Raise to RL unless otherwise noted

Sample Concentration units, unless otherwise noted: ug/L
Associated Samples: All

					Sample Identification									
Analyte	**Maximum PB[a] (ug/l)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**	**RL**	1	4	5	6	7					
Sb		0.021		0.50	0.35		0.24	0.34	0.24					
Ca	8.8													
Fe	3.5			20.0		10.0		4.5						
Mn	0.4			5.0		2.0								
Pb	0.076													

Sample Concentration units, unless otherwise noted: ug/L
Associated Samples: 1, 3-7

					Sample Identification									
Analyte	**Maximum PB[a] (ug/l)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**	**RL**	3	5	6							
Pb		0.006												
Pt		0.01												
Tl		0.006		0.200	0.021	0.110	0.082							
U		0.005												

Sample Concentration units, unless otherwise noted: ug/L
Associated Samples: 2

					Sample Identification									
Analyte	**Maximum PB[a] (ug/l)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**		**No Qualifiers**									
Tl		0.005												

Sample Concentration units, unless otherwise noted: ug/L
Associated Samples: 1-6

					Sample Identification									
Analyte	**Maximum PB[a] (ug/l)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**	**RL**	4	6								
B		4.2												
Fe		4.0		20.0	See PB	See PB								

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1, 2

					Sample Identification									
Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	No Qualifiers									
Ba		0.9												
Mn		0.5												
Sr		0.20												

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 3-6

					Sample Identification									
Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	No Qualifiers									
Ba		1.1												
Ca		11.3												
Mg		6.0												
Sr		0.30												

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 5, 6

					Sample Identification									
Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	No Qualifiers									
Mn		0.6												

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 4, 7

					Sample Identification									
Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	4									
Mn		0.3		5.0	See PB									

LDC #: 21495D4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: NA

Reason Code: bl
Raise to RL unless otherwise noted

Reviewer: CB
2nd Reviewer:

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 7

					Sample Identification									
Analyte	**Maximum PB[a] (ug/l)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**	**RL**	**No Qualifiers**									
Al		2.8												
B		4.9												
Ba		0.8												
Ca		8.0												
Fe		4.0												
Sr		0.10												

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 21495D4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reason: bf

Reviewer: CR
2nd Reviewer: L

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 6/4/09 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: 1-3, 5

Analyte	Blank ID	Sample Identification										
	FB060409 (SDG# R0903006)	Action Level	1	2	3	5						
Al	2.8			23.6 / 50.0								
Be	0.10					0.10 / 0.30						
Fe	3.8											
Mg	2.3											
Tl	0.008				0.021 / 0.200	0.110 / 0.200						
W	0.04				0.56 / 1.00							
Zn	2.0		1.0 / 10.0	1.6 / 10.0		5.3 / 10.0						

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

LDC #: 21495D4
SDG #: R0903243

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/6020/7000)
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: br
Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 5/21/09 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Filter Blank Associated Samples: 4, 6

Analyte	Blank ID	Sample Identification										
	MC-3B-FILT (SDG# R0902886)	Action Level	4	6								
Al	5.3			3.7 / 50.0								
Sb	0.03			0.34 / 0.50								
Ca	116	1160										
Mg	2.3											
Mn	0.2		2.0 / 5.0									
Mo	1.7											
Sr	0.2											
Ti	0.7											
W	0.06		0.48 / 1.00									
Zn	2.2			2.1 / 10.0								

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

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 17 through June 24, 2009

LDC Report Date: September 24, 2009

Matrix: Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903404

Sample Identification

M-78B
M-128B
M-128BDISS
H-38B
M-19B
M-34B
M-125B
M-125BDISS
M-22AB
M-17AB
M-17ABDISS
M-78BMS
M-78BDUP
M-125BMS
M-125BDUP

Introduction

This data review covers 15 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

IV. 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	Maximum Concentration	Associated Samples
PB (prep blank)	Calcium Strontium Tungsten	11.3 ug/L 0.10 ug/L 0.25 ug/L	All samples in SDG R0903404
ICB/CCB	Boron Tungsten	7.9 ug/L 0.04 ug/L	All samples in SDG R0903404
ICB/CCB	Strontium	0.20 ug/L	M-128B H-38B
ICB/CCB	Strontium	0.10 ug/L	M-78B M-128BDISS M-19B M-34B M-125B M-125BDISS M-22AB M-17AB M-17ABDISS

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Copper	1.0 ug/L	M-128BDISS M-19B M-34B M-125B M-125BDISS M-22AB M-17AB M-17ABDISS
ICB/CCB	Magnesium	2.8 ug/L	M-78B M-128B M-128BDISS H-38B M-19B M-34B M-22AB M-17AB M-17ABDISS
ICB/CCB	Magnesium	2.2 ug/L	M-125B M-125BDISS
ICB/CCB	Sodium	191 ug/L	M-78B M-128BDISS H-38B M-19B M-34B M-125B M-125BDISS M-22AB M-17AB M-17ABDISS
ICB/CCB	Sodium	105 ug/L	M-128B

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-128BDISS	Tungsten Copper	0.98 ug/L 3.0 ug/L	1.00U ug/L 10.0U ug/L
M-19B	Copper	3.6 ug/L	10.0U ug/L
M-34B	Copper	7.7 ug/L	10.0U ug/L
M-125B	Tungsten	0.82 ug/L	1.00U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
M-125BDISS	Tungsten	0.62 ug/L	1.00U ug/L
M-17AB	Copper	8.3 ug/L	10.0U ug/L
M-17ABDISS	Copper	8.9 ug/L	10.0U ug/L

Sample FB060409 (from SDG R0903006) was identified as a field blank. No metal contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB060409	6/4/09	Aluminum Beryllium Iron Magnesium Thallium Tungsten Zinc	2.8 ug/L 0.10 ug/L 3.8 ug/L 2.3 ug/L 0.008 ug/L 0.04 ug/L 2.0 ug/L	M-78B M-128B H-38B M-125B

Sample MC-3B-FILT (from SDG R0902886) was identified as filter blank. No metal contaminants were found in this blank with the following exceptions:

Filter Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
MC-3B-FILT	5/21/09	Aluminum Antimony Calcium Magnesium Manganese Molybdenum Strontium Titanium Tungsten Zinc	5.3 ug/L 0.03 ug/L 116 ug/L 2.3 ug/L 0.2 ug/L 1.7 ug/L 0.2 ug/L 0.7 ug/L 0.06 ug/L 2.2 ug/L	M-128BDISS M-125BDISS

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	Zinc	6.2 ug/L	10.0U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
M-128B	Beryllium Thallium Zinc	0.10 ug/L 0.092 ug/L 5.3 ug/L	0.30U ug/L 0.200U ug/L 10.0U ug/L
H-38B	Aluminum Beryllium Thallium Zinc	37.4 ug/L 0.10 ug/L 0.072 ug/L 1.4 ug/L	50.0U ug/L 0.30U ug/L 0.200U ug/L 10.0U ug/L
M-125B	Beryllium Thallium Tungsten Zinc	0.10 ug/L 0.122 ug/L 0.82 ug/L 1.0 ug/L	0.30U ug/L 0.200U ug/L 1.00U ug/L 10.0U ug/L
M-128BDISS	Antimony Tungsten Zinc	0.24 ug/L 0.98 ug/L 1.7 ug/L	0.50U ug/L 1.00U ug/L 10.0U ug/L
M-125BDISS	Tungsten Zinc	0.62 ug/L 0.8 ug/L	1.00U ug/L 10.0U ug/L

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

XII. 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.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG R0903404

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0903404	M-78B M-128B M-128BDISS H-38B M-19B M-34B M-125B M-125BDISS M-22AB M-17AB M-17ABDISS	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

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

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903404	M-128BDISS	Tungsten Copper	1.00U ug/L 10.0U ug/L	A	bl
R0903404	M-19B	Copper	10.0U ug/L	A	bl
R0903404	M-34B	Copper	10.0U ug/L	A	bl
R0903404	M-125B	Tungsten	1.00U ug/L	A	bl
R0903404	M-125BDISS	Tungsten	1.00U ug/L	A	bl
R0903404	M-17AB	Copper	10.0U ug/L	A	bl
R0903404	M-17ABDISS	Copper	10.0U ug/L	A	bl

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

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903404	M-78B	Zinc	10.0U ug/L	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903404	M-128B	Beryllium Thallium Zinc	0.30U ug/L 0.200U ug/L 10.0U ug/L	A	bf
R0903404	H-38B	Aluminum Beryllium Thallium Zinc	50.0U ug/L 0.30U ug/L 0.200U ug/L 10.0U ug/L	A	bf
R0903404	M-125B	Beryllium Thallium Tungsten Zinc	0.30U ug/L 0.200U ug/L 1.00U ug/L 10.0U ug/L	A	bf
R0903404	M-128BDISS	Antimony Tungsten Zinc	0.50U ug/L 1.00U ug/L 10.0U ug/L	A	br
R0903404	M-125BDISS	Tungsten Zinc	1.00U ug/L 10.0U ug/L	A	br

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495E4
SDG #: R0903404
Laboratory: Columbia Analytical Services

Date: 9-17-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: L

METHOD: Metals (EPA SW 846 Method 6010B/6020/7000)

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: 6/17/09 - 6/24/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	A	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	SW	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	SW	Filter Blank = MC-3B-FILT (SDG# R0902886) FB = FB060409 (SDG# 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: water

1	M-78B	11	M-17ABDISS	21	PBW1	31	
2	M-128B	12	M-78BMS	22		32	
3	M-128BDISS	13	M-78BDUP	23		33	
4	H-38B	14	M-125BMS	24		34	
5	M-19B	15	M-125BDUP	25		35	
6	M-34B	16		26		36	
7	M-125B	17		27		37	
8	M-125BDISS	18		28		38	
9	M-22AB	19		29		39	
10	M-17AB	20		30		40	

Notes: _____

LDC #: 21295E4
SDG #: R0903404

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-11	water	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:12,13	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:14,15	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, ~~Be, B, Cd~~, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: ~~Mercury by CVAA if performed~~

LDC #: 21495E4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: NA

Reason Code: bl
Raise to RL unless otherwise noted

Reviewer: CR
2nd Reviewer:

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All

					Sample Identification									
Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	3	7	8							
B		7.9												
Ca	11.3													
Sr	0.10													
W	0.25	0.04		1.00	0.98	0.82	0.62							

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 2, 4

					Sample Identification									
Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	No Qualifiers									
Sr		0.20												

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1, 3, 5-11

					Sample Identification									
Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	No Qualifiers									
Sr		0.10												

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 3, 5-11

					Sample Identification									
Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	3	5	6	10	11					
Cu		1.0		10.0	3.0	3.6	7.7	8.3	8.9					

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1-6, 9-11

					Sample Identification									
Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	No Qualifiers									
Mg		2.8												

LDC #: 21495E4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: NA

Reason Code: bl
Raise to RL unless otherwise noted

Reviewer: CR
2nd Reviewer:

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 7, 8

					Sample Identification									
Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	No Qualifiers									
Mg		2.2												

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1,3-11

					Sample Identification									
Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	No Qualifiers									
Na		191												

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 2

					Sample Identification									
Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	No Qualifiers									
Na		105												

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 21495E4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

Reason: bf

METHOD: Trace Metals (EPA SW846 6010B/7000)
(Y) N N/A Were field blanks identified in this SDG?
(Y) N N/A Were target analytes detected in the field blanks?
Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 6/4/09 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: 1, 2, 4, 7

Analyte	Blank ID	Sample Identification											
	FB060409 (SDG# R0903006)	Action Level	1	2	4	7							
Al	2.8				37.4 / 50.0								
Be	0.10			0.10 / 0.30	0.10 / 0.30	0.10 / 0.30							
Fe	3.8												
Mg	2.3												
Tl	0.008			0.092 / 0.200	0.072 / 0.200	0.122 / 0.200							
W	0.04					0.82 / 1.00							
Zn	2.0		6.2 / 10.0	5.3 / 10.0	1.4 / 10.0	1.0 / 10.0							

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

LDC #: 21495E4
SDG #: R0903243

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: L

METHOD: Trace Metals (EPA SW846 6010B/6020/7000)

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: br

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 5/21/09 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Filter Blank

Associated Samples: 3, 8

Analyte	Blank ID	Sample Identification										
	MC-3B-FILT (SDG# R0902886)	Action Level	3	8								
Al	5.3											
Sb	0.03		0.24 / 0.50									
Ca	116	1160										
Mg	2.3											
Mn	0.2											
Mo	1.7											
Sr	0.2											
Ti	0.7											
W	0.06		0.98 / 1.00	0.62 / 1.00								
Zn	2.2		1.7 / 10.0	0.8 / 10.0								

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

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 5 through June 11, 2009

LDC Report Date: October 7, 2009

Matrix: Soil

Parameters: Metals

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
SA127-0.5BDUP

Introduction

This data review covers 19 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

IV. 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	Maximum Concentration	Associated Samples
PB (prep blank)	Boron Chromium Iron Manganese Sodium Tin	0.4 mg/Kg 0.07 mg/Kg 0.8 mg/Kg 0.02 mg/Kg 32 mg/Kg 3.4 mg/Kg	All samples in SDG R0903184
ICB/CCB	Boron Iron Molybdenum Tungsten	4.0 ug/L 4.0 ug/L 0.60 ug/L 0.04 ug/L	All samples in SDG R0903184
ICB/CCB	Thallium	0.006 ug/L	SA127-0.5B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Thallium	0.013 ug/L	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
ICB/CCB	Barium	0.90 ug/L	SA127-0.5B RSAJ6-0.5B RSAK6-0.5B RSAK8-0.5B RSAL7-0.5B RSAK4-0.5B RSAK4009-0.5B SA134-0.5B
ICB/CCB	Barium Sodium	0.60 ug/L 30.0 ug/L	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
ICB/CCB	Magnesium Strontium	2.0 ug/L 0.20 ug/L	RSAK4-0.5B RSAK4009-0.5B SA134-0.5B
ICB/CCB	Manganese	0.50 ug/L	RSAL8-0.5B SA35-0.5B SA55-0.5B 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	Manganese Strontium Sodium	0.40 ug/L 0.10 ug/L 200.0 ug/L	SA127-0.5B RSAJ6-0.5B RSAK6-0.5B RSAK8-0.5B RSAL7-0.5B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Manganese	0.30 ug/L	SA56-0.5B

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
SA127-0.5B	Boron Tin	7.0 mg/Kg 3.8 mg/Kg	10.5U mg/Kg 10.5U mg/Kg
RSAJ6-0.5B	Tin	4.4 mg/Kg	10.5U mg/Kg
RSAK6-0.5B	Boron Tin	8.3 mg/Kg 4.1 mg/Kg	10.4U mg/Kg 10.4U mg/Kg
RSAK8-0.5B	Tin	4.0 mg/Kg	10.4U mg/Kg
RSAL7-0.5B	Boron Tin	4.5 mg/Kg 3.7 mg/Kg	10.2U mg/Kg 10.2U mg/Kg
RSAL8-0.5B	Tin	4.3 mg/Kg	10.3U mg/Kg
SA35-0.5B	Boron Tin	3.9 mg/Kg 3.9 mg/Kg	10.4U mg/Kg 10.4U mg/Kg
SA55-0.5B	Boron Tin	5.8 mg/Kg 4.0 mg/Kg	10.3U mg/Kg 10.3U mg/Kg
SA56-0.5B	Boron Tin	4.9 mg/Kg 3.4 mg/Kg	10.3U mg/Kg 10.3U mg/Kg
SA176-0.5B	Tin	4.3 mg/Kg	10.4U mg/Kg
RSAO3-0.5B	Boron Tin	5.6 mg/Kg 4.0 mg/Kg	10.1U mg/Kg 10.1U mg/Kg
SA182-0.5B	Tin	5.3 mg/Kg	11.9U mg/Kg
SA201-0.5B	Tin	7.6 mg/Kg	10.5U mg/Kg
SA166-0.5B	Boron Tin	6.7 mg/Kg 4.5 mg/Kg	10.4U mg/Kg 10.4U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAK4-0.5B	Boron Tin	5.5 mg/Kg 4.2 mg/Kg	10.2U mg/Kg 10.2U mg/Kg
RSAK4009-0.5B	Boron Tin	5.3 mg/Kg 4.0 mg/Kg	10.1U mg/Kg 10.1U mg/Kg
SA134-0.5B	Boron Tin	8.3 mg/Kg 3.9 mg/Kg	10.3U mg/Kg 10.3U mg/Kg

Sample FB072109-SO (from SDG R0904016) was identified as a field blank. No metal contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB072109-SO	7/21/09	Aluminum Barium Calcium Iron Lead Magnesium Manganese Potassium Sodium Strontium Tungsten Uranium Zinc	9.4 ug/L 0.5 ug/L 336 ug/L 13.8 ug/L 0.020 ug/L 30.0 ug/L 3.0 ug/L 79.3 ug/L 241 ug/L 4.40 ug/L 0.02 ug/L 0.004 ug/L 8.6 ug/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.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

Matrix spike (MS) samples 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
SA127-0.5BMS (All samples in SDG R0903184)	Antimony Tungsten	44.4 (75-125) 50.5 (75-125)	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A

VII. Duplicate Sample Analysis

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
SA127-0.5BDUP (All samples in SDG R0903184)	Calcium	22.8 (≤20)	-	J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
SA127-0.5BL	Iron Manganese Nickel Zinc	11.7 (≤10) 10.2 (≤10) 12.2 (≤10) 14.4 (≤10)	All samples in SDG R0903184	J (all detects) UJ (all non-detects)	A

XII. 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.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples RSAK4-0.5B and RSAK4009-0.5B were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAK4-0.5B	RSAK4009-0.5B				
Aluminum	9460	8940	6 (≤50)	-	-	-
Arsenic	1.68	1.57	-	0.11 (≤0.51)	-	-
Barium	164	182	10 (≤50)	-	-	-
Beryllium	0.417	0.362	14 (≤50)	-	-	-
Boron	5.5	5.3	-	0.2 (≤10.2)	-	-
Cadmium	0.04	0.08	-	0.04 (≤0.10)	-	-
Calcium	16300	22100	30 (≤50)	-	-	-
Chromium	5.26	4.82	9 (≤50)	-	-	-
Cobalt	7.1	6.2.	-	0.9 (≤2.1)	-	-
Copper	17.3	15.5	11 (≤50)	-	-	-
Iron	14700	13300	10 (≤50)	-	-	-
Lead	10.0	9.0	-	1 (≤2.1)	-	-
Magnesium	10300	9380	9 (≤50)	-	-	-

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAK4-0.5B	RSAK4009-0.5B				
Manganese	409	383	7 (≤50)	-	-	-
Mercury	0.011	0.009	-	0.002 (≤0.016)	-	-
Molybdenum	0.57	0.44	-	0.13 (≤0.31)	-	-
Nickel	18.3	13.4	31 (≤50)	-	-	-
Potassium	2840	3050	7 (≤50)	-	-	-
Sodium	1080	1270	16 (≤50)	-	-	-
Strontium	135	157	-	22 (≤41.0)	-	-
Thallium	0.198	0.131	41 (≤50)	-	-	-
Tin	4.2	4.0	-	0.2 (≤10.2)	-	-
Titanium	856	797	7 (≤50)	-	-	-
Tungsten	0.19	0.23	-	0.04 (≤0.10)	-	-
Uranium	0.750	0.664	12 (≤50)	-	-	-
Vanadium	42.8	38.8	10 (≤50)	-	-	-
Zinc	33.6	30.3	10 (≤50)	-	-	-

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

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
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	Antimony Tungsten	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
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	Calcium	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)
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	Chromium Nickel Sodium Zinc	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
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 (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0903184

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903184	SA127-0.5B	Boron Tin	10.5U mg/Kg 10.5U mg/Kg	A	bl
R0903184	RSAJ6-0.5B	Tin	10.5U mg/Kg	A	bl
R0903184	RSAK6-0.5B	Boron Tin	10.4U mg/Kg 10.4U mg/Kg	A	bl
R0903184	RSAK8-0.5B	Tin	10.4U mg/Kg	A	bl
R0903184	RSAL7-0.5B	Boron Tin	10.2U mg/Kg 10.2U mg/Kg	A	bl
R0903184	RSAL8-0.5B	Tin	10.3U mg/Kg	A	bl
R0903184	SA35-0.5B	Boron Tin	10.4U mg/Kg 10.4U mg/Kg	A	bl
R0903184	SA55-0.5B	Boron Tin	10.3U mg/Kg 10.3U mg/Kg	A	bl
R0903184	SA56-0.5B	Boron Tin	10.3U mg/Kg 10.3U mg/Kg	A	bl
R0903184	SA176-0.5B	Tin	10.4U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903184	RSAO3-0.5B	Boron Tin	10.1U mg/Kg 10.1U mg/Kg	A	bl
R0903184	SA182-0.5B	Tin	11.9U mg/Kg	A	bl
R0903184	SA201-0.5B	Tin	10.5U mg/Kg	A	bl
R0903184	SA166-0.5B	Boron Tin	10.4U mg/Kg 10.4U mg/Kg	A	bl
R0903184	RSAK4-0.5B	Boron Tin	10.2U mg/Kg 10.2U mg/Kg	A	bl
R0903184	RSAK4009-0.5B	Boron Tin	10.1U mg/Kg 10.1U mg/Kg	A	bl
R0903184	SA134-0.5B	Boron Tin	10.3U mg/Kg 10.3U mg/Kg	A	bl

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495F4
SDG #: R0903184
Laboratory: Columbia Analytical Services

Date: 9-18-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [signature]

METHOD: Metals (EPA SW 846 Method 6010B/6020/7000)

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
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	SW	Dup
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(15,16)
XV	Field Blanks	SW	FB = FB072109-SO (SO6 & 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: SO1

1	SA127-0.5B	11	RSA03-0.5B	21	PBS1	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	SA127-0.5BDUP	29		39	
10	SA176-0.5B	20		30		40	

Notes: _____

LDC #: 21295F4
SDG #: R0903184

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-17	Soil	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC: 18, 19	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 21495F4
SDG #: R0903184

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason: b1

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

METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)
Soil preparation factor applied: 100x
Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: All

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	Sample Identification 1	2	3	4	5	6	7	8	9	10	11
B	0.4	4.0		7.0 / 10.5		8.3 / 10.4		4.5 / 10.2		3.9 / 10.4	5.8 / 10.3	4.9 / 10.3		5.6 / 10.1
Cr	0.07													
Fe	0.8	4.0												
Mn	0.02													
Mo		0.60												
Na	32													
Sn	3.4			3.8 / 10.5	4.4 / 10.5	4.1 / 10.4	4.0 / 10.4	3.7 / 10.2	4.3 / 10.3	3.9 / 10.4	4.0 / 10.3	3.4 / 10.3	4.3 / 10.4	4.0 / 10.1
W		0.04												

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	Sample Identification 12	13	14	15	16	17					
B	0.4	4.0				6.7 / 10.4	5.5 / 10.2	5.3 / 10.1	8.3 / 10.3					
Cr	0.07													
Fe	0.8	4.0												
Mn	0.02													
Mo		0.60												
Na	32													
Sn	3.4			5.3 / 11.9	7.6 / 10.5	4.5 / 10.4	4.2 / 10.2	4.0 / 10.1	3.9 / 10.3					
W		0.04												

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 1

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	Sample Identification No Qualifiers										
Tl		0.006												

LDC #: 21495F4
SDG #: R0903184
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x

(b1)

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 2-17

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	Sample Identification: No Qualifiers										
Tl		0.013												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-5, 15-17

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	Sample Identification: No Qualifiers										
Ba		0.90												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 6-14

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	Sample Identification: No Qualifiers										
Ba		0.60												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 15-17

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	Sample Identification: No Qualifiers										
Mg		2.0												
Sr		0.20												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 6-8, 10-17

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	Sample Identification: No Qualifiers										
Mn		0.50												

LDC #: 21495F4
SDG #: R0903184
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x

(b1)

Reviewer: CR
2nd Reviewer:

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-5

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**No Qualifiers**										
Mn		0.40												
Sr		0.10												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-5

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**No Qualifiers**										
Na		200.0												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 6-14

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**No Qualifiers**										
Na		30.0												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 9

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**No Qualifiers**										
Mn		0.30												

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 21495F4
SDG #: R0903184

VALIDATION FINDINGS WORKSHEET
Field Blanks

(bf)

Reviewer: CR
2nd Reviewer: h

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 7/21/09 ~~Soil factor~~ applied 100x x 2xdil = 200x
Field blank type: (circle one) Field Blank / Rinsate / Other: Filter Blank Associated Samples: ~~11-13~~ All

Analyte	Blank ID	Sample Identification											
	FB072109-SO (SDG#: R0904016)	Action Level	No Qualifiers										
Al	9.4												
Ba	0.5												
Ca	336	672											
Fe	13.8												
Pb	0.020												
Mg	30.0	60											
Mn	3.0												
K	79.3												
Na	241												
Sr	4.40												
W	0.02												
U	0.004												
Zn	8.6												

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

LDC #: 21495F4
SDG #: R0903184

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

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

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 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 Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

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
	18	SO:1	Sb	44.4	All	J-/UJ/A (m)
			W	50.5	↓	↓

Comments:

LDC #: 21495F4
SDG #: R0903184

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Reviewer: CR
2nd Reviewer:

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?

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
	19	Soil	Ca	22.8 (≤20)		All	J/UJ/A (d)

Comments:

LDC #: 21495F4
SDG #: R0903184

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: CR
2nd Reviewer: [illegible]

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 If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?
Y (N) N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	1	Soil	Fe	11.7	All	J | UJ | A (csd)
			Mn	10.2	↓	↓
			Ni	12.2		
			Zn	14.4		

Comments: _____

LDC#: 21495F4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: L

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg) 15	Concentration (mg/Kg) 16	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Aluminum	9460	8940	6			
Arsenic	1.68	1.57	7	0.11	(≤0.51)	
Barium	164	182	10			
Beryllium	0.417	0.362	14			
Boron	5.5	5.3		0.2	(≤10.2)	
Cadmium	0.04	0.08		0.04	(≤0.10)	
Calcium	16300	22100	30			
Chromium	5.26	4.82	9			
Cobalt	7.1	6.2.		0.9	(≤2.1)	
Copper	17.3	15.5	11			
Iron	14700	13300	10			
Lead	10.0	9.0		1	(≤2.1)	
Magnesium	10300	9380	9			
Manganese	409	383	7			
Mercury	0.011	0.009		0.002	(≤0.016)	
Molybdenum	0.57	0.44		0.13	(≤0.31)	
Nickel	18.3	13.4	31			
Potassium	2840	3050	7			
Sodium	1080	1270	16			

LDC#: 21495F4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: V

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg) 15	Concentration (mg/Kg) 16	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Strontium	135	157		22	(≤41.0)	
Thallium	0.198	0.131	41			
Tin	4.2	4.0		0.2	(≤10.2)	
Titanium	856	797	7			
Tungsten	0.19	0.23		0.04	(≤0.10)	
Uranium	0.750	0.664	12			
Vanadium	42.8	38.8	10			
Zinc	33.6	30.3	10			

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 23, 2009

Matrix: Soil

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903443

Sample Identification

SA197-0.5B	SA197-0.5BDUP
SA198-0.5B	SA150-0.5BMS
SA64-0.5B	SA150-0.5BDUP
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	
SA197-0.5BMS	

Introduction

This data review covers 23 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

IV. 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	Maximum Concentration	Associated Samples
PB (prep blank)	Chromium Iron Manganese Magnesium Molybdenum Strontium Sodium Selenium Tin Thallium	0.10 mg/Kg 1.1 mg/Kg 0.04 mg/Kg 0.8 mg/Kg 0.50 mg/Kg 0.04 mg/Kg 19 mg/Kg 0.8 mg/Kg 3.8 mg/Kg 0.016 mg/Kg	All samples in SDG R0903443
ICB/CCB	Boron Antimony Magnesium	8.0 ug/L 3.0 ug/L 4.0 ug/L	All samples in SDG R0903443
ICB/CCB	Manganese Sodium	0.50 ug/L 50.0 ug/L	SA201-28B SA201009-28B SA43009-0.5B SA40-0.5B SA200-0.5B RSAO6-0.5B SA51-0.5B SA43-0.5B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Sodium	100.0 ug/L	SA197-0.5B
ICB/CCB	Sodium	70.0 ug/L	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
ICB/CCB	Nickel	0.50 ug/L	SA43009-0.5B SA51-0.5B SA43-0.5B
ICB/CCB	Beryllium	0.007 ug/L	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
ICB/CCB	Tungsten	0.032 ug/L	SA60-0.5B SA150-0.5B RSAN5-0.5B SA53-0.5B SA201-10B SA201-28B
ICB/CCB	Tungsten	0.022 ug/L	SA201009-28B SA43009-0.5B SA40-0.5B SA200-0.5B RSAO6-0.5B SA51-0.5B SA43-0.5B

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	Boron Molybdenum Tin	4.5 mg/Kg 0.30 mg/Kg 4.6 mg/Kg	10.7U mg/Kg 0.32U mg/Kg 10.7U mg/Kg
SA198-0.5B	Boron Antimony Tin	3.4 mg/Kg 0.6 mg/Kg 6.5 mg/Kg	10.3U mg/Kg 2.1U mg/Kg 10.3U mg/Kg
SA64-0.5B	Boron Tin	5.9 mg/Kg 4.7 mg/Kg	10.7U mg/Kg 10.7U mg/Kg
SA104-0.5B	Antimony Tin	0.7 mg/Kg 4.6 mg/Kg	2.0U mg/Kg 10.1U mg/Kg
SA129-0.5B	Antimony	1.3 mg/Kg	2.1U mg/Kg
SA70-0.5B	Tin	4.5 mg/Kg	10.5U mg/Kg
SA60-0.5B	Tin	4.7 mg/Kg	10.3U mg/Kg
SA150-0.5B	Boron Tin	6.6 mg/Kg 4.5 mg/Kg	10.1U mg/Kg 10.1U mg/Kg
RSAN5-0.5B	Boron Tin	7.3 mg/Kg 4.2 mg/Kg	10.3U mg/Kg 10.3U mg/Kg
SA53-0.5B	Boron Tin	3.6 mg/Kg 3.5 mg/Kg	8.6U mg/Kg 8.6U mg/Kg
SA201-10B	Tin	4.7 mg/Kg	10.7U mg/Kg
SA201-28B	Tin	4.5 mg/Kg	10.5U mg/Kg
SA201009-28B	Tin	3.9 mg/Kg	10.5U mg/Kg
SA43009-0.5B	Boron Tin	9.5 mg/Kg 4.5 mg/Kg	10.7U mg/Kg 10.7U mg/Kg
SA40-0.5B	Tin	4.6 mg/Kg	10.8U mg/Kg
SA200-0.5B	Tin	4.4 mg/Kg	10.6U mg/Kg
RSAO6-0.5B	Selenium Tin	1.1 mg/Kg 4.2 mg/Kg	4.1U mg/Kg 10.2U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA51-0.5B	Tin	4.8 mg/Kg	10.5U mg/Kg
SA43-0.5B	Boron Tin	8.7 mg/Kg 4.5 mg/Kg	10.6U mg/Kg 10.6U mg/Kg

Sample FB072109-SO (from SDG R0904016) was identified as a field blank. No metal contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB072109-SO	7/21/09	Aluminum Barium Calcium Iron Lead Magnesium Manganese Potassium Sodium Strontium Tungsten Uranium Zinc	9.4 ug/L 0.5 ug/L 336 ug/L 13.8 ug/L 0.020 ug/L 30.0 ug/L 3.0 ug/L 79.3 ug/L 241 ug/L 4.40 ug/L 0.02 ug/L 0.004 ug/L 8.6 ug/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.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

Matrix spike (MS) samples 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
SA197-0.5BMS (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 SA43009-0.5B SA40-0.5B SA200-0.5B RSAO6-0.5B SA51-0.5B SA43-0.5B)	Antimony Tungsten	43.1 (75-125) 50.4 (75-125)	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A

VII. Duplicate Sample Analysis

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
SA197-0.5BDUP (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 SA43009-0.5B SA40-0.5B SA200-0.5B RSAO6-0.5B SA51-0.5B SA43-0.5B)	Calcium	27.0 (≤20)	-	J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
SA197-0.5BL	Chromium Nickel Sodium Zinc	13 (≤10) 10.3 (≤10) 13.6 (≤10) 14.2 (≤10)	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 SA43009-0.5B SA40-0.5B SA200-0.5B RSAO6-0.5B SA51-0.5B SA43-0.5B	J (all detects) UJ (all non-detects)	A

XII. 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.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SA201-28B and SA201009-28B and samples SA43009-0.5B and SA43-0.5B were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA201-28B	SA201009-28B				
Aluminum	9380	10200	8 (≤50)	-	-	-
Arsenic	11.3	11.0	3 (≤50)	-	-	-
Barium	102	113	10 (≤50)	-	-	-
Beryllium	0.391	0.429	9 (≤50)	-	-	-
Boron	15.8	18.3	-	2.5 (≤10.5)	-	-
Cadmium	0.15	0.11	-	0.04 (≤0.04)	-	-
Calcium	51400	63300	21 (≤50)	-	-	-
Chromium	20.4	20.3	0 (≤50)	-	-	-
Cobalt	3.6	3.7	-	0.1 (≤2.1)	-	-
Copper	11.6	11.9	3 (≤50)	-	-	-
Iron	10600	10400	2 (≤50)	-	-	-
Lead	5.2	5.4	-	0.2 (≤2.1)	-	-
Magnesium	22000	26000	17 (≤50)	-	-	-
Manganese	159	172	8 (≤50)	-	-	-
Mercury	0.002	0.003	-	0.001 (≤0.019)	-	-
Molybdenum	0.50	0.44	-	0.06 (≤0.32)	-	-
Nickel	8.39	8.95	0 (≤50)	-	-	-
Potassium	2040	2250	10 (≤50)	-	-	-
Silver	2.7	2.8	4 (≤50)	-	-	-
Sodium	1310	1370	4 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA201-28B	SA201009-28B				
Strontium	120	131	-	11 (≤41.1)	-	-
Thallium	0.115	0.118	3 (≤50)	-	-	-
Tin	4.5	3.9	-	0.6 (≤10.5)	-	-
Titanium	679	635	7 (≤50)	-	-	-
Tungsten	0.27	0.34	-	0.07 (≤0.11)	-	-
Uranium	3.47	3.22	7 (≤50)	-	-	-
Vanadium	38.2	36.6	4 (≤50)	-	-	-
Zinc	25.1	25.6	2 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA43009-0.5B	SA43-0.5B				
Aluminum	4630	5520	18 (≤50)	-	-	-
Antimony	9.0	2.4	-	6.6 (≤2.2)	J (all detects)	A
Arsenic	10.2	14.0	31 (≤50)	-	-	-
Barium	186	205	10 (≤50)	-	-	-
Beryllium	0.331	0.276	18 (≤50)	-	-	-
Boron	9.5	8.7	-	0.8 (≤10.7)	-	-
Cadmium	0.32	0.34	-	0.02 (≤0.11)	-	-
Calcium	113000	98700	14 (≤50)	-	-	-
Chromium	11.9	12.5	0 (≤50)	-	-	-
Cobalt	4.5	5.3	-	0.8 (≤2.2)	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA43009-0.5B	SA43-0.5B				
Copper	22.0	22.5	0 (≤50)	-	-	-
Iron	8310	9060	0 (≤50)	-	-	-
Lead	102	98.4	4 (≤50)	-	-	-
Magnesium	59000	53000	0 (≤50)	-	-	-
Manganese	13800	13300	0 (≤50)	-	-	-
Mercury	0.030	0.027	-	0.003 (≤0.019)	-	-
Molybdenum	1.59	1.36	-	0.23 (≤0.32)	-	-
Nickel	14.8	15.9	0 (≤50)	-	-	-
Platinum	0.033	0.018	-	0.015 (≤0.11)	-	-
Potassium	1350	1680	22 (≤50)	-	-	-
Silver	0.2U	0.3	-	0.1 (≤0.5)	-	-
Sodium	604	636	5 (≤50)	-	-	-
Strontium	207	200	-	7 (≤42.9)	-	-
Thallium	0.977	0.956	2 (≤50)	-	-	-
Tin	4.5	4.5	-	0 (≤10.7)	-	-
Titanium	508	640	23 (≤50)	-	-	-
Tungsten	2.270	5.230	79 (≤50)	-	J (all detects)	A
Uranium	0.783	0.795	2 (≤50)	-	-	-
Vanadium	33.0	33.5	2 (≤50)	-	-	-
Zinc	37.8	38.9	3 (≤50)	-	-	-

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

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
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 SA43009-0.5B SA40-0.5B SA200-0.5B RSAO6-0.5B SA51-0.5B SA43-0.5B	Antimony Tungsten	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
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 SA43009-0.5B SA40-0.5B SA200-0.5B RSAO6-0.5B SA51-0.5B SA43-0.5B	Calcium	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)
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 SA43009-0.5B SA40-0.5B SA200-0.5B RSAO6-0.5B SA51-0.5B SA43-0.5B	Chromium Nickel Sodium Zinc	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
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 (PQL) (sp)
R0903443	SA43009-0.5B SA43-0.5B	Antimony	J (all detects)	A	Field duplicates (Difference) (fd)
R0903443	SA43009-0.5B SA43-0.5B	Tungsten	J (all detects)	A	Field duplicates (RPD) (fd)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0903443

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903443	SA197-0.5B	Boron Molybdenum Tin	10.7U mg/Kg 0.32U mg/Kg 10.7U mg/Kg	A	bl
R0903443	SA198-0.5B	Boron Antimony Tin	10.3U mg/Kg 2.1U mg/Kg 10.3U mg/Kg	A	bl
R0903443	SA64-0.5B	Boron Tin	10.7U mg/Kg 10.7U mg/Kg	A	bl
R0903443	SA104-0.5B	Antimony Tin	2.0U mg/Kg 10.1U mg/Kg	A	bl
R0903443	SA129-0.5B	Antimony	2.1U mg/Kg	A	bl
R0903443	SA70-0.5B	Tin	10.5U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903443	SA60-0.5B	Tin	10.3U mg/Kg	A	bl
R0903443	SA150-0.5B	Boron Tin	10.1U mg/Kg 10.1U mg/Kg	A	bl
R0903443	RSAN5-0.5B	Boron Tin	10.3U mg/Kg 10.3U mg/Kg	A	bl
R0903443	SA53-0.5B	Boron Tin	8.6U mg/Kg 8.6U mg/Kg	A	bl
R0903443	SA201-10B	Tin	10.7U mg/Kg	A	bl
R0903443	SA201-28B	Tin	10.5U mg/Kg	A	bl
R0903443	SA201009-28B	Tin	10.5U mg/Kg	A	bl
R0903443	SA43009-0.5B	Boron Tin	10.7U mg/Kg 10.7U mg/Kg	A	bl
R0903443	SA40-0.5B	Tin	10.8U mg/Kg	A	bl
R0903443	SA200-0.5B	Tin	10.6U mg/Kg	A	bl
R0903443	RSAO6-0.5B	Selenium Tin	4.1U mg/Kg 10.2U mg/Kg	A	bl
R0903443	SA51-0.5B	Tin	10.5U mg/Kg	A	bl
R0903443	SA43-0.5B	Boron Tin	10.6U mg/Kg 10.6U mg/Kg	A	bl

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495G4
SDG #: R0903443
Laboratory: Columbia Analytical Services

Date: 9-18-09
Page: 1 of
Reviewer: CR
2nd Reviewer:

METHOD: Metals (EPA SW 846 Method 6010B/6020/7000)

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
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	SW	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(12,13), (14,19)
XV	Field Blanks	SW	~~Filter Blank~~ 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: SO, 1

1	SA197-0.5B	11	SA201-10B	21	SA197-0.5BDUP	31	PBS1
2	SA198-0.5B	12	SA201-28B	22	SA150-0.5BMS	32	
3	SA64-0.5B	13	SA201009-28B	23	SA150-0.5BDUP	33	
4	SA104-0.5B	14	SA43009-0.5B	24		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	SA197-0.5BMS -1	30		40	

Notes:

LDC #: 21295G4
SDG #: R0903443

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-19	Soil	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:20,21	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:22,23	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP	S	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS	S	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 21495G4
SDG #: R0903443

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason Code: b1

Page: 1 of 3
Reviewer: CR
2nd Reviewer:

METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)
Soil preparation factor applied: 100x
Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: All

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	Sample Identification 1	2	3	4	5	6	7	8	9	10	11
B		8.0		4.5 / 10.7	3.4 / 10.3	5.9 / 10.7					6.6 / 10.1	7.3 / 10.3	3.6 / 8.6	
Sb		3.0			0.6 / 2.1		0.7 / 2.0	1.3 / 2.1						
Cr	0.10													
Fe	1.1													
Mn	0.04													
Mg	0.8	4.0												
Mo	0.50			0.30 / 0.32										
Sr	0.04													
Na	19													
Se	0.8													
Sn	3.8			4.6 / 10.7	6.5 / 10.3	4.7 / 10.7	4.6 / 10.1		4.5 / 10.5	4.7 / 10.3	4.5 / 10.1	4.2 / 10.3	3.5 / 8.6	4.7 / 10.7
Tl	0.016													

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	Sample Identification 12	13	14	15	16	17	18	19			
B		8.0				9.5 / 10.7					8.7 / 10.6			
Sb		3.0												
Cr	0.10													
Fe	1.1													
Mn	0.04													
Mg	0.8	4.0												
Mo	0.50													
Sr	0.04													
Na	19													
Se	0.8								1.1 / 4.1					
Sn	3.8			4.5 / 10.5	3.9 / 10.5	4.5 / 10.7	4.6 / 10.8	4.4 . 10.6	4.2 / 10.2	4.8 / 10.5	4.5 / 10.6			
Tl	0.016													

LDC #: 21495G4
SDG #: R0903443
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x

Reason: b1

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 12-19

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	Sample Identification: No Qualifiers									
Mn		0.50											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	Sample Identification: No Qualifiers									
Na		100.0											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 2-11

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	Sample Identification: No Qualifiers									
Na		70.0											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 12-19

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	Sample Identification: No Qualifiers									
Na		50.0											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 14, 18, 19

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	Sample Identification: No Qualifiers									
Ni		0.50											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-12

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	Sample Identification: No Qualifiers									
Be		0.007											

LDC #: 21495G4
SDG #: R0903443
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x

Reason b1

Reviewer: CR
2nd Reviewer: [illegible]

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 7-12

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**No Qualifiers**										
W		0.032												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 13-19

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**No Qualifiers**										
W		0.022												

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 21495G4
SDG #: R0903443

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer:

Reason: bf

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 7/21/09 ~~Soil factor~~ applied 100x x 2xdil = 200x
Field blank type: (circle one) Field Blank / Rinsate / Other: ~~Filter Blank~~ OR Associated Samples: 11-13

Analyte	Blank ID	Sample Identification										
	FB072109-SO (SDG#: R0904016)	Action Level	No Qualifiers									
Al	9.4											
Ba	0.5											
Ca	336	672										
Fe	13.8											
Pb	0.020											
Mg	30.0	60										
Mn	3.0											
K	79.3											
Na	241											
Sr	4.40											
W	0.02											
U	0.004											
Zn	8.6											

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

LDC #: 21495G4
SDG #: R0903443

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

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

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 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 Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

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
	20	Soil	Sb	43.1	1-10, 14-19 ~~Water~~	J- | UJ | A (cm)
			W	50.4	↓ ↓ ↓	↓

Comments: 20 Not from Area 7

LDC #: 21495G4
SDG #: R0903443

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

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

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?

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
	21	Soil	Ca	27.0 (≤20)		1-19 ~~AH TCR~~	J / UJ / A (1d)
						↓	

Comments: Not from area 1

LDC #: 21495G4
SDG #: R0903443

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: CR
2nd Reviewer:

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 If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	1	Soil	Cr	13	~~All~~ 1-10, 14-19	J/UJ/A (sd)
			Ni	10.3		
			Na	13.6		
			Zn	14.2		

Comments: Not from area 7

LDC#: 21495G4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	12	13				
Aluminum	9380	10200	8			
Arsenic	11.3	11.0	3			
Barium	102	113	10			
Beryllium	0.391	0.429	9			
Boron	15.8	18.3		2.5	(≤10.5)	
Cadmium	0.15	0.11		0.04	(≤0.11)	
Calcium	51400	63300	21			
Chromium	20.4	20.3	0			
Cobalt	3.6	3.7		0.1	(≤2.1)	
Copper	11.6	11.9	3			
Iron	10600	10400	2			
Lead	5.2	5.4		0.2	(≤2.1)	
Magnesium	22000	26000	17			
Manganese	159	172	8			
Mercury	0.002	0.003		0.001	(≤0.019)	
Molybdenum	0.50	0.44		0.06	(≤0.32)	
Nickel	8.39	8.95	6			
Potassium	2040	2250	10			
Silver	2.7	2.8	4			

LDC#: 21495G4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	12	13				
Sodium	1310	1370	4			
Strontium	120	131		11	(≤41.1)	
Thallium	0.115	0.118	3			
Tin	4.5	3.9		0.6	(≤10.5)	
Titanium	679	635	7			
Tungsten	0.27	0.34		0.07	(≤0.11)	
Uranium	3.47	3.22	7			
Vanadium	38.2	36.6	4			
Zinc	25.1	25.6	2			

LDC#: 21495G4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: V

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg) 14	Concentration (mg/Kg) 19	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Aluminum	4630	5520	18			
Antimony	9.0	2.4		6.6	(≤2.2)	Jdet / A (fd)
Arsenic	10.2	14.0	31			
Barium	186	205	10			
Beryllium	0.331	0.276	18			
Boron	9.5	8.7		0.8	(≤10.7)	
Cadmium	0.32	0.34		0.02	(≤0.11)	
Calcium	113000	98700	14			
Chromium	11.9	12.5	5			
Cobalt	4.5	5.3		0.8	(≤2.2)	
Copper	22.0	22.5	2			
Iron	8310	9060	9			
Lead	102	98.4	4			
Magnesium	59000	53000	11			
Manganese	13800	13300	4			
Mercury	0.030	0.027		0.003	(≤0.019)	
Molybdenum	1.59	1.36		0.23	(≤0.32)	
Nickel	14.8	15.9	7			
Platinum	0.033	0.018		0.015	(≤0.11)	

LDC#: 21495G4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: [signature]

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg) 14	Concentration (mg/Kg) 19	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Potassium	1350	1680	22			
Silver	0.2U	0.3		0.1	(≤0.5)	
Sodium	604	636	5			
Strontium	207	200		7	(≤42.9)	
Thallium	0.977	0.956	2			
Tin	4.5	4.5		0	(≤10.7)	
Titanium	508	640	23			
Tungsten	2.270	5.230	79			Jdet/A (fd)
Uranium	0.783	0.795	2			
Vanadium	33.0	33.5	2			
Zinc	37.8	38.9	3			

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 1, 2009

Matrix: Soil

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903615

Sample Identification

SA45-0.5B
SA45009-0.5B
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
SA102-0.5B
SA109-0.5B
SA45-0.5BMS
SA45-0.5BDUP

Introduction

This data review covers 17 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

IV. 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	Maximum Concentration	Associated Samples
PB (prep blank)	Aluminum Chromium Iron Molybdenum Magnesium Tin Thallium Tungsten	0.4 mg/Kg 0.09 mg/Kg 0.8 mg/Kg 1.30 mg/Kg 0.3 mg/Kg 3.5 mg/Kg 0.003 mg/Kg 0.019 mg/Kg	All samples in SDG R0903615
ICB/CCB	Barium	0.80 ug/L	SA45009-0.5B SA187-0.5B SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA152-10B
ICB/CCB	Barium	0.70 ug/L	SA45-0.5B SA152-20B SA152-34B SA50-0.5B SA54-0.5B SA106-0.5B SA102-0.5B SA109-0.5B

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
SA45-0.5B	Boron Molybdenum Tin	6.2 mg/Kg 0.25 mg/Kg 4.3 mg/Kg	10.5U mg/Kg 0.32U mg/Kg 10.5U mg/Kg
SA45009-0.5B	Boron Tin	5.6 mg/Kg 3.8 mg/Kg	10.2U mg/Kg 10.2U mg/Kg
SA187-0.5B	Tin	4.0 mg/Kg	10.2U mg/Kg
SA153-0.5B	Boron Tin	8.9 mg/Kg 3.7 mg/Kg	10.4U mg/Kg 10.4U mg/Kg
SA186-0.5B	Boron Tin	9.7 mg/Kg 4.1 mg/Kg	10.3U mg/Kg 10.3U mg/Kg
SA185-0.5B	Boron Tin	5.6 mg/Kg 3.9 mg/Kg	10.5U mg/Kg 10.5U mg/Kg
RSAO5-0.5B	Boron Tin	10.2 mg/Kg 4.0 mg/Kg	10.3U mg/Kg 10.3U mg/Kg
SA152-10B	Boron Tin	6.4 mg/Kg 3.9 mg/Kg	10.7U mg/Kg 10.7U mg/Kg
SA152-20B	Boron Tin	6.8 mg/Kg 3.8 mg/Kg	10.4U mg/Kg 10.4U mg/Kg
SA152-34B	Tin	4.6 mg/Kg	12.3U mg/Kg
SA50-0.5B	Boron Tin	9.7 mg/Kg 5.3 mg/Kg	10.2U mg/Kg 10.2U mg/Kg
SA54-0.5B	Boron Tin	5.7 mg/Kg 3.9 mg/Kg	9.9U mg/Kg 9.9U mg/Kg
SA106-0.5B	Tin	4.2 mg/Kg	11.6U mg/Kg
SA102-0.5B	Tin	3.8 mg/Kg	10.4U mg/Kg
SA109-0.5B	Boron Molybdenum Tin	8.7 mg/Kg 0.32 mg/Kg 3.8 mg/Kg	10.5U mg/Kg 0.32U mg/Kg 10.5U mg/Kg

Sample FB072109-SO (from SDG R0904016) was identified as a field blank. No metal contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB072109-SO	7/21/09	Aluminum Barium Calcium Iron Lead Magnesium Manganese Potassium Sodium Strontium Tungsten Uranium Zinc	9.4 ug/L 0.5 ug/L 336 ug/L 13.8 ug/L 0.020 ug/L 30.0 ug/L 3.0 ug/L 79.3 ug/L 241 ug/L 4.40 ug/L 0.02 ug/L 0.004 ug/L 8.6 ug/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.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

Matrix spike (MS) samples 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
SA45-0.5BMS (SA45-0.5B SA45009-0.5B 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)	Antimony Tungsten	42.6 (75-125) 71.9 (75-125)	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A

VII. Duplicate Sample Analysis

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
SA45-0.5BDUP (SA45-0.5B	Potassium	23.0 (≤20)	-	J (all detects) UJ (all non-detects)	A
SA45009-0.5B 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)	Uranium	21.2 (≤20)	-	J (all detects) UJ (all non-detects)	

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
SA45-0.5BL	Chromium Nickel	29 (≤10) 11.1 (≤10)	SA45-0.5B SA45009-0.5B 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	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

XII. 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.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SA45-0.5B and SA45009-0.5B were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA45-0.5B	SA45009-0.5B				
Aluminum	9190	7660	18 (≤50)	-	-	-
Arsenic	2.15	2..21	-	0.15 (≤0.53)	-	-
Barium	242	169	36 (≤50)	-	-	-
Beryllium	0.381	0.396	4 (≤50)	-	-	-
Boron	6.2	5.6	-	0.6 (≤10.5)	-	-

Analyte	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA45-0.5B	SA45009-0.5B				
Calcium	25700	28200	9 (≤50)	-	-	-
Chromium	17.1	15.7	9 (≤50)	-	-	-
Cobalt	6.7	6.2	-	0.5 (≤2.1)	-	-
Copper	16.4	14.5	12 (≤50)	-	-	-
Iron	13200	12900	2 (≤50)	-	-	-
Lead	8.2	7.6	-	0.6 (≤2.1)	-	-
Magnesium	8650	8430	3 (≤50)	-	-	-
Manganese	2060	2000	3 (≤50)	-	-	-
Mercury	0.025	0.024	-	0.001 (≤0.020)	-	-
Molybdenum	0.25	0.51	-	0.26 (≤0.32)	-	-
Nickel	13.0	13.1	1 (≤50)	-	-	-
Platinum	0.011	0.007U	-	0.004 (≤0.11)	-	-
Potassium	3010	2310	26 (≤50)	-	-	-
Sodium	6620	5350	21 (≤50)	-	-	-
Strontium	280	230	20 (≤50)	-	-	-
Thallium	0.260	0.134	64 (≤50)	-	J (all detects)	A
Tin	4.3	3.8	-	0.5 (≤10.5)	-	-
Titanium	699	683	2 (≤50)	-	-	-
Tungsten	0.32	0.29	-	0.03 (≤0.11)	-	-
Uranium	0.715	0.749	5 (≤50)	-	-	-

Analyte	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA45-0.5B	SA45009-0.5B				
Vanadium	35.8	36.4	2 (≤50)	-	-	-
Zinc	31.5	28.6	10 (≤50)	-	-	-

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

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0903615	SA45-0.5B SA45009-0.5B 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	Antimony Tungsten	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
R0903615	SA45-0.5B SA45009-0.5B 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	Potassium Uranium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)
R0903615	SA45-0.5B SA45009-0.5B 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	Chromium Nickel	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)
R0903615	SA45-0.5B SA45009-0.5B 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 SA102-0.5B SA109-0.5B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0903615	SA45-0.5B SA45009-0.5B	Thallium	J (all detects)	A	Field duplicates (RPD) (fd)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0903615

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903615	SA45-0.5B	Boron Molybdenum Tin	10.5U mg/Kg 0.32U mg/Kg 10.5U mg/Kg	A	bl
R0903615	SA45009-0.5B	Boron Tin	10.2U mg/Kg 10.2U mg/Kg	A	bl
R0903615	SA187-0.5B	Tin	10.2U mg/Kg	A	bl
R0903615	SA153-0.5B	Boron Tin	10.4U mg/Kg 10.4U mg/Kg	A	bl
R0903615	SA186-0.5B	Boron Tin	10.3U mg/Kg 10.3U mg/Kg	A	bl
R0903615	SA185-0.5B	Boron Tin	10.5U mg/Kg 10.5U mg/Kg	A	bl
R0903615	RSAO5-0.5B	Boron Tin	10.3U mg/Kg 10.3U mg/Kg	A	bl
R0903615	SA152-10B	Boron Tin	10.7U mg/Kg 10.7U mg/Kg	A	bl
R0903615	SA152-20B	Boron Tin	10.4U mg/Kg 10.4U mg/Kg	A	bl
R0903615	SA152-34B	Tin	12.3U mg/Kg	A	bl
R0903615	SA50-0.5B	Boron Tin	10.2U mg/Kg 10.2U mg/Kg	A	bl
R0903615	SA54-0.5B	Boron Tin	9.9U mg/Kg 9.9U mg/Kg	A	bl
R0903615	SA106-0.5B	Tin	11.6U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903615	SA102-0.5B	Tin	10.4U mg/Kg	A	bl
R0903615	SA109-0.5B	Boron Molybdenum Tin	10.5U mg/Kg 0.32U mg/Kg 10.5U mg/Kg	A	bl

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495H4
SDG #: R0903615
Laboratory: Columbia Analytical Services

Date: 9-18-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6010B/6020/7000)

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
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	SW	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(1,2)
XV	Field Blanks	SW	Filter Blank FB = FB012109-SO (SDG# R0903615)

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	PBS1	31	
2	SA45009-0.5B	12	SA54-0.5B	22		32	
3	SA187-0.5B	13	SA106-0.5B	23		33	
4	SA153-0.5B	14	SA102-0.5B	24		34	
5	SA186-0.5B	15	SA109-0.5B	25		35	
6	SA185-0.5B	16	SA45-0.5BMS	26		36	
7	RSAO5-0.5B	17	SA45-0.5BDUP	27		37	
8	SA152-10B	18		28		38	
9	SA152-20B	19		29		39	
10	SA152-34B	20		30		40	

Notes: _____

LDC #: 21295H4
SDG #: R0903615

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-15	Soil	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:16,17	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 21495H4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: mg/Kg

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x
Associated Samples: All

Reason Code: bl

Page: 1 of 1
Reviewer: OR
2nd Reviewer:

				Sample Identification														
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Al	0.4																	
B		10.0		6.2 / 10.5	5.6 / 10.2		8.9 / 10.4	9.7 / 10.3	5.6 / 10.5	10.2 / 10.3	6.4 / 10.7	6.8 / 10.4		9.7 / 10.2	5.7 / 9.9			8.7 / 10.5
Be		0.009																
Cr	0.09																	
Fe	0.8																	
Mo	1.30			0.25 / 0.32														0.32 / 0.32
Mg	0.3																	
Sn	3.5			4.3 / 10.5	3.8 / 10.2	4.0 / 10.2	3.7 / 10.4	4.1 / 10.3	3.9 / 10.5	4.0 / 10.3	3.9 / 10.7	3.8 / 10.4	4.6 / 12.3	5.3 / 10.2	3.9 / 9.9	4.2 / 11.6	3.8 / 10.4	3.8 / 10.5
Tl	0.003																	
W	0.019	0.059																

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 2-8

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**No Qualifiers**										
Ba		0.80												

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 1, 9-15

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**No Qualifiers**										
Ba		0.70												

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 21495H4
SDG #: R0903615

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer:

Reason: bf

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 7/21/09 Soil factor applied 100x x 2xdil = 200x
Field blank type: (circle one) Field Blank / Rinsate / Other: ~~Filter Blank~~ Associated Samples: 8-10

Analyte	Blank ID	Sample Identification										
	FB072109-SO (SDG#: R0904016)	Action Level	No Qualifiers									
Al	9.4											
Ba	0.5											
Ca	336	672										
Fe	13.8											
Pb	0.020											
Mg	30.0	60										
Mn	3.0											
K	79.3											
Na	241											
Sr	4.40											
W	0.02											
U	0.004											
Zn	8.6											

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

LDC #: 2149SH4
SDG #: R0903615

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Page: 1 of 1
Reviewer: QR
2nd Reviewer:

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 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 Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

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
	16	SD	Soil	42.6	1-7, 11-15 A	J- UJ A (m)
		W		71.9		

Comments: MS/MSD Not from Area 1

MS.4S2

LDC #: 21495H4
SDG #: R0903615

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

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

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?

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
	17	Soil	K	23.6		1-3, 11-15 ~~ALL~~ ~~1-2~~ OR	J/UJ/A (1a)
			Ca	21.2		↓ ↓	↓

Comments: Dup not ~~of~~ from Area 7

LDC #: 21495H4
SDG #: R0903615

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: CR
2nd Reviewer: [illegible]

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".

Q N N/A If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	1	Soil	Cr	29	1-7, 11-15 ~~All~~ ~~1, 2CR~~	J / UJ / A (sd)
			Ni	11.1	↓ ↓	

Comments: Not From Area 1

LDC#: 21495H4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: LR
2nd Reviewer: [illegible]

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg) 1	Concentration (mg/Kg) 2	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Aluminum	9190	7660	18			
Arsenic	2.15	2..21		0.15	(≤0.53)	
Barium	242	169	36			
Beryllium	0.381	0.396	4			
Boron	6.2	5.6		0.6	(≤10.5)	
Calcium	25700	28200	9			
Chromium	17.1	15.7	9			
Cobalt	6.7	6.2		0.5	(≤2.1)	
Copper	16.4	14.5	12			
Iron	13200	12900	2			
Lead	8.2	7.6		0.6	(≤2.1)	
Magnesium	8650	8430	3			
Manganese	2060	2000	3			
Mercury	0.025	0.024		0.001	(≤0.020)	
Molybdenum	0.25	0.51		0.26	(≤0.32)	
Nickel	13.0	13.1	1			
Platinum	0.011	0.007U		0.004	(≤0.11)	
Potassium	3010	2310	26			
Sodium	6620	5350	21			

LDC#: 21495H4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg) 1	Concentration (mg/Kg) 2	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Strontium	280	230	20			
Thallium	0.260	0.134	64			Jdet/A (fd)
Tin	4.3	3.8		0.5	(≤10.5)	
Titanium	699	683	2			
Tungsten	0.32	0.29		0.03	(≤0.11)	
Uranium	0.715	0.749	5			
Vanadium	35.8	36.4	2			
Zinc	31.5	28.6	10			

V:\FIELD DUPLICATES\FD_inorganic\21495H4.wpd

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 23, 2009
Matrix:	Soil/Water
Parameters:	Metals
Validation Level:	Stage 2B
Laboratory:	Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903678

Sample Identification

EB070109-SO1
SA114-0.5B
SA114009-0.5B
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
SA114009-0.5BMS
SA114009-0.5BDUP
RSAN6-0.5BMS
RSAN6-0.5BDUP
RSAN6-0.5B

Introduction

This data review covers 23 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

IV. 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	Maximum Concentration	Associated Samples
PB (prep blank)	Aluminum Iron Magnesium Manganese Strontium	2.9 ug/L 3.8 ug/L 3.8 ug/L 0.2 ug/L 0.1 ug/L	All water samples in SDG R0903678
ICB/CCB	Aluminum Barium Boron Iron Magnesium Manganese Molybdenum Sodium Tungsten	4.9 ug/L 2.7 ug/L 16.9 ug/L 5.8 ug/L 10.0 ug/L 0.6 ug/L 0.6 ug/L 187 ug/L 0.01 ug/L	All water samples in SDG R0903678
PB (prep blank)	Boron Iron Molybdenum Magnesium Manganese Sodium Strontium Tin	2.4 mg/Kg 1.2 mg/Kg 0.60 mg/Kg 0.6 mg/Kg 0.02 mg/Kg 24 mg/Kg 0.02 mg/Kg 3.8 mg/Kg	All soil samples in SDG R0903678

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Aluminum Boron	5.0 ug/L 20.0 ug/L	All soil samples in SDG R0903678
ICB/CCB	Barium Calcium	4.00 ug/L 10.0 ug/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
ICB/CCB	Barium Cadmium Sodium Strontium	3.00 ug/L 0.20 ug/L 200.0 ug/L 0.40 ug/L	SA114-0.5B SA114009-0.5B RSAN6-0.5B
ICB/CCB	Iron Manganese Strontium	7.0 ug/L 0.70 ug/L 0.60 ug/L	SA88-20B SA88-32B RSAK3-0.5B RSAK3-10B RSAK3-20B RSAK3-31B
ICB/CCB	Iron Manganese	6.0 ug/L 0.60 ug/L	SA114-0.5B SA114009-0.5B SA82-0.5B SA82-10B SA82-29B RSAL3-10B RSAL3-30B SA134-10B SA134-20B SA134-31B SA134009-31B SA88-10B RSAN6-0.5B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Magnesium	10.0 ug/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 RSAN6-0.5B
ICB/CCB	Strontium	0.5 ug/L	SA82-0.5B SA82-10B SA82-29B RSAL3-10B RSAL3-30B SA134-10B SA134-20B SA134-31B SA134009-31B SA88-10B
ICB/CCB	Beryllium	0.009 ug/L	SA114009-0.5B
ICB/CCB	Beryllium Tungsten	0.014 ug/L 0.054 ug/L	SA114-0.5B RSAN6-0.5B SA82-0.5B SA82-10B RSAL3-10B SA134-10B
ICB/CCB	Tungsten	0.027 ug/L	SA134-20B SA88-10B SA88-20B RSAK3-0.5B RSAK3-10B
ICB/CCB	Beryllium Tungsten	0.011 ug/L 0.053 ug/L	RSAK3-20B
ICB/CCB	Tungsten	0.023 ug/L	SA134-31B SA134009-31B SA88-32B 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	Aluminum Boron Magnesium Manganese Sodium Strontium	2.3 ug/L 14.4 ug/L 9.8 ug/L 0.3 ug/L 228 ug/L 0.1 ug/L	50.0U ug/L 50.0U ug/L 20.0U ug/L 5.0U ug/L 300U ug/L 10.0U ug/L
SA114-0.5B	Tin Cadmium	4.4 mg/Kg 0.07 mg/Kg	10.8U mg/Kg 0.11U mg/Kg
SA114009-0.5B	Tin	4.0 mg/Kg	10.6U mg/Kg
RSAN6-0.5B	Tin	4.4 mg/Kg	9.9U mg/Kg
SA82-0.5B	Boron Tin	9.1 mg/Kg 4.0 mg/Kg	9.8U mg/Kg 9.8U mg/Kg
SA82-10B	Tin	4.4 mg/Kg	10.3U mg/Kg
SA82-29B	Tin	7.5 mg/Kg	17.0U mg/Kg
RSAL3-10B	Tin	4.7 mg/Kg	10.8U mg/Kg
RSAL3-30B	Tin	6.2 mg/Kg	15.1U mg/Kg
SA134-10B	Tin	4.4 mg/Kg	10.9U mg/Kg
SA134-20B	Tin	4.2 mg/Kg	10.2U mg/Kg
SA134-31B	Tin	6.0 mg/Kg	14.6U mg/Kg
SA134009-31B	Tin	8.1 mg/Kg	15.3U mg/Kg
SA88-10B	Boron Tin	10.3 mg/Kg 5.6 mg/Kg	10.5U mg/Kg 10.5U mg/Kg
SA88-20B	Tin	6.3 mg/Kg	14.0U mg/Kg
SA88-32B	Tin	8.7 mg/Kg	16.5U mg/Kg
RSAK3-0.5B	Boron Tin	9.5 mg/Kg 5.7 mg/Kg	10.8U mg/Kg 10.8U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAK3-10B	Boron Molybdenum Tin	7.0 mg/Kg 0.26 mg/Kg 5.6 mg/Kg	10.8U mg/Kg 0.32U mg/Kg 10.8U mg/Kg
RSAK3-20B	Tin	7.4 mg/Kg	13.2U mg/Kg
RSAK3-31B	Tin Tungsten	9.1 mg/Kg 0.28 mg/Kg	17.1U mg/Kg 0.35U mg/Kg

Sample EB070109-SO1 was identified as an equipment blank. No metal contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB070109-SO1	7/1/09	Aluminum Boron Calcium Chromium Magnesium Manganese Sodium Strontium	2.3 ug/L 14.4 ug/L 24.2 ug/L 0.7 ug/L 9.8 ug/L 0.3 ug/L 228 ug/L 0.1 ug/L	SA114-0.5B SA114009-0.5B RSAN6-0.5B

Sample FB072109-SO (from SDG R0904016) was identified as a field blank. No metal contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB072109-SO	7/21/09	Aluminum Barium Calcium Iron Lead Magnesium Manganese Potassium Sodium Strontium Tungsten Uranium Zinc	9.4 ug/L 0.5 ug/L 336 ug/L 13.8 ug/L 0.020 ug/L 30.0 ug/L 3.0 ug/L 79.3 ug/L 241 ug/L 4.40 ug/L 0.02 ug/L 0.004 ug/L 8.6 ug/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
SA82-29B	Tungsten	0.27 mg/Kg	0.34U mg/Kg
RSAL3-30B	Tungsten	0.26 mg/Kg	0.31U mg/Kg
RSAK3-31B	Tungsten	0.28 mg/Kg	0.35U mg/Kg

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

Matrix spike (MS) samples 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
SA114009-0.5BMS (SA114-0.5B SA114009-0.5B RSAN6-0.5B)	Antimony	41.5 (75-125)	J- (all detects) UJ (all non-detects)	A

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
SA114009-0.5BL	Iron Manganese Nickel Zinc	11.4 (≤10) 10.5 (≤10) 10.2 (≤10) 10.4 (≤10)	SA114-0.5B SA114009-0.5B RSAN6-0.5B	J (all detects) UJ (all non-detects)	A

XII. 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.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SA114-0.5B and SA114009-0.5B and samples SA134-31B and SA134009-31B were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA114-0.5B	SA114009-0.5B				
Aluminum	6900	6760	2 (≤50)	-	-	-
Arsenic	7.37	7.74	5 (≤50)	-	-	-
Barium	184	156	16 (≤50)	-	-	-
Beryllium	0.417	0.372	11 (≤50)	-	-	-
Boron	188	179	5 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA114-0.5B	SA114009-0.5B				
Cadmium	0.07	0.04U	-	0.03 (≤0.11)	-	-
Calcium	22300	19300	14 (≤50)	-	-	-
Chromium	1120	1150	3 (≤50)	-	-	-
Cobalt	7.3	5.7	-	1.6 (≤2.2)	-	-
Copper	13.8	12.8	8 (≤50)	-	-	-
Iron	8570	8280	3 (≤50)	-	-	-
Lead	11.4	10.4	-	1 (≤2.2)	-	-
Magnesium	126000	125000	1 (≤50)	-	-	-
Manganese	1670	1270	27 (≤50)	-	-	-
Mercury	0.045	0.051	-	0.006 (≤0.020)	-	-
Molybdenum	1.17	1.02	-	0.15 (≤0.33)	-	-
Nickel	11.0	11.5	4 (≤50)	-	-	-
Platinum	0.026	0.025	-	0.001 (≤0.11)	-	-
Potassium	1490	1370	8 (≤50)	-	-	-
Sodium	4080	4020	1 (≤50)	-	-	-
Strontium	154	141	-	13 (≤43.4)	-	-
Thallium	0.174	0.178	2 (≤50)	-	-	-
Tin	4.4	4.0	-	0.4 (≤10.8)	-	-
Titanium	396	369	7 (≤50)	-	-	-
Tungsten	2.820	3.250	14 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA114-0.5B	SA114009-0.5B				
Uranium	1.28	1.24	3 (≤50)	-	-	-
Vanadium	24.4	25.5	4 (≤50)	-	-	-
Zinc	24.8	22.8	8 (≤50)	-	-	-

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA134-31B	SA134009-31B				
Aluminum	16500	17500	6 (≤50)	-	-	-
Arsenic	19.9	20.1	1 (≤50)	-	-	-
Barium	40.8	41.8	2 (≤50)	-	-	-
Beryllium	0.863	0.852	1 (≤50)	-	-	-
Boron	30.5	31.9	-	1.4 (≤15.3)	-	-
Calcium	12900	11100	15 (≤50)	-	-	-
Chromium	51.3	49.1	4 (≤50)	-	-	-
Cobalt	5.0	5.4	-	0.4 (≤3.1)	-	-
Copper	14.6	15.4	-	0.8 (≤3.1)	-	-
Iron	13800	14700	6 (≤50)	-	-	-
Lead	8.0	8.0	-	0 (≤3.1)	-	-
Magnesium	46000	48000	4 (≤50)	-	-	-
Manganese	253	263	4 (≤50)	-	-	-
Mercury	0.009	0.010	-	0.001 (≤0.020)	-	-
Molybdenum	1.49	1.50	-	0.01 (≤0.46)	-	-

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA134-31B	SA134009-31B				
Nickel	12.4	13.1	5 (≤50)	-	-	-
Potassium	3510	3770	7 (≤50)	-	-	-
Silver	0.3U	0.4	-	0.1 (≤0.8)	-	-
Sodium	1750	1840	5 (≤50)	-	-	-
Strontium	200	163	-	37 (≤61.0)	-	-
Thallium	0.218	0.224	3 (≤50)	-	-	-
Tin	6.0	8.1	-	2.1 (≤15.3)	-	-
Titanium	650	713	9 (≤50)	-	-	-
Tungsten	0.37	0.35	-	0.02 (≤0.30)	-	-
Uranium	6.18	6.37	3 (≤50)	-	-	-
Vanadium	40.0	42.0	5 (≤50)	-	-	-
Zinc	33.6	36.1	7 (≤50)	-	-	-

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

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0903678	SA114-0.5B SA114009-0.5B	Antimony	J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
R0903678	SA114-0.5B SA114009-0.5B	Iron Manganese Nickel Zinc	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)
R0903678	EB070109-SO1 SA114-0.5B SA114009-0.5B 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 RSAN6-0.5B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0903678

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903678	EB070109-SO1	Aluminum Boron Magnesium Manganese Sodium Strontium	50.0U ug/L 50.0U ug/L 20.0U ug/L 5.0U ug/L 300U ug/L 10.0U ug/L	A	bl
R0903678	SA114-0.5B	Tin Cadmium	10.8U mg/Kg 0.11U mg/Kg	A	bl
R0903678	SA114009-0.5B	Tin	10.6U mg/Kg	A	bl
R0903678	RSAN6-0.5B	Tin	9.9U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903678	SA82-0.5B	Boron Tin	9.8U mg/Kg 9.8U mg/Kg	A	bl
R0903678	SA82-10B	Tin	10.3U mg/Kg	A	bl
R0903678	SA82-29B	Tin	17.0U mg/Kg	A	bl
R0903678	RSAL3-10B	Tin	10.8U mg/Kg	A	bl
R0903678	RSAL3-30B	Tin	15.1U mg/Kg	A	bl
R0903678	SA134-10B	Tin	10.9U mg/Kg	A	bl
R0903678	SA134-20B	Tin	10.2U mg/Kg	A	bl
R0903678	SA134-31B	Tin	14.6U mg/Kg	A	bl
R0903678	SA134009-31B	Tin	15.3U mg/Kg	A	bl
R0903678	SA88-10B	Boron Tin	10.5U mg/Kg 10.5U mg/Kg	A	bl
R0903678	SA88-20B	Tin	14.0U mg/Kg	A	bl
R0903678	SA88-32B	Tin	16.5U mg/Kg	A	bl
R0903678	RSAK3-0.5B	Boron Tin	10.8U mg/Kg 10.8U mg/Kg	A	bl
R0903678	RSAK3-10B	Boron Molybdenum Tin	10.8U mg/Kg 0.32U mg/Kg 10.8U mg/Kg	A	bl
R0903678	RSAK3-20B	Tin	13.2U mg/Kg	A	bl
R0903678	RSAK3-31B	Tin Tungsten	17.1U mg/Kg 0.35U mg/Kg	A	bl

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

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903678	SA82-29B	Tungsten	0.34U mg/Kg	A	bf
R0903678	RSAL3-30B	Tungsten	0.31U mg/Kg	A	bf
R0903678	RSAK3-31B	Tungsten	0.35U mg/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495I4
SDG #: R0903678
Laboratory: Columbia Analytical Services

Date: 9-22-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [signature]

METHOD: Metals (EPA SW 846 Method 6010B/6020/7000)

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: 7/1/09 - 7/2/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	A	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(2,3), (11,12)
XV	Field Blanks	SW	FB= FB072109-SO (SDG# R0904016), EB=1 (no ass. samples from Area 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: 1 water / 23 soil

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

Notes: _____

LDC #: 2125814 495 cr
SDG #: K0903678

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-19,24	water soil	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:20,21	soil	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:22,23	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP	soil/water	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 21495I4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: ug/L

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: NA
Associated Samples: All Water

Reason Code: bl

					Sample Identification									
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum PB[a] (ug/L)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	1									
Al		2.9	4.9		2.3 / 50.0									
Ba			2.7											
B			16.9		14.4 / 50.0									
Fe		3.8	5.8											
Mg		3.8	10.0		9.8 / 20.0									
Mn		0.2	0.6		0.3 / 5.0									
Mo			0.6											
Na			187		228 / 300									
Sr		0.1			0.1 / 10.0									
W			0.01											

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 21495H4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: mg/Kg

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x
Associated Samples: All Soil

Reason Code: bl

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	2	3	24	4	5	6	7	8	9	10	11
Al		5.0												
B	2.4	20.0					9.1 / 9.8							
Fe	1.2													
Mo	0.60													
Mg	0.6													
Mn	0.02													
Na	24													
Sr	0.02													
Sn	3.8			4.4 / 10.8	4.0 / 10.6	4.4 / 9.9	4.0 / 9.8	4.4 / 10.3	7.5 / 17.0	4.7 / 10.8	6.2 / 15.1	4.4 / 10.9	4.2 / 10.2	6.0 / 14.6

				Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	12	13	14	15	16	17	18	19		
Al		5.0											
B	2.4	20.0			10.3 / 10.5			9.5 / 10.8	7.0 / 10.8				
Fe	1.2												
Mo	0.60								0.26 / 0.32				
Mg	0.6												
Mn	0.02												
Na	24												
Sr	0.02												
Sn	3.8			8.1 / 15.3	5.6 / 10.5	6.3 / 14.0	8.7 / 16.5	5.7 / 10.8	5.6 / 10.8	7.4 / 13.2	9.1 / 17.1		

LDC #: 21495H4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x

Reason Code: bl

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 4-19

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**No Qualifiers**										
Ba		4.00												
Ca		10.0												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 2, 3, 24

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**2**										
Ba		3.00												
Cd		0.20		0.07 / 0.11										
Na		200.0												
Sr		0.40												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 14-19

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**No Qualifiers**										
Fe		7.0												
Mn		0.70												
Sr		0.60												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 2-13, 24

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**No Qualifiers**										
Fe		6.0												
Mn		0.60												

LDC #: 21495H4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x

Reason Code: bl

Reviewer: CR
2nd Reviewer:

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 4-19, 24

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Mg		10.0												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 4-13

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Sr		0.5												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 3

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Be		0.009												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 2, 24, 4, 5, 7, 9

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	~~-~~ No Qualifiers CR	~~-~~									
Be		0.014												
W		0.054		~~-0.27 / 0.34~~ CR	~~-0.26 / 0.34~~ CR									

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 10, 13, 14, 16, 17

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
W		0.027												

LDC #: 21495H4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x

Reason Code: bl

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 18

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Be		0.011												
W		0.053												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 11, 12, 15, 19

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	19										
W		0.023		0.28 / 0.35										

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 21495I4
SDG #: R0903678

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

METHOD: Trace Metals (EPA SW846 6010B/7000)

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

Reason code: be

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 7/1/09 Soil factor applied 200x
Field blank type: (circle one) Field Blank / Rinsate / Other: (EB)

Associated Samples: ~~No Associated Samples from Area 1~~ 2,3,24

Analyte	Blank ID	Sample Identification										
	1	Action Level	No Qualifiers									
Al	2.3											
B	14.4											
Ca	24.2											
Cr	0.7											
Mg	9.8											
Mn	0.3											
Na	228											
Sr	0.1											

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

LDC #: 21495I4
SDG #: R0903678

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/7000)

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

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 7/21/09 Soil factor applied 100x x 2xdil = 200x
Field blank type: (circle one) Field Blank / Rinsate / Other: Filter Blank Associated Samples: 4-19

Analyte	Blank ID	Sample Identification											
	FB072109-SO (SDG#: R0904016)	Action Level	6	8	19								
Al	9.4												
Ba	0.5												
Ca	336	672											
Fe	13.8												
Pb	0.020												
Mg	30.0	60											
Mn	3.0												
K	79.3												
Na	241												
Sr	4.40												
W	0.02		0.27 / 0.34	0.26 / 0.31	0.28 / 0.35								
U	0.004												
Zn	8.6												

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

LDC #: 21495I4
SDG #: R0903678

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

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

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 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 Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

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
	20	Soil	Sb	41.5	2,3,24	J-/UJ/A (m)

Comments: Not from area 1

MS.4S2

LDC #: 21495I4
SDG #: R0903678

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: CR
2nd Reviewer: L

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 If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?
Y (N) N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	~~23~~	Soil	Fe	11.4	2,3,24	J/UJ/A Csd
			Mn	10.5		
			Ni	10.7		
			Zn	10.4		

Comments: Not from area 1

LDC#: 21495I4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer:

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg) 2	Concentration (mg/Kg) 3	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Aluminum	6900	6760	2			
Arsenic	7.37	7.74	5			
Barium	184	156	16			
Beryllium	0.417	0.372	11			
Boron	188	179	5			
Cadmium	0.07	0.04U		0.03	(≤0.11)	
Calcium	22300	19300	14			
Chromium	1120	1150	3			
Cobalt	7.3	5.7		1.6	(≤2.2)	
Copper	13.8	12.8	8			
Iron	8570	8280	3			
Lead	11.4	10.4		1	(≤2.2)	
Magnesium	126000	125000	1			
Manganese	1670	1270	27			
Mercury	0.045	0.051		0.006	(≤0.020)	
Molybdenum	1.17	1.02		0.15	(≤0.33)	
Nickel	11.0	11.5	4			
Platinum	0.026	0.025		0.001	(≤0.11)	
Potassium	1490	1370	8			

LDC#: 21495I4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg) 2	Concentration (mg/Kg) 3	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Sodium	4080	4020	1			
Strontium	154	141		13	(≤43.4)	
Thallium	0.174	0.178	2			
Tin	4.4	4.0		0.4	(≤10.8)	
Titanium	396	369	7			
Tungsten	2.820	3.250	14			
Uranium	1.28	1.24	3			
Vanadium	24.4	25.5	4			
Zinc	24.8	22.8	8			

LDC#:21495I4__
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: V

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg)		(≤~~20~~ 30) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	11	12				
Aluminum	16500	17500	6			
Arsenic	19.9	20.1	1			
Barium	40.8	41.8	2			
Beryllium	0.863	0.852	1			
Boron	30.5	31.9		1.4	(≤15.3)	
Calcium	12900	11100	15			
Chromium	51.3	49.1	4			
Cobalt	5.0	5.4		0.4	(≤3.1)	
Copper	14.6	15.4		0.8	(≤3.1)	
Iron	13800	14700	6			
Lead	8.0	8.0		0	(≤3.1)	
Magnesium	46000	48000	4			
Manganese	253	263	4			
Mercury	0.009	0.010		0.001	(≤0.020)	
Molybdenum	1.49	1.50		0.01	(≤0.46)	
Nickel	12.4	13.1	5			
Potassium	3510	3770	7			
Silver	0.3U	0.4		0.1	(≤0.8)	
Sodium	1750	1840	5			

LDC#:21495I4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: VN

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg)		(≤30) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	11	12				
Strontium	200	163		37	(≤61.0)	
Thallium	0.218	0.224	3			
Tin	6.0	8.1		2.1	(≤15.3)	
Titanium	650	713	9			
Tungsten	0.37	0.35		0.02	(≤0.30)	
Uranium	6.18	6.37	3			
Vanadium	40.0	42.0	5			
Zinc	33.6	36.1	7			

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: October 1, 2009

Matrix: Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903561

Sample Identification

M-75B
M-13AB
M-13ABDISS
M-13009AB
M-13009ABDISS
M-64B
M-111AB
EB062909-GW
M-25B
M-12AB
M-12ABDISS
M-110B
M-110BDISS
I-ARB
M-75BMS
M-75BDUP
M-13ABMS
M-13ABDUP

Introduction

This data review covers 18 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

IV. 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	Maximum Concentration	Associated Samples
PB (prep blank)	Aluminum Iron Magnesium Manganese Strontium	2.9 ug/L 3.8 ug/L 3.8 ug/L 0.2 ug/L 0.1 ug/L	All samples in SDG R0903561
ICB/CCB	Strontium Tungsten	0.3 ug/L 0.1 ug/L	All samples in SDG R0903561
ICB/CCB	Thallium	0.004 ug/L	M-75B M-13AB M-13009AB M-64B M-111AB EB062909-GW M-25B M-12AB M-110B I-ARB

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Boron Molybdenum Manganese	16.9 ug/L 0.6 ug/L 0.6 ug/L	M-75B M-13AB M-13ABDISS M-13009AB M-13009ABDISS M-64B M-111AB M-25B M-12AB M-12ABDISS M-110B M-110BDISS I-ARB
ICB/CCB	Barium Iron Molybdenum	2.7 ug/L 5.8 ug/L 10.0 ug/L	M-110BDISS
ICB/CCB	Barium	2.2 ug/L	M-13ABDISS M-13009ABDISS M-64B M-111AB M-25B M-12AB M-12ABDISS M-110B I-ARB
ICB/CCB	Barium Iron	1.5 ug/L 3.8 ug/L	M-75B M-13AB M-13009AB
ICB/CCB	Magnesium	5.9 ug/L	M-75B M-13AB M-13ABDISS M-13009AB M-13009ABDISS M-64B M-111AB M-25B M-12AB M-12ABDISS M-110B I-ARB
ICB/CCB	Sodium	187 ug/L	M-111AB M-110B M-110BDISS I-ARB
ICB/CCB	Sodium	211 ug/L	M-75B M-64B M-25B M-12AB

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Sodium	205 ug/L	M-12ABDISS
ICB/CCB	Aluminum Barium Boron Iron Molybdenum Magnesium Manganese Sodium	2.7 ug/L 0.9 ug/L 8.6 ug/L 6.7 ug/L 0.9 ug/L 4.1 ug/L 0.6 ug/L 62 ug/L	EB062909-GW

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	Aluminum Iron Manganese Tungsten Thallium	29.4 ug/L 19.3 ug/L 1.3 ug/L 0.77 ug/L 0.116 ug/L	50.0U ug/L 20.0U ug/L 5.0U ug/L 1.00U ug/L 0.200U ug/L
M-13AB	Aluminum Tungsten Thallium	5.6 ug/L 0.76 ug/L 0.043 ug/L	50.0U ug/L 1.00U ug/L 0.200U ug/L
M-13ABDISS	Aluminum Tungsten	11.5 ug/L 0.71 ug/L	50.0U ug/L 1.00U ug/L
M-13009AB	Aluminum Tungsten Thallium	5.9 ug/L 0.70 ug/L 0.029 ug/L	50.0U ug/L 1.00U ug/L 0.200U ug/L
M-13009ABDISS	Aluminum Tungsten	4.4 ug/L 0.64 ug/L	50.0U ug/L 1.00U ug/L
M-64B	Tungsten	0.80 ug/L	1.00U ug/L
EB062909-GW	Magnesium Manganese Strontium	2.6 ug/L 0.3 ug/L 0.1 ug/L	20.0U ug/L 5.0U ug/L 10.0U ug/L
M-25B	Aluminum Thallium	23.2 ug/L 0.161 ug/L	50.0U ug/L 0.200U ug/L
M-12AB	Thallium	0.152 ug/L	0.200U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
M-12ABDISS	Aluminum Iron Manganese	45.8 ug/L 12.9 ug/L 2.2 ug/L	50.0U ug/L 20.0U ug/L 5.0U ug/L
M-110B	Tungsten	0.39 ug/L	1.00U ug/L
M-110BDISS	Iron Tungsten	6.8 ug/L 0.41 ug/L	20.0U ug/L 1.00U ug/L
I-ARB	Aluminum Tungsten	9.4 ug/L 0.28 ug/L	50.0U ug/L 1.00U ug/L

Sample EB062909-GW was identified as an equipment rinsate. No metal contaminants were found in this blank with the following exceptions:

Equipment Rinsate ID	Sampling Date	Analyte	Concentration	Associated Samples
EB062909-GW	6/29/09	Calcium Magnesium Manganese Strontium Titanium	7.7 ug/L 2.6 ug/L 0.3 ug/L 0.1 ug/L 0.4 ug/L	No associated samples in this SDG

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

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

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
M-75B	Barium	13.5 (≤10)	M-75B	J (all detects) UJ (all non-detects)	A

XII. 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.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

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

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0903561	M-75B	Barium	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)
R0903561	M-75B M-13AB M-13ABDISS M-13009AB M-13009ABDISS M-64B M-111AB EB062909-GW M-25B M-12AB M-12ABDISS M-110B M-110BDISS I-ARB	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0903561

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903561	M-75B	Aluminum Iron Manganese Tungsten Thallium	50.0U ug/L 20.0U ug/L 5.0U ug/L 1.00U ug/L 0.200U ug/L	A	bl
R0903561	M-13AB	Aluminum Tungsten Thallium	50.0U ug/L 1.00U ug/L 0.200U ug/L	A	bl
R0903561	M-13ABDISS	Aluminum Tungsten	50.0U ug/L 1.00U ug/L	A	bl
R0903561	M-13009AB	Aluminum Tungsten Thallium	50.0U ug/L 1.00U ug/L 0.200U ug/L	A	bl
R0903561	M-13009ABDISS	Aluminum Tungsten	50.0U ug/L 1.00U ug/L	A	bl
R0903561	M-64B	Tungsten	1.00U ug/L	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903561	EB062909-GW	Magnesium Manganese Strontium	20.0U ug/L 5.0U ug/L 10.0U ug/L	A	bl
R0903561	M-25B	Aluminum Thallium	50.0U ug/L 0.200U ug/L	A	bl
R0903561	M-12AB	Thallium	0.200U ug/L	A	bl
R0903561	M-12ABDISS	Aluminum Iron Manganese	50.0U ug/L 20.0U ug/L 5.0U ug/L	A	bl
R0903561	M-110B	Tungsten	1.00U ug/L	A	bl
R0903561	M-110BDISS	Iron Tungsten	20.0U ug/L 1.00U ug/L	A	bl
R0903561	I-ARB	Aluminum Tungsten	50.0U ug/L 1.00U ug/L	A	bl

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495J4
SDG #: R0903561
Laboratory: Columbia Analytical Services

Date: 9-17-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer:

METHOD: Metals (EPA SW 846 Method 6010B/6020/7000)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/25/09 - 7/1/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	A	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	SW	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	SW	EB=8 (no associated samples in area)

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

Validated Samples: water

1	M-75B	11	M-12ABDISS	21	PBW1	31	
2	M-13AB	12	M-110B	22		32	
3	M-13ABDISS	13	M-110BDISS	23		33	
4	M-13009AB	14	I-ARB	24		34	
5	M-13009ABDISS	15	M-75BMS	25		35	
6	M-64B	16	M-75BDUP	26		36	
7	M-111AB	17	M-13ABMS	27		37	
8	EB062909-GW1	18	M-13ABDUP	28		38	
9	M-25B	19		29		39	
10	M-12AB	20		30		40	

Notes:

LDC #: 21295J4
SDG #: R0903561

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-14	water	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:15,16	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:17,18	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP	✓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS	✓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 21495J4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: NA
Sample Concentration units, unless otherwise noted: ug/L

Reason Code: bl
Raise to RL unless otherwise noted
Associated Samples: All

					Sample Identification											
Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	1	2	3	4	5	6	8	9	11	12	13	14
Al	2.9			50.0	29.4	5.6	11.5	5.9	4.4			23.2	45.8			9.4
Fe	3.8			20.0	19.3								12.9		6.8	
Mg	3.8			20.0							2.6					
Mn	0.2			5.0	1.3						0.3		2.2			
Sr	0.1	0.3		10.0							0.1					
W		0.1		1.00	0.77	0.76	0.71	0.70	0.64	0.80				0.39	0.41	0.28

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1, 2, 4, 6-10, 12, 14

					Sample Identification										
Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	1	2	4	9	10						
Tl		0.004		0.200	0.116	0.043	0.029	0.161	0.152						

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1-7, 9-14

					Sample Identification										
Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	1	11									
B		16.9													
Mo		0.6													
Mn		0.6		5.0	See PB	See PB									

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 13

					Sample Identification										
Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	RL	13										
Ba		2.7													
Fe		5.8		20.0	See PB										
Mg		10.0													

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 3, 5, 6, 7, 9-12, 14

					Sample Identification									
Analyte	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	RL	No Qualifiers									
Ba		2.2												

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1, 2, 4

					Sample Identification									
Analyte	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	RL	1									
Ba		1.5												
Fe		3.8		20.0	See PB									

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1-7, 9-12, 14

					Sample Identification									
Analyte	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	RL	No Qualifiers									
Mg		5.9												

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 7, 12-14

					Sample Identification									
Analyte	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	RL	No Qualifiers									
Na		187												

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1, 6, 9, 10

					Sample Identification									
Analyte	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	RL	No Qualifiers									
Na		211												

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 11

					Sample Identification									
Analyte	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	RL	No Qualifiers									
Na		205												

LDC #: 21495J4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: NA

Reason Code: bl
Raise to RL unless otherwise noted

Reviewer:
2nd Reviewer:

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 8

					Sample Identification									
Analyte	**Maximum PB[a] (ug/L)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**RL**	**8**									
Al		2.7												
Ba		0.9												
B		8.6												
Fe		6.7												
Mo		0.9												
Mg		4.1		20.0	See PB									
Mn		0.6		5.0	See PB									
Na		62												

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 21495J4
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

METHOD: Trace Metals (EPA SW846 6010B/7000)

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

Blank units: ug/L **Associated sample units:**
Sampling date: 6/29/09 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: None associated in Area 1 ~~No associated samples in Area 1~~

Analyte	Blank ID	Sample Identification										
	8	Action Level										
Ca	7.7											
Mg	2.6											
Mn	0.3											
Sr	0.1											
Ti	0.4											

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

LDC #: 21295J4
SDG #: R0903561

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: CR
2nd Reviewer:

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 If analyte concentrations were > 50X the IDL, was ~~an ICP~~ serial dilution analyzed?
Y (N) N/A Were ICP serial dilution percent differences (%D) (≤10%?)
Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	1	Water	Ba	13.5	~~All None~~ 1	J/UJ/A (sd)

Comments: Not from area 1

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 23, 2009

Matrix: Soil/Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903584

Sample Identification

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
SA202-10BMS
SA202-10BDUP
SA41-0.5BMS
SA41-0.5BDUP

Introduction

This data review covers 22 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

IV. 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	Maximum Concentration	Associated Samples
PB (prep blank)	Aluminum Iron Magnesium Manganese Strontium	2.9 ug/L 3.8 ug/L 3.8 ug/L 0.2 ug/L 0.1 ug/L	All water samples in SDG R0903584
ICB/CCB	Aluminum Boron Barium Iron Molybdenum Magnesium Manganese Strontium Tungsten	3.4 ug/L 16.9 ug/L 1.5 ug/L 3.8 ug/L 0.6 ug/L 5.9 ug/L 0.6 ug/L 0.3 ug/L 0.01 ug/L	All water samples in SDG R0903584
PB (prep blank)	Iron Chromium Manganese Sodium Strontium Tin	0.8 mg/Kg 0.06 mg/Kg 0.02 mg/Kg 24 mg/Kg 0.02 mg/Kg 3.9 mg/Kg	All soil samples in SDG R0903584

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Strontium Tungsten	0.10 ug/L 0.055 ug/L	All soil samples in SDG R0903584
PB (prep blank)	Boron Molybdenum	20.0 mg/Kg 0.60 mg/Kg	SA202-10B SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B SA172-0.5B SA41-0.5B SA44-0.5B SA42-0.5B RSAI2-10B RSAI2009-10B RSAI2-20B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B
ICB/CCB	Beryllium	0.009 ug/L	SA202-10B
ICB/CCB	Aluminum Barium Magnesium	3.0 ug/L 2.00 ug/L 6.0 ug/L	RSAJ2009-33B
ICB/CCB	Barium Iron Magnesium	1.00 ug/L 4.0 ug/L 4.0 ug/L	SA41-0.5B SA44-0.5B SA42-0.5B RSAI2-10B RSAI2009-10B RSAI2-20B RSAJ2-10B RSAJ2-20B RSAJ2-33B
ICB/CCB	Barium Magnesium Manganese	0.90 ug/L 3.0 ug/L 0.30 ug/L	SA202-10B SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B SA172-0.5B
ICB/CCB	Manganese Nickel	0.6 ug/L 0.40 ug/L	SA41-0.5B SA44-0.5B SA42-0.5B RSAI2-10B RSAI2009-10B RSAI2-20B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Aluminum Boron Magnesium Manganese Molybdenum Titanium	3.0 ug/L 9.0 ug/L 4.0 ug/L 0.60 ug/L 0.90 ug/L 0.3 ug/L	SA188-0.5B RSAI2-31B
ICB/CCB	Barium	0.70 ug/L	SA188-0.5B
ICB/CCB	Barium Iron Sodium	0.90 ug/L 7.0 ug/L 60.0 ug/L	RSAI2-31B

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
EB062609-SO	Aluminum Boron Molybdenum Magnesium Manganese Strontium	3.0 ug/L 2.7 ug/L 1.5 ug/L 9.9 ug/L 0.9 ug/L 0.3 ug/L	50.0U ug/L 50.0U ug/L 2.0U ug/L 20.0U ug/L 5.0U ug/L 10.0U ug/L
SA202-10B	Tin Boron	4.2 mg/Kg 7.7 mg/Kg	10.8U mg/Kg 10.8U mg/Kg
SA202-28B	Tin	4.8 mg/Kg	11.4U mg/Kg
RSAI3-10B	Tin	4.4 mg/Kg	10.9U mg/Kg
RSAI3-20B	Tin	4.2 mg/Kg	10.7U mg/Kg
RSAI3-32B	Tin	5.0 mg/Kg	9.6U mg/Kg
SA188-0.5B	Tin	5.1 mg/Kg	10.6U mg/Kg
SA172-0.5B	Tin Boron	4.3 mg/Kg 9.7 mg/Kg	10.4U mg/Kg 10.4U mg/Kg
SA41-0.5B	Tin	4.9 mg/Kg	10.7U mg/Kg
SA44-0.5B	Tin Boron	3.9 mg/Kg 7.0 mg/Kg	10.5U mg/Kg 10.5U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA42-0.5B	Tin Boron	4.7 mg/Kg 4.4 mg/Kg	10.0U mg/Kg 10.0U mg/Kg
RSAI2-10B	Tin Boron	4.5 mg/Kg 6.6 mg/Kg	10.9U mg/Kg 10.9U mg/Kg
RSAI2009-10B	Tin Boron	4.2 mg/Kg 6.2 mg/Kg	10.7U mg/Kg 10.7U mg/Kg
RSAI2-20B	Tin	4.7 mg/Kg	10.9U mg/Kg
RSAI2-31B	Tin Tungsten Molybdenum	4.0 mg/Kg 0.087 mg/Kg 0.25 mg/Kg	11.2U mg/Kg 0.11U mg/Kg 0.34U mg/Kg
RSAJ2-10B	Tin	4.3 mg/Kg	10.7U mg/Kg
RSAJ2-20B	Tin	4.2 mg/Kg	10.6U mg/Kg
RSAJ2-33B	Tin	4.2 mg/Kg	9.5U mg/Kg
RSAJ2009-33B	Tin	4.1 mg/Kg	9.8U mg/Kg

Sample EB062609-SO was identified as an equipment blank. No metal contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB062609-SO	6/26/09	Aluminum Boron Calcium Lead Magnesium Manganese Molybdenum Strontium	3.0 ug/L 2.7 ug/L 42.0 ug/L 0.007 ug/L 9.9 ug/L 0.9 ug/L 1.5 ug/L 0.3 ug/L	RSAI2-10B RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B

Sample FB072109-SO (from SDG R0904016) was identified as a field blank. No metal contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB072109-SO	7/21/09	Aluminum	9.4 ug/L	SA202-10B
		Barium	0.5 ug/L	SA202-28B
		Calcium	336 ug/L	RSAI3-10B
		Iron	13.8 ug/L	RSAI3-20B
		Lead	0.020 ug/L	RSAI3-32B
		Magnesium	30.0 ug/L	RSAI2-10B
		Manganese	3.0 ug/L	RSAI2009-10B
		Potassium	79.3 ug/L	RSAI2-20B
		Sodium	241 ug/L	RSAI2-31B
		Strontium	4.40 ug/L	RSAJ2-10B
		Tungsten	0.02 ug/L	RSAJ2-20B
		Uranium	0.004 ug/L	RSAJ2-33B
		Zinc	8.6 ug/L	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
RSAI2-10B	Boron	6.6 mg/Kg	10.9U mg/Kg
RSAI2009-10B	Boron	6.2 mg/Kg	10.7U mg/Kg
RSAI2-31B	Tungsten	0.087 mg/Kg	0.11U mg/Kg

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

Matrix spike (MS) samples 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
SA202-10BMS (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)	Antimony Tungsten	38.5 (75-125) 50.1 (75-125)	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A

VII. Duplicate Sample Analysis

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)	Calcium	58.5 (≤20)	-	J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
SA202-10BL	Chromium Zinc	28 (≤10) 11.5 (≤10)	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	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

XII. 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.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples RSAI2-10B and RSAI2009-10B and samples RSAJ2-33B and RSAJ2009-33B were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAI2-10B	RSAI2009-10B				
Aluminum	8160	8230	1 (≤50)	-	-	-
Arsenic	3.12	2.92	7 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAI2-10B	RSAI2009-10B				
Barium	142	154	8 (≤50)	-	-	-
Beryllium	0.413	0.361	13 (≤50)	-	-	-
Boron	6.6	6.2	-	0.4 (≤10.9)	-	-
Calcium	24800	33600	30 (≤50)	-	-	-
Chromium	6.18	5.98	3 (≤50)	-	-	-
Cobalt	6.7	6.1	-	0.6 (≤2.2)	-	-
Copper	15.6	15.6	0 (≤50)	-	-	-
Iron	14200	13400	6 (≤50)	-	-	-
Lead	7.7	7.6	-	0.1 (≤2.2)	-	-
Magnesium	9390	8290	12 (≤50)	-	-	-
Manganese	304	288	5 (≤50)	-	-	-
Mercury	0.007	0.006	-	0.001 (≤0.017)	-	-
Molybdenum	0.59	0.43	-	0.16 (≤0.33)	-	-
Nickel	14.0	12.7	10 (≤50)	-	-	-
Potassium	2040	2030	0 (≤50)	-	-	-
Sodium	2340	2610	11 (≤50)	-	-	-
Strontium	232	285	21 (≤50)	-	-	-
Thallium	0.094	0.076	-	0.018 (≤0.021)	-	-
Tin	4.5	4.2	-	0.3 (≤10.9)	-	-
Titanium	697	905	26 (≤50)	-	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAI2-10B	RSAI2009-10B				
Tungsten	0.22	0.19	-	0.03 (≤0.11)	-	-
Uranium	1.35	1.27	6 (≤50)	-	-	-
Vanadium	40.4	41.0	1 (≤50)	-	-	-
Zinc	29.2	27.1	7 (≤50)	-	-	-

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAJ2-33B	RSAJ2009-33B				
Aluminum	26600	27800	4 (≤50)	-	-	-
Arsenic	21.1	21.8	3 (≤50)	-	-	-
Barium	108	131	19 (≤50)	-	-	-
Beryllium	0.962	0.997	4 (≤50)	-	-	-
Boron	29.7	30.7	-	1 (≤9.8)	-	-
Calcium	45400	51800	13 (≤50)	-	-	-
Chromium	52.6	49.3	6 (≤50)	-	-	-
Cobalt	7.6	7.5	-	0.1 (≤2.0)	-	-
Copper	22.1	23.4	6 (≤50)	-	-	-
Iron	18200	18900	4 (≤50)	-	-	-
Lead	13.8	13.7	1 (≤50)	-	-	-
Magnesium	38000	39000	3 (≤50)	-	-	-
Manganese	483	476	1 (≤50)	-	-	-
Mercury	0.010	0.008	-	0.002 (≤0.024)	-	-

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAJ2-33B	RSAJ2009-33B				
Molybdenum	1.14	1.17	-	0.03 (≤0.29)	-	-
Nickel	17.7	18.2	3 (≤50)	-	-	-
Platinum	0.010	0.009	-	0.001 (≤0.098)	-	-
Potassium	4870	5080	4 (≤50)	-	-	-
Selenium	0.7U	0.7	-	0 (≤3.9)	-	-
Sodium	2000	2060	3 (≤50)	-	-	-
Strontium	144	153	-	9 (≤39.1)	-	-
Thallium	0.384	0.400	4 (≤50)	-	-	-
Tin	4.2	4.1	-	0.1 (≤9.8)	-	-
Titanium	578	606	5 (≤50)	-	-	-
Tungsten	0.37	0.45	-	0.08 (≤0.098)	-	-
Uranium	4.89	4.97	2 (≤50)	-	-	-
Vanadium	38.0	38.1	0 (≤50)	-	-	-
Zinc	51.7	52.8	2 (≤50)	-	-	-

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

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
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	Antimony Tungsten	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
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	Calcium	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)
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	Chromium Zinc	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)

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

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0903584

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903584	EB062609-SO	Aluminum Boron Molybdenum Magnesium Manganese Strontium	50.0U ug/L 50.0U ug/L 2.0U ug/L 20.0U ug/L 5.0U ug/L 10.0U ug/L	A	bl
R0903584	SA202-10B	Tin Boron	10.8U mg/Kg 10.8U mg/Kg	A	bl
R0903584	SA202-28B	Tin	11.4U mg/Kg	A	bl
R0903584	RSAI3-10B	Tin	10.9U mg/Kg	A	bl
R0903584	RSAI3-20B	Tin	10.7U mg/Kg	A	bl
R0903584	RSAI3-32B	Tin	9.6U mg/Kg	A	bl
R0903584	SA188-0.5B	Tin	10.6U mg/Kg	A	bl
R0903584	SA172-0.5B	Tin Boron	10.4U mg/Kg 10.4U mg/Kg	A	bl
R0903584	SA41-0.5B	Tin	10.7U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903584	SA44-0.5B	Tin Boron	10.5U mg/Kg 10.5U mg/Kg	A	bl
R0903584	SA42-0.5B	Tin Boron	10.0U mg/Kg 10.0U mg/Kg	A	bl
R0903584	RSAI2-10B	Tin Boron	10.9U mg/Kg 10.9U mg/Kg	A	bl
R0903584	RSAI2009-10B	Tin Boron	10.7U mg/Kg 10.7U mg/Kg	A	bl
R0903584	RSAI2-20B	Tin	10.9U mg/Kg	A	bl
R0903584	RSAI2-31B	Tin Tungsten Molybdenum	11.2U mg/Kg 0.11U mg/Kg 0.34U mg/Kg	A	bl
R0903584	RSAJ2-10B	Tin	10.7U mg/Kg	A	bl
R0903584	RSAJ2-20B	Tin	10.6U mg/Kg	A	bl
R0903584	RSAJ2-33B	Tin	9.5U mg/Kg	A	bl
R0903584	RSAJ2009-33B	Tin	9.8U mg/Kg	A	bl

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

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903584	RSAI2-10B	Boron	10.9U mg/Kg	A	be
R0903584	RSAI2009-10B	Boron	10.7U mg/Kg	A	be
R0903584	RSAI2-31B	Tungsten	0.11U mg/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495K4
SDG #: R0903584
Laboratory: Columbia Analytical Services

Date: 9-22-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6010B/6020/7000)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/25/09 - 6/26/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	SW	Dup
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(11,12), (17,18)
XV	Field Blanks	SW	EB=19, 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: 1 water / 22 soil

1	SA202-10B	11	RSAI2-10B	21	SA202-10BDUP	31	PBS
2	SA202-28B	12	RSAI2009-10B	22	SA41-0.5BMS	32	PBW
3	RSAI3-10B	13	RSAI2-20B	23	SA41-0.5BDUP	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 #: 21495H4
SDG #: K0903584

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-19	soil/water	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:20,21	soil	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:22,23	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Analysis Method		
ICP	S/W	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 21495K4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: ug/L

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: NA
Associated Samples: All Water

Reviewer: CR
2nd Reviewer:

					Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	19									
Al		2.9	3.4		3.0 / 50.0									
B			16.9		2.7 / 50.0									
Ba			1.5											
Fe		3.8	3.8											
Mo			0.6		1.5 / 2.0									
Mg		3.8	5.9		9.9 / 20.0									
Mn		0.2	0.6		0.9 / 5.0									
Sr		0.1	0.3		0.3 / 10.0									
W			0.01											

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 21495K4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Soil preparation factor applied: 100x
Reason Code: bl
Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: All Soil

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**1**	2	3	4	5	6	7	8	9	10	11
Fe	0.8													
Cr	0.06													
Mn	0.02													
Na	24													
Sr	0.02	0.10												
Sn	3.9			4.2 / 10.8	4.8 / 11.4	4.4 / 10.9	4.2 / 10.7	5.0 / 9.6	5.1 / 10.6	4.3 / 10.4	4.9 / 10.7	3.9 / 10.5	4.7 / 10.0	4.5 / 10.9
W		0.055												

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**12**	13	14	15	16	17	18				
Fe	0.8													
Cr	0.06													
Mn	0.02													
Na	24													
Sr	0.02	0.10												
Sn	3.9			4.2 / 10.7	4.7 / 10.9	4.0 / 11.2	4.3 / 10.7	4.2 / 10.6	4.2 / 9.5	4.1 / 9.8				
W		0.055				0.087 / 0.11								

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 1-5, 7-13, 15-18

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**1**	7	9	10	11	12					
B	20.0			7.7 / 10.8	9.7 / 10.4	7.0 / 10.5	4.4 / 10.0	6.6 / 10.9	6.2 / 10.7					
Mo	0.60													

LDC #: 21495K4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason Code: bl

Soil preparation factor applied: 100x

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Be		0.009												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 18

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Al		3.0												
Ba		2.00												
Mg		6.0												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 8-13, 15-17

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Ba		1.00												
Fe		4.0												
Mg		4.0												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-5, 7

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Ba		0.90												
Mg		3.0												
Mn		0.30												

LDC #: 21495K4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason Code: bl

Soil preparation factor applied: 100x

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 8-13, 15-18

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Mn		0.6												
Ni		0.40												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 6, 14

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	14										
Al		3.0												
B		9.0												
Mg		4.0												
Mn		0.60												
Mo		0.90		0.25 / 0.34										
Ti		0.3												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 6

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Ba		0.70												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 14

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Ba		0.90												
Fe		7.0												
Na		60.0												

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 21495K4
SDG #: R0903584

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)

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

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 6/26/09 Soil factor applied 200x
Field blank type: (circle one) Field Blank / Rinsate / Other: (EB) Associated Samples: 11-18

Analyte	Blank ID	Sample Identification										
	19	Action Level	11	12								
Al	3.0											
B	2.7		6.6 / 10.9	6.2 / 10.7								
Ca	42.0											
Pb	0.007											
Mg	9.9											
Mn	0.9											
Mo	1.5											
Sr	0.3											

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

LDC #: 21495K4
SDG #: R0903584

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/7000)

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

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 7/21/09 Soil factor applied 100x x 2xdil = 200x
Field blank type: (circle one) Field Blank / Rinsate / Other: Filter Blank Associated Samples: 1-5, 11-18

Analyte	Blank ID	Sample Identification										
	FB072109-SO (SDG#: R0904016)	Action Level	14									
Al	9.4											
Ba	0.5											
Ca	336	672										
Fe	13.8											
Pb	0.020											
Mg	30.0	60										
Mn	3.0											
K	79.3											
Na	241											
Sr	4.40											
W	0.02		0.087 / 0.11									
U	0.004											
Zn	8.6											

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

LDC #: 21495B4
SDG #: R0903584

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

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

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 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 Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

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
	20	Soil	Sb	38.5	1-5, 11-18	J- / UJ / A (m)
			W	50.1	↓	↓

Comments: _____

MS.4S2

LDC #: 21495R4
SDG #: R0903584

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Reviewer: CR
2nd Reviewer: [illegible]

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?

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
	21	Soil	Cd	58.5 (≤20)		1-5, 11-18	J/UJ/A (1d)

Comments: _____

LDC #: 2149SK4
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: CR
2nd Reviewer: [illegible]

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 If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?
Y (N) N/A Were ICP serial dilution percent differences (%D) (≤10%)?
Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	M-75B *	Water	Ba	13.5	None	No Qual
	(SDG# R0903561)					
	1	Soil	Cr	28	1-5, 11-18	J/UJ/A (scd)
			Zn	11.5	V	

Comments: * Not from Area 1

LDC#: 21495K4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: V

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	CR-10 11	CR-11 12				
Aluminum	8160	8230	1			
Arsenic	3.12	2.92	7			
Barium	142	154	8			
Beryllium	0.413	0.361	13			
Boron	6.6	6.2		0.4	(≤10.9)	
Calcium	24800	33600	30			
Chromium	6.18	5.98	3			
Cobalt	6.7	6.1		0.6	(≤2.2)	
Copper	15.6	15.6	0			
Iron	14200	13400	6			
Lead	7.7	7.6		0.1	(≤2.2)	
Magnesium	9390	8290	12			
Manganese	304	288	5			
Mercury	0.007	0.006		0.001	(≤0.017)	
Molybdenum	0.59	0.43		0.16	(≤0.33)	
Nickel	14.0	12.7	10			
Potassium	2040	2030	0			
Sodium	2340	2610	11			
Strontium	232	285	21			

LDC#:21495K4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer:

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	10	11				
Thallium	0.094	0.076		0.018	(≤0.021)	
Tin	4.5	4.2		0.3	(≤10.9)	
Titanium	697	905	26			
Tungsten	0.22	0.19		0.03	(≤0.11)	
Uranium	1.35	1.27	6			
Vanadium	40.4	41.0	1			
Zinc	29.2	27.1	7			

LDC#: 21495K4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer:

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg) 17	Concentration (mg/Kg) 18	(≤~~20~~ 50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Aluminum	26600	27800	4			
Arsenic	21.1	21.8	3			
Barium	108	131	19			
Beryllium	0.962	0.997	4			
Boron	29.7	30.7		1	(≤9.8)	
Calcium	45400	51800	13			
Chromium	52.6	49.3	6			
Cobalt	7.6	7.5		0.1	(≤2.0)	
Copper	22.1	23.4	6			
Iron	18200	18900	4			
Lead	13.8	13.7	1			
Magnesium	38000	39000	3			
Manganese	483	476	1			
Mercury	0.010	0.008		0.002	(≤0.024)	
Molybdenum	1.14	1.17		0.03	(≤0.29)	
Nickel	17.7	18.2	3			
Platinum	0.010	0.009		0.001	(≤0.098)	
Potassium	4870	5080	4			
Selenium	0.7U	0.7		0	(≤3.9)	

LDC#:21495K4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer:

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg)		(≤30) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	17	18				
Sodium	2000	2060	3			
Strontium	144	153		9	(≤39.1)	
Thallium	0.384	0.400	4			
Tin	4.2	4.1		0.1	(≤9.8)	
Titanium	578	606	5			
Tungsten	0.37	0.45		0.08	(≤0.098)	
Uranium	4.89	4.97	2			
Vanadium	38.0	38.1	0			
Zinc	51.7	52.8	2			

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 24, 2009

Matrix: Soil

Parameters: Metals

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
SA206-10BMS
SA206-10BDUP
SA206-30BMS
SA206-30BDUP

Introduction

This data review covers 20 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

IV. 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	Maximum Concentration	Associated Samples
PB (prep blank)	Aluminum Chromium Iron Manganese Molybdenum Nickel Tin	0.5 mg/Kg 0.10 mg/Kg 1.1 mg/Kg 0.04 mg/Kg 0.10 mg/Kg 0.08 mg/Kg 3.9 mg/Kg	All samples in SDG R0903729
ICB/CCB	Boron Magnesium Strontium	8.0 ug/L 2.0 ug/L 0.30 ug/L	All samples in SDG R0903729
ICB/CCB	Barium Iron Manganese	3.00 ug/L 4.0 ug/L 0.20 ug/L	SA69-10B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Barium Manganese	1.00 ug/L 0.10 ug/L	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
ICB/CCB	Molybdenum	0.60 ug/L	SA206-0.5B SA206-10B SA206-25B SA206-30B RSAK4-10B RSAK4-20B RSAK4-31B
ICB/CCB	Molybdenum	0.5 ug/L	RSAL4-0.5B RSAL4009-0.5B RSAL4-10B RSAL4-28B SA100-10B SA100-30B SA69-0.5B SA69-10B SA69-29B
ICB/CCB	Beryllium Tungsten	0.011 ug/L 0.053 ug/L	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	Beryllium Tungsten	0.006 ug/L 0.023 ug/L	SA100-30B SA69-0.5B SA69-10B SA69-29B

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
SA206-0.5B	Boron Tin	7.7 mg/Kg 4.2 mg/Kg	10.2U mg/Kg 10.2U mg/Kg
SA206-10B	Tin	4.7 mg/Kg	11.0U mg/Kg
SA206-25B	Tin	6.1 mg/Kg	16.1U mg/Kg
SA206-30B	Tin	5.4 mg/Kg	13.4U mg/Kg
RSAK4-10B	Boron Tin	9.4 mg/Kg 4.5 mg/Kg	10.5U mg/Kg 10.5U mg/Kg
RSAK4-20B	Boron Tin	7.9 mg/Kg 4.1 mg/Kg	10.3U mg/Kg 10.3U mg/Kg
RSAK4-31B	Tin	4.8 mg/Kg	12.3U mg/Kg
RSAL4-0.5B	Boron Tin	5.1 mg/Kg 3.9 mg/Kg	10.3U mg/Kg 10.3U mg/Kg
RSAL4009-0.5B	Boron Tin	4.6 mg/Kg 4.0 mg/Kg	10.2U mg/Kg 10.2U mg/Kg
RSAL4-10B	Boron Tin	8.9 mg/Kg 4.3 mg/Kg	10.7U mg/Kg 10.7U mg/Kg
RSAL4-28B	Tin	6.3 mg/Kg	15.1U mg/Kg
SA100-10B	Boron Tin	9.8 mg/Kg 4.1 mg/Kg	10.4U mg/Kg 10.4U mg/Kg
SA100-30B	Tin	4.9 mg/Kg	12.7U mg/Kg
SA69-0.5B	Boron Tin	4.5 mg/Kg 4.2 mg/Kg	10.5U mg/Kg 10.5U mg/Kg
SA69-10B	Boron Tin	6.7 mg/Kg 4.1 mg/Kg	10.7U mg/Kg 10.7U mg/Kg
SA69-29B	Tin	5.1 mg/Kg	12.7U mg/Kg

Sample FB072109-SO (from SDG R0904016) was identified as a field blank. No metal contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB072109-SO	7/21/09	Aluminum Barium Calcium Iron Lead Magnesium Manganese Potassium Sodium Strontium Tungsten Uranium Zinc	9.4 ug/L 0.5 ug/L 336 ug/L 13.8 ug/L 0.020 ug/L 30.0 ug/L 3.0 ug/L 79.3 ug/L 241 ug/L 4.40 ug/L 0.02 ug/L 0.004 ug/L 8.6 ug/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.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

Matrix spike (MS) samples 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
SA206-30BMS (All samples in SDG R0903729)	Antimony	27.9 (75-125)	J- (all detects) R (all non-detects)	A
SA206-30BMS (All samples in SDG R0903729)	Beryllium Uranium	126.7 (75-125) 126.6 (75-125)	J+ (all detects) J+ (all detects)	A
SA206-30BMS (All samples in SDG R0903729)	Tungsten	62.6 (75-125)	J- (all detects) UJ (all non-detects)	A

VII. Duplicate Sample Analysis

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
SA206-30BDUP (All samples in SDG R0903729)	Calcium Zinc Nickel	77.4 (≤20) 20.1 (≤20) 23.8 (≤20)	- - -	J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
SA206-30BL	Barium Boron Calcium Iron Manganese Nickel Potassium Sodium Strontium Titanium Vanadium Zinc	12.9 (≤10) 15.9 (≤10) 15.9 (≤10) 15.4 (≤10) 15.1 (≤10) 15.7 (≤10) 10.1 (≤10) 11.3 (≤10) 12.5 (≤10) 11.2 (≤10) 13.3 (≤10) 21.8 (≤10)	All samples in SDG R0903729	J (all detects) UJ (all non-detects)	A

XII. 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.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples RSAL4-0.5B and RSAL4009-0.5B were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAL4-0.5B	RSAL4009-0.5B				
Aluminum	9920	10200	3 (≤50)	-	-	-
Arsenic	2.07	2.09	-	0.02 (≤0.52)	-	-
Barium	236	176	29 (≤50)	-	-	-
Beryllium	0.493	0.545	10 (≤50)	-	-	-
Boron	5.1	4.6	-	0.5 (≤10.3)	-	-
Calcium	23600	16100	38 (≤50)	-	-	-
Chromium	7.94	8.79	10 (≤50)	-	-	-
Cobalt	7.4	7.9	-	0.5 (≤2.1)	-	-
Copper	17.6	17.2	2 (≤50)	-	-	-
Iron	16100	14100	13 (≤50)	-	-	-
Lead	10.3	9.5	-	0.8 (≤2.1)	-	-
Magnesium	8640	9160	6 (≤50)	-	-	-
Manganese	612	424	36 (≤50)	-	-	-
Mercury	0.010	0.007	-	0.003 (≤0.018)	-	-
Molybdenum	0.66	0.47	-	0.19 (≤0.31)	-	-

Analyte	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAL4-0.5B	RSAL4009-0.5B				
Nickel	14.9	22.0	38 (≤50)	-	-	-
Platinum	0.008	0.007	-	0.001 (≤0.10)	-	-
Potassium	2870	2480	15 (≤50)	-	-	-
Sodium	835	1300	44 (≤50)	-	-	-
Strontium	127	123	-	4 (≤41.5)	-	-
Thallium	0.117	0.131	11 (≤50)	-	-	-
Tin	3.9	4.0	-	0.1 (≤10.3)	-	-
Titanium	867	708	20 (≤50)	-	-	-
Tungsten	0.21	0.32	-	0.11 (≤0.10)	-	-
Uranium	0.710	0.774	9 (≤50)	-	-	-
Vanadium	43.2	37.3	15 (≤50)	-	-	-
Zinc	34.4	32.2	7 (≤50)	-	-	-

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

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
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	Antimony	J- (all detects) R (all non-detects)	A	Matrix spike analysis (%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	Beryllium Uranium	J+ (all detects) J+ (all detects)	A	Matrix spike analysis (%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	Tungsten	J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
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	Calcium Zinc Nickel	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)
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	Barium Boron Calcium Iron Manganese Nickel Potassium Sodium Strontium Titanium Vanadium Zinc	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)
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 (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0903729

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0903729	SA206-0.5B	Boron Tin	10.2U mg/Kg 10.2U mg/Kg	A	bl
R0903729	SA206-10B	Tin	11.0U mg/Kg	A	bl
R0903729	SA206-25B	Tin	16.1U mg/Kg	A	bl
R0903729	SA206-30B	Tin	13.4U mg/Kg	A	bl
R0903729	RSAK4-10B	Boron Tin	10.5U mg/Kg 10.5U mg/Kg	A	bl
R0903729	RSAK4-20B	Boron Tin	10.3U mg/Kg 10.3U mg/Kg	A	bl
R0903729	RSAK4-31B	Tin	12.3U mg/Kg	A	bl
R0903729	RSAL4-0.5B	Boron Tin	10.3U mg/Kg 10.3U mg/Kg	A	bl
R0903729	RSAL4009-0.5B	Boron Tin	10.2U mg/Kg 10.2U mg/Kg	A	bl
R0903729	RSAL4-10B	Boron Tin	10.7U mg/Kg 10.7U mg/Kg	A	bl
R0903729	RSAL4-28B	Tin	15.1U mg/Kg	A	bl
R0903729	SA100-10B	Boron Tin	10.4U mg/Kg 10.4U mg/Kg	A	bl
R0903729	SA100-30B	Tin	12.7U mg/Kg	A	bl
R0903729	SA69-0.5B	Boron Tin	10.5U mg/Kg 10.5U mg/Kg	A	bl
R0903729	SA69-10B	Boron Tin	10.7U mg/Kg 10.7U mg/Kg	A	bl
R0903729	SA69-29B	Tin	12.7U mg/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG R0903729

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495L4
SDG #: R0903729
Laboratory: Columbia Analytical Services

Date: 9-22-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: V

METHOD: Metals (EPA SW 846 Method 6010B/6020/7000)

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: 7/6/09 - 7/7/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	SW	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(8,9)
XV	Field Blanks	SW	FB = FB072109-SO (SDG # R0904916 21495)

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		31	PBS
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	SA206-10BMS	27		37	
8	RSAL4-0.5B	18	SA206-10BDUP	28		38	
9	RSAL4009-0.5B	19	SA206-30BMS	29		39	
10	RSAL4-10B	20	SA206-30BDUP	30		40	

Notes: _____

LDC #: 21495L4
SDG #: K0903729

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-16	Soil	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:17R	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:19D	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP	S	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 21495K4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x

Reason Code: bl

Page: 1 of 2
Reviewer:
2nd Reviewer:

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: All

				Sample Identification															
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Al	0.5																		
B		8.0		7.7 / 10.2				9.4 / 10.5	7.9 / 10.3		5.1 / 10.3	4.6 / 10.2	8.9 / 10.7		9.8 / 10.4		4.5 / 10.5	6.7 / 10.7	
Cr	0.10																		
Fe	1.1																		
Mn	0.04																		
Mg		2.0																	
Mo	0.10																		
Ni	0.08																		
Sr		0.30																	
Sn	3.9			4.2 / 10.2	4.7 / 11.0	6.1 / 16.1	5.4 / 13.4	4.5 / 10.5	4.1 / 10.3	4.8 / 12.3	3.9 / 10.3	4.0 / 10.2	4.3 / 10.7	6.3 / 15.1	4.1 / 10.4	4.9 / 12.7	4.2 / 10.5	4.1 / 10.7	5.1 / 12.7

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 16

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Ba		3.00												
Fe		4.0												
Mn		0.20												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-15

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Ba		1.00												
Mn		0.10												

LDC #: 21495K4 V
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x

Reason Code: bl

Reviewer: CR
2nd Reviewer: [illegible]

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-7

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Mo		0.60												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 8-16

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Mo		0.5												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-12

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Be		0.011												
W		0.053												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 13-16

				Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers										
Be		0.006												
W		0.023												

LDC #: 21495L4
SDG #: R0903729

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks? Reason Code: bf
Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 7/21/09 Soil factor applied 100x x 2xdil = 200x
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: All

Analyte	Blank ID	Sample Identification										
	FB072109-SO (SDG#: R0904016)	Action Level	No Qualifiers									
Al	9.4											
Ba	0.5											
Ca	336	672										
Fe	13.8											
Pb	0.020											
Mg	30.0	60										
Mn	3.0											
K	79.3											
Na	241											
Sr	4.40											
W	0.02											
U	0.004											
Zn	8.6											

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

LDC #: 21495L4
SDG #: R0903729

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

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

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 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 Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

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
	19	Soil	Sb	27.9	All	J- (R/A cm) (No post spike)
			Be	126.7	↓	J+ ~~(R/A)~~ J/A
			W	62.6		J- (UJ/A
			U	126.6	↓	J+ det/A ↓

Comments: All Area 1

LDC #: 21495L4
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Reviewer: CR
2nd Reviewer:

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?

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
	20	Soil	Ca	77.4 (≤20)		All	J / UJ / A (b)
			Zn	20.1		↓	↓
			Ni	23.8			

Comments: All Area 1

LDC #: 21495L4
SDG #: R0903729

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

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

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 If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?
Y (N) N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	4	Soil	Ba	12.9	All	J/UJ/A (sd)
			B	15.9		
			Ca	15.9		
			Fe	15.4		
			Mn	15.1		
			Ni	15.7		
			K	10.1		
			Na	11.3		
			Sr	12.5		
			Ti	11.2		
			V	13.3		
			Zn	21.8		

Comments: All Area 1

LDC#: 21495L4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: L

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	8	9				
Aluminum	9920	10200	3			
Arsenic	2.07	2.09	1	0.02	(≤0.52)	
Barium	236	176	29			
Beryllium	0.493	0.545	10			
Boron	5.1	4.6		0.5	(≤10.3)	
Calcium	23600	16100	38			
Chromium	7.94	8.79	10			
Cobalt	7.4	7.9		0.5	(≤2.1)	
Copper	17.6	17.2	2			
Iron	16100	14100	13			
Lead	10.3	9.5		0.8	(≤2.1)	
Magnesium	8640	9160	6			
Manganese	612	424	36			
Mercury	0.010	0.007		0.003	(≤0.018)	
Molybdenum	0.66	0.47		0.19	(≤0.31)	
Nickel	14.9	22.0	38			
Platinum	0.008	0.007		0.001	(≤0.10)	
Potassium	2870	2480	15			
Sodium	835	1300	44			

LDC#: 21495L4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: LA

METHOD: Metals (EPA Method 6020/6010B/7000)

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

Compound	Concentration (mg/Kg) 8	Concentration (mg/Kg) 9	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Strontium	127	123		4	(≤41.5)	
Thallium	0.117	0.131	11			
Tin	3.9	4.0		0.1	(≤10.3)	
Titanium	867	708	20			
Tungsten	0.21	0.32		0.11	(≤0.10)	
Uranium	0.710	0.774	9			
Vanadium	43.2	37.3	15			
Zinc	34.4	32.2	7			