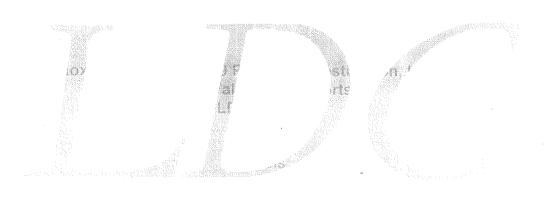
Tronox LLC Facility, 2009 Phase B Investigation, Henderson Data Validation Reports LDC #21495

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	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 Antimony Molybdenum Manganese Magnesium Strontium Tungsten	5.3 ug/L 0.03 ug/L 1.7 ug/L 0.2 ug/L 2.3 ug/L 0.2 ug/L 0.06 ug/L	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

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 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	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.

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)	А	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	ы

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

No Sample Data Qualified in this SDG

_DC # SDG # _abora		-	LIDATIO	N COMP		Henderson IESS WOR		Date: 9-17-0 Page: of Reviewer:
METH	OD: Metals (EPA SW 8	346 M	ethod 6010	3/6020/700	00)			2nd Reviewer:
	amples listed below wer ion findings worksheets		ewed for ea	ch of the f	ollowing	validation area	as. Validation fi	indings are noted in attached
	Validation	Area					Comment	ts
1.	Technical holding times			A	Sampling	dates: 5/2	-1109	
II.	ICP/MS Tune	٠.		A			·	
III.	Calibration			A				
IV.	Blanks			SW				
V.	ICP Interference Check Sa	mple (I	CS) Analysis	A				
VI.	Matrix Spike Analysis			A	ms			
VII.	Duplicate Sample Analysis			A	a	?		
VIII.	Laboratory Control Sample	s (LCS)	A	LC	>		
IX.	Internal Standard (ICP-MS			\sim	100	reviewe	d	
Χ.	Furnace Atomic Absorption			N	No	reviewe	izea	
XI.	ICP Serial Dilution			A				
XII.	Sample Result Verification			N				·
XIII.	Overall Assessment of Date			A				
XIV.	Field Duplicates			N				
χV	Field Blanks			50	F()+	er Blank	=	
Note:	A = Acceptable N = Not provided/applicab SW = See worksheet	le	R = Rin	o compound sate eld blank		D = Dup TB = Tr		
	water	- 1				1		
1	MC-3B-FILT	11	PBW		21		31	
2	MC-3B-FILTMS	12			22		32	
3	MC-3B-FILTDUP	13			23		33	
1 2 3 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	

LDC #: <u>21295A4</u> SDG #: <u>R0902886</u>

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: __of__ Reviewer: ____ 2nd reviewer: ____

All circled elements are applicable to each sample.

	1	
Sample ID	Matrix	Target Analyte List (TAL)
1	watery	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Q(`Z,3	\int	A) Sb (As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe) Pb, (Mg, Mo, Mn, Hg, Ni) Pt, (K, Se, Ag, Na, Sr) Ti, (Sn, Ti,)W, U, V, Zn)
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sh, As, Ba, Be, B, Cd, 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_	Â), Sb.(As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe) Pb, Mg, Mo, Mn) Hg (Ni) Pt, (K, Se, Ag, Na, Sr) TI, (Sh, Ti,)W, U, (V, Zn
ICP-MS	w	AI(St), As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe(Pb), Mg, Mo, Mn, Hg, Ni(Pt), K, Se, Ag, Na, Sr(T) 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

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

Sample Concentration units, unless otherwise noted:

Soil preparation factor applied: NA Associated Samples:

Page: C Reviewer: C 2nd Reviewer._ Reason Code: bl VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES

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												_		To the state of th			
<u>utification</u>																	
Sample Identification																	
8																	
	~	5.3 / 50.0	0.03 / 0.05								1.7 / 2.0	0.2 / 5.0	2.3 / 20.0	0.2 / 10.0			0.06 / 0.10
	Action Limit																
	Maximum ICB/CCB ^a (uq/l)	2.3		0.5	3.9	0.10	6.8			4 6	1.5	0.4	2.1	0.1	180	0.002	0.04
	Maximum PB ^a (110/1)		0.02					0.7	80	3							0.08
	Maximum PB ^a (ma/Ka)																
	Analyte	Ā	Sb	Ba	В	Be	Ca	5 2		200	2 2	Mn	Ma	Š.	e Z	F	: >

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

SDG #: R0902886 LDC #: 21495A4

VALIDATION FINDINGS WORKSHEET

Reviewer: C

Page:

Field Blanks

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

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

Associated sample units: ug/L Blank units: ug/L Y N N/A

Field blank type: (circle one) Field Blank / Rinsate / Other: Filter Blank Soil factor applied Sampling date: 5/21/09

Reason Code: br

None

Associated Samples:

Sample Identification Action Level 1160 Blank ID 90.0 0.03 116 0.2 0.7 2.3 0.2 1.7 5.3 Analyte S Σ 툴 ₽ ≥ Zn Sb ര് F ₹

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:

- 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 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	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
мс-зв	Aluminum	10.5 ug/L	50.0U ug/L
	Beryllium	0.10 ug/L	0.30U ug/L
	Copper	3.5 ug/L	10.0U ug/L
EB052709	Aluminum	2.6 ug/L	50.0U ug/L
	Beryllium	0.10 ug/L	0.30U ug/L
	Calcium	14 ug/L	50U ug/L
	Copper	0.8 ug/L	10.0U ug/L
	Sodium	269 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	2.8 ug/L	50.0U ug/L
	Beryllium	0.10 ug/L	0.30U ug/L
	Iron	3.8 ug/L	20.0U ug/L
	Thallium	0.008 ug/L	0.200U ug/L
	Tungsten	0.04 ug/L	0.10U ug/L
	Magnesium	2.3 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	МС-ЗВ

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 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
мс-зв	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:

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

All analytes reported below the PQL were qualified as follows:

Sample	Sample Finding			
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	мс-зв	Aluminum Beryllium Copper	50.0U ug/L 0.30U ug/L 10.0U ug/L	А	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	А	bl
R0903006	M-127B	Beryllium	0.30U ug/L	А	bl
R0903006	M-127BDISS	Thallium	0.200U ug/L	Α	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	А	ы

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	мс-зв	Aluminum Beryllium	50.0U ug/L 0.30U ug/L	А	be,bf
R0903006	мс-зв	Copper Lead	10.0U ug/L 0.341J+ ug/L	А	be

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

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

R0903006 & SDG #: Laboratory: Columbia Analytical Services

21495B4

LDC #:

Stage 4

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
l.	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	m)
VII.	Duplicate Sample Analysis	A	PP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	\mathcal{N}	(506* R0902886)
XI.	ICP Serial Dilution	A	(506x R0902886)
XII.	Sample Result Verification	SW	
XIII.	Overall Assessment of Data	1	
XIV.	Field Duplicates	N	
ΧV	Field Blanks	SW	ER=Z FilterBlank=MC-3B-FILT CSOGN

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

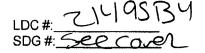
TB = Trip blank

EB = Equipment blank

Validated Samples:

	<u> </u>					
1	MC-3B	11	PBW)	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	1, ms	18		28	38	
9	V Duo	19		29	39	
10		20		30	40	

Notes:	

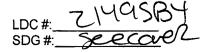


VALIDATION FINDINGS CHECKLIST

Page: __of __ Reviewer: ____ 2nd Reviewer: ____

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

Validation Area	Yes	No	NA	Findings/Comments
1 Technical holdinguines 2.	163	100	I IKA	1 indings/comments
All technical holding times were met.				
Cooler temperature criteria was met.				·
II: Galibration				
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.	<u></u>	7		
IV ICP Interteinnes Check Sample				
Were ICP interference check samples performed daily?	/			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?		777-63202		
IV. Mātrixspike/Matoxspike/Euplicates				
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.	<u> </u>	/		
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) \leq 20% for waters and \leq 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were \leq 5X the RL, including when only one of the duplicate sample values were \leq 5X the RL.	_/			
V: Laboratory controls amples				
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?	/			



VALIDATION FINDINGS CHECKLIST

Page: Zof Z Reviewer: CC 2nd Reviewer: _____

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 Senai Dilation				To the second of
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	/			
Were all percent differences (%Ds) < 10%?	7			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.				
With Internal standards (Ereas stand 46) (Methico, 6020) (Call.				
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?	<u>ر</u>		************	
IX: Regional Chainy Assurance and Chainy Control: 65 24 4 4 3 3				The second secon
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?		_		
XII Overalli assess menkdiciatar				
Overall assessment of data was found to be acceptable.				
XII. Frield-buppicate				
			_	
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.				
XIII - Fieldtelmik (* 1944) - Andrew Lander Signatur (* 1944)				
Field blanks were identified in this SDG.	$ \underline{} $			
Target analytes were detected in the field blanks.				

LDC #: 21295B4 SDG #: R0903006

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: of)
Reviewer: CR
2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	
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
(x:5%		Al (Sb.)As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt) K, Se, Ag, Na, Sr(T) Sn, Ti, W, U V, Zn
07.8.9		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		A) Sb, As, Ba, Be, B, Cd, 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, Sh, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Ph, Mg, Mo, Mn, Hg, Ni, Pt) K, Se, Ag, Na, Sr(T) 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) ng/r Sample Concentration units, unless otherwise noted:

VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES

Soil preparation factor applied: NA Associated Samples:

All except Na = 1-4

Raise to RL unless otherwise noted Reason Code: bl

Reviewer: CS 2nd Reviewer: Page:

Sample Identification Sample Identification 0.008 0.10 0.04 3.8 2.8 0.103 4 Associated Samples: 0.10 က 0.10 269 0.8 2.6 7 $^{\circ}$ 10.5 0.10 2.3 3.5 na/ Action Limit 0.200 20.0 10.0 0.0 50.0 0.30 20,02 300 20 젒 Sample Concentration units, unless otherwise noted: Maximum ICB/CCB^a (ug/L) Action Limit 2.1 Maximum PB^a (uq/l) Maximum ICB/CCB^a 0.009 0.05 (1/bin) 0.031 0.10 3.9 6.8 9.0 4.6 5. 0.4 295 0.7 2.3 0.5 Maximum PB^a Maximum PB^a (1/611) 0.08 0.02 0.7 0.8 Analyte Analyte Μg ಪ g Sb ഗ് ≥

4 Sample Identification			
1.3			ent.
@10x Associated Samples:			Note: a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element
@10x	No Qualifiers		or PB detected
ted: ua/l	Action Limit		nest ICB, CCB,
Sample Concentration units, unless otherwise noted:	Maximum ICB/CCB ^a	3.7	ation is the high
its, unless o	Maximum PB ^a		lyte concentra
centration ut	Maximum Maximum PB*		The listed ana
Sample Con	Analyte	Mg	Note: a -

SDG #: R0903006 LDC #: 21495B4

VALIDATION FINDINGS WORKSHEET

Field Blanks

Reviewer: Cand Reviewer: _______

Were field blanks identified in this SDG?

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

N N/A A/N N/A

Were target analytes detected in the field blanks?

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

Soil factor applied ___ Field blank type: (circle one) Field Blank / Rinsate / Other: Sampling date: 5/27809

Reason Code: be

Associated Samples:

															 		 _
ion																	
Sample Identification																-	
San																	
	-	10.5 / 50.0	0.10 / 0.30		3.5 / 10.0	0.341 J+											
	Action Level					0.900			0.750	1.1							
Blank ID	2	2.6	0.10	14	0.8	0.090	0.01	269	0.075	0.11	0.010	1.2					
Analyte		A	Be	Ca	Cu	Pb	£	Na	F	Μ	n	Zn					

100 # 149 5134 spe # 808032006

VALIDATION FINDINGS WORKSHEET

Field Blanks

2nd Reviewer:

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

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

Were target analytes detected in the field blanks?

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

Sampling date: 6/4/09 Soil factor applied NA Field blank type: (circle one) Field Blank / Rinsate / Other: Sampling date: 6/4/09

Report: 64

			·													
												-				
	ion															
Associated Samples: 1, 3	Sample Identification															
ssociated Sa	San															
Ä																
/ Other:	The state of the s	3		S. 10 10:30												
ank/Rinsate		_	0.5 500	5.10/0.30 6.10/01.30												
ne) É ield Bl)	Action Level														
pe: (circle or	Blank ID	7	2.8	0.10	3.8	2.3	0.008	0.04	2.0							
ield blank type: (circle one) Field Blank / Rinsate / Other.	Analyte		ΙΑ	Be	Fe	Mg	F	×	Zn							

LDC #: 21495B4

SDG #: R0903006

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: \(\frac{1}{\cdot \text{of } \frac{1}{\cdot \text{d}}}

Reviewer: C

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

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

Were target analytes detected in the field blanks?

Associated sample units: ug/L Blank units: ug/L YN N/A

Sampling date: 5/21/09 Soil factor applied Field blank type: (circle one) Field Blank / Rinsate / Other: Sampling date: 5/21/09

Reason Code: br

Associated Samples:

Filter Blan

	-																
,				111111111111111111111111111111111111111													
tion																	
Sample Identification																	
San																	
<i>)</i> 									•								
	No Qualifiers											*					
	Action N Level			1160													
Blank ID	386)	5.3	0.03	116	2.3	0.2	1.7	0.2	0.7	90:0	2.2						
Analyte	5,500	Al	Sb	Ca	Mg	Mn	Mo	Š	Ë	×	Zn						Charles and the second

2749SB4 SDG#: SECOVOR LDC#

Initial and Continuing Calibration Calculation Verification **VALIDATION FINDINGS WORKSHEET**



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 × 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

Acceptable (Y/N) Reported % R 0 **Recalculated** %R 0 True (ug/L) 1250 Found (ug/L) 1567 5,20 Element を土 9 Type of Analysis GFAA (Initial calibration) ICP (Initial calibration) Standard ID

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.

てのこ

5

2

76.1

Sb

ICP/MS (Continuing calibation)

701

70)

228

26,00

3

ICP/MS (Initial calibration)

HC C

8

3

250

252

かせ

ICP (Continuing calibration)

7

CVAA (Initial calibration)

100

70

5,00

5

50%

8,8

5.16

かせ

CVAA (Continuing calibration)

700

GFAA (Continuing calibration)

100# 445BY SDG #500 RECENT

VALIDATION FINDINGS WORKSHEET **Level IV Recalculation Worksheet**

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:

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.

%R = Found × 100 True

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

Where, S = Original sample concentration

D = Duplicate sample concentration RPD = <u>IS-DL</u> x 100 (S+D)/2 An ICP serial dilution percent difference (%D) was recalculated using the following formula:

Where, i = Initial Sample Result (mg/L) SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5) %D = II-SDR × 100

					Recalculated	Reported	
Samole ID	Type of Analysis	Element	Found (S / I (units)	True / D / SDR (units)	%R / RPD / %D	%R / RPD / %D	Acceptable (Y/N)
2	ICP interference check	Ø	FOB		90	90) -
527	Laboratory control sample	12	0122	2500	936	936	
N	Matrix spike	4	(ssr-sr) 42,0	2000	96.0	98.0	
Q	Duplicate	2	13.7	13,6	0.7	0,7	
MC-30-FILT	(CP serial dilution	Š	6.7	6,5	1\$0	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 #: 2149634 SDG #: <u>Secore</u>

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

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

Please Y N Y N Y N	see qua N/A N/A N/A	riave results need tebolted	and calculated correctly? ated range of the instruments ar	ble questions are identified as "N/A". Individual individual representation of the ICP?
Detector following	ed analy ng equat	rte results for	Ca	were recalculated and verified using the
Concent	ration =	(RD)(FV)(Dii) (In. Vol.)(%S)	Recalculation:	
RD FV In. Vol. Dil %S	= = = =	Raw data concentration Final volume (ml) Initial volume (ml) or weight (G) Dilution factor Decimal percent solids	Raw Poto	1: (303,3mg/L)1000 = 303000 right

Sample ID	Analyte	Reported Concentration (Mg ()	Calculated Concentration (MQ L)	Acceptable (Y/N)
	Al	10,5	16,5	Y
	<u> </u>	0,59	0,59	1
	As	57.1	57.1	
	Ba	34.1	34.4	
	Be	0.10	0.10	
		2420	2420	
	<u> </u>	303000	303000	
	<u> </u>	11.0	11.0	
		2.0	7.0	
	Fe	3,5	3.5	
		237	237	
	<u>e</u> b	0.341	0.341	
	ing	417000	417000	
	<i>\(\lambda\)</i> \(\lambda\)	465	465	
	Wo	16.5	10.5	
	// ,	13.0	13.0	
	4	71900	71400	
	Na	8480006	848000 17500	
		17500		
	<u> </u>	9.81	9.81	
	<u> </u>	13,7	13.7	
		4,8	4.8	

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA152-0.5B	Boron	4.4 mg/Kg	10.5U mg/Kg
	Tin	3.6 mg/Kg	10.3U mg/Kg
SA152009-0.5B	Boron	4.1 mg/Kg	10.3U mg/Kg
	Tin	3.8 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	7.3 mg/Kg	10.5U mg/Kg
	Tin	4.2 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)	А
,	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)	А
	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)	Α

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:

	Concentration (mg/Kg)		DDD	Difference		
Analyte	SA76-0.5B	SA76009-0.5B	RPD (Limits)	(Limits)	Flags	A or P
Aluminum	9010	9340	4 (≤50)		-	
Arsenic	2.95	6.05	69 (≤50)	-	J (all detects)	А
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)	-	-

	Concentrati	on (mg/Kg)	RPD	Diff.		
Analyte	SA76-0.5B	SA76009-0.5B	(Limits)	Difference (Limits)	Flags	A or P
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)	-	-	-

	Concentration (mg/Kg)					
Analyte	SA152-0.5B	SA152009-0.5B	RPD (Limits)	Difference (Limits)	Flags	A or P
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)	-	-

	Concentration (mg/Kg)					
Analyte	SA152-0.5B	SA152009-0.5B	RPD (Limits)	Difference (Limits)	Flags	A or P
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)	-	•	-

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

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 RSAM2-0.5B SA189-0.5B SA189-0.5B SA182-0.5B SA152-0.5B SA152-0.5B SA152-0.5B SA152-0.5B	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 RSAM2-0.5B SA189-0.5B SA189-0.5B SA152-0.5B SA152-0.5B SA152-0.5B SA152-0.5B SA152-0.5B SA152-0.5B	Cobalt	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Α	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 SA189-0.5B SA152-0.5B SA152-0.5B SA152-0.5B SA152-0.5B SA152-0.5B SA152-0.5B RSAJ2-0.5B RSAJ3-0.5B	All analytes reported below the PQL.	J (all detects)	Α	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	А	bl
R0903051	RSAI3-0.5B	Boron Tin	10.3U mg/Kg 10.3U mg/Kg	А	bl
R0903051	RSAJ5-0.5B	Tin	11.0U mg/Kg	Α	bl
R0903051	RSAK5-0.5B	Boron Tin	10.6U mg/Kg 10.8U mg/Kg	А	bl
R0903051	SA76-0.5B	Tin	10.5U mg/Kg	А	bl
R0903051	SA76009-0.5B	Tin	10.8U mg/Kg	А	bl
R0903051	RSAL3-0.5B	Tin	10.4U mg/Kg	А	bl
R0903051	SA100-0.5B	Boron Tin	10.1U mg/Kg 10.1U mg/Kg	А	bl
R0903051	RSAM3-0.5B	Boron Tin	10.4U mg/Kg 10.3U mg/Kg	А	bl
R0903051	RSAM2-0.5B	Boron Tin	10.3U mg/Kg 10.2U mg/Kg	А	bl
R0903051	SA189-0.5B	Boron Tin	10.4U mg/Kg 10.5U mg/Kg	А	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	А	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	А	bl
R0903051	RSAJ2-0.5B	Tin	11.0U mg/Kg	А	bl
R0903051	RSAJ3-0.5B	Tin	11.3U mg/Kg	А	bl
R0903051	SA202-0.5B	Boron Tin	10.5U mg/Kg 10.4U mg/Kg	А	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

LDC #: 21495C4 SDG #:

Stage 2B

R0903051 Laboratory: Columbia Analytical Services

Reviewer: C 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: 6/1/09 - 6/4/09
11.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	5~	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	ms
VII.	Duplicate Sample Analysis	A	0.0
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	\mathcal{N}	Notrened
X.	Furnace Atomic Absorption QC	\mathcal{N}	Not reviewed 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)
χv	Field Blanks	SW	Filter Blank B- FB072109-SO CSD64 ROADYD

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

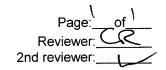
Validated Samples: , ,

	Soil						
1	RSA12-0.5B	11	SA189-0.5B	21 (Pes+	31	PBS1
2	RSAI3-0.5B	12	SA88-0.5B	22	-RSA120-0.5BD	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	8 RSA12-0.5B MS	30		40	

Notes:		

LDC #: 21295C4 SDG #: R0903051

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference



All circled elements are applicable to each sample.

Sample	Matrix	Target Analyte List (TAL)
	\ 1 U	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zb
0X :48][4]		(Al, Sb, As, Ba, Be, B, Cd, 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	4	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn(Hg) Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sh, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Ph, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
	_ 1	Analysis Method
ICP		(Al, Sb,)As,(Ba,)Be,(B, Cd, Ca,)Cr,(Co, Cu, Fe, Pb, Mg, Mo, Mn) Hg(N), Pt, (K, Se, Ag, Na, Sr,)Tl,(Sn, Ti, W, U, V, Zn)
ICP-MS	<u>S</u>	Al, Sb, As Ba, Be B, Cd, Ca, Cr Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt K, Se, Ag, Na, Sr, Tr Sn, Ti, W, UV, 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

Mercury by CVAA if performed

Comments:

LDC #: 21495C4 SDG #: R0903051

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

(191)

Page: o Reviewer: C

METHOD: Trace :	350 #. NOSUSOS I	/EDA C/// 8/	18 Mothod 60	07/0609/90/70	L1 6	il proparation	Soil propagation factor applied: 100x	od 100v				·	 2nd Reviewer	
Sample Con	Sample Concentration units, unless otherwise noted:	יט איט א ובי) rits, unless כ	therwise not	ed: mg		ii preparatio	Associate	Associated Samples:	HA.			-		
								Samr	Sample Identification	ion				
Analyte	Maximum PB³ (ma/Ka)	Maximum ICB/CCB ^a	Action Limit	+	2	င	4	5	9	7	ω	o	10	<u>+</u>
ΙΑ	0.6													
В	0.5	0.9		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
ن	60:0													
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												
								Sam	Sample Identification	ion				
Analyte	Maximum PB ^a (mq/Kq)	Maximum ICB/CCB ^a (uq/l.)	Action Limit	12	13	14	15	16	17					
Ι	9.0													
В	0.5	6.0		8.0 / 10.6	4.4 / 10.5	4.1 / 10.3			7.3 / 10.5					
Ċ	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					
ટંડ		0.3												

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VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: 100x	Associated Samples: 16. 17	Sample Identification			Associated Samples: 7-17	Sample Identification			Associated Samples: 1-6	Sample Identification		
LDC #: <u>21495C4</u> SDG #: <u>R0903051</u> METHOD : Trace metals (EPA SW 846 Method 6010B/6020/7000)	ed: ma/Ka		No Qualifiers		ed: ma/Ka		No Qualifiers		ed: ma/Ka		No Qualifiers	
3 Method 60	herwise not		Action Limit		therwise not	207	Action Limit		therwise not		Action Limit	
EPA SW 846	its. unless of	313	Maximum ICB/CCB ^a (ug/l)	2.0	its. unless of		Maximum ICB/CCB [®] (ug/L)	09:0	io seimi sii		Maximum ICB/CCB ^a (uq/l)	0:30
3054 3051 ace metals (entration un		Maximum PB ^a (mq/Kg)		entration un		Maximum PB ^a (mg/Kg)		entration un		Maximum PB ^a (mg/Kg)	
LDC #: 21495C4 SDG #: R0903051 METHOD: Trace r	Sample Concentration units, unless otherwise noted:		Analyte	Al	Sample Concentration units, unless otherwise noted:		Analyte	Ba	Sample Concentration units unless otherwise noted:		Analyte	Ba

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

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

(Pt)

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

Y 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: Firer-Blank)

₹

Associated Samples:

Sample Identification No Qualifiers Action Level 672 8 FB072109-SO (SDG#: R0904016) Blank ID 13.8 0.020 30.0 79.3 4.40 0.004 0.02 9.4 0.5 336 3.0 241 8.6 Analyte δ M Ba Sa Fe В Na Zn ≥ Š ¥ \supset ₹

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".

VALIDATION FINDINGS WORKSHEET Matrix Spike Analysis

2nd Reviewer: 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".

Note and the sample of the sample concorded to the sample c

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.

Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery? Y N N/A W

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

		(w)													
	Qualification	151/A (C													
		1-4-													
	Associated Samples														
	Assc	110	ノ												
	%R	59.2	5.4 -												
	Analyt	Sh	3												
	Matrix	Soil													
11	K Spike ID	202										·			-
	# Matrb	ユ									·				Comments:

SDG #: (209030

VALIDATION FINDINGS WORKSHEET ICP Serial Dilution

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 ICR serial dilution percent differences (%D)(≤10%?)

Were ICP serial dilution percent differences (%D)(≤10%?)

Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IVONLY:

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

>	Y N (N/A) Were recalcu	Were recalculated readily acceptable:	1			
	Ci dame Letilo	Match	Ansivte	Q%	Associated Samples	Qualifications
		1.08	0 0	0.1	AII	7 / Uz (A (Sd)
		7	40	7.11))
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LDC#: 21495C4 SDG#: See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page: \	o	f J
Reviewer:	e	2
2nd Reviewer:_		

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

YN NA YN NA

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

	Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	5	6	RPD	Difference	Limits	(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#: <u>21495C4</u> SDG#: See Cover

VALIDATION FINDINGS WORKSHEET <u>Field Duplicates</u>

Page: Zof Reviewer: 2nd Reviewer:

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

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

	Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	5	6	RPD	Difference	Limits	(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	DUBLICATES		

V:\FIELD DUPLICATES\FD_inorganic\21495C4.wpd

LDC#: <u>21495C4</u> SDG#: <u>See Cover</u>

VALIDATION FINDINGS WORKSHEET Field <u>Duplicates</u>

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

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

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	7	8	RPD	Difference	Limits	(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#: <u>21495C4</u> SDG#: <u>See Cover</u>

VALIDATION FINDINGS WORKSHEET Field Duplicates

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Page:of	<u> </u>
Reviewer: CR	_
2nd Reviewer:	_

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

YN NA YN NA

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

	Concentration	Concentration (mg/Kg)		(mg/Kg)	(mg/Kg)	Qualifications
Compound	7	8	RPD	Difference	Limits	(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.
- Partial 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	23.6 ug/L	50.0U ug/L
	Zinc	1.6 ug/L	10.0U ug/L
M-142B	Thallium	0.021 ug/L	0.200U ug/L
	Tungsten	0.56 ug/L	1.00U ug/L
M-130B	Barium	0.10 ug/L	0.30U ug/L
	Thallium	0.110 ug/L	0.200U ug/L
	Zinc	5.3 ug/L	10.0U ug/L
M-142BDISS	Manganese	2.0 ug/L	5.0U ug/L
	Tungsten	0.48 ug/L	1.00U ug/L
M-130BDISS	Aluminum	3.7 ug/L	50.0U ug/L
	Antimony	0.34 ug/L	0.50U ug/L
	Zinc	2.1 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)	Α

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	А	bl
R0903243	M-142B	Thallium	0.200U ug/L	А	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	А	bl
R0903243	M-130BDISS	Antimony Iron Thallium	0.50U ug/L 20.0U ug/L 0.200U ug/L	A	ld
R0903243	M-29B	Antimony	0.50U ug/L	А	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	А	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	А	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	А	br
R0903243	M-130BDISS	Aluminum Antimony Zinc	50.0U ug/L 0.50U ug/L 10.0U ug/L	А	br

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

SDG #:_ R0903243 Laboratory: Columbia Analytical Services

21495D4

LDC #:___

Stage 2B

Reviewer: C

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
1.	Technical holding times	A	Sampling dates: 6/9/09 - 6/16/09
II.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	ms
VII.	Duplicate Sample Analysis	A	Qp .
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	\mathcal{N}	Not reviewed Notutilized
X.	Furnace Atomic Absorption QC	\sim	No+U+ilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	SW	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
ΧV	Field Blanks	SW	Filter Blank=MC-3B-FILT (SOBNRO902886)

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

FB= FB66409 (\$06\$RCQ03006)

ND = No compounds detected D = Duplicate

R = Rinsate

FB = Field blank

TB = Trip blank

EB = Equipment blank

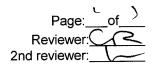
Validated Samples:

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



All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-7	water	(ÅI, Sb, As, Ba, Be, B, Cd, 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:89		A), Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe) Pb, Mg, Mo, Mn) Hg, (Ni) Pt, [K, Se, Ag, Na, Sr] TI, 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, Ti, Sn, Ti, W, U, V, Zn
10 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, Sh, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Ph, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
	<u> </u>	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) TI, 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 Ti 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

Tronox_SR.wpd

LDC #: 21495D4

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

Reason Code: bl Raise to RL unless otherwise noted

Page: of S Reviewer: CAS 2nd Reviewer:

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									Sample Identification	ification		•
Analyte	Maximum PB ^a (uq/l)	Maximum ICB/CCB ^a (ug/l.)	Action Limit	RL	1	4	5	ပ	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 Cor	centration u	Sample Concentration units, unless otherwise noted:	therwise not	ted: ua/l		Assoc	Associated Samples:	7	3-7			
								(5)	Sample Identification	ification		
Analyte	Maximum PB³ (ug/l)	Maximum ICB/CCB ^a (ug/L)	Action Limit	RL	က	5	9					
Pb		0.006										
Pŧ		0.01										
L		900.0		0.200	0.021	0.110	0.082					
n		0.005			_							
Sample Cor	<u>ncentration u</u>	Sample Concentration units, unless otherwise noted:	therwise no	ted: ua/L	1	Assoc	Associated Samples:	es:	2			
									Sample Identification	ification		
Analyte	Maximum PB ^a (ug/l)	Maximum ICB/CCB ^a (ug/l.)	Action Limit		No Qualifiers				-,-			
T		0.005										
Sample Cor	ncentration u	Sample Concentration units, unless otherwise noted:	therwise no	ted: ua/l	NERGENALIZATION PROPERTY SECTION AND A SECTION ASSECTATION ASSECTATION AND A SECTION AND A SECTION ASSECTATION ASS	Assoc	Associated Samples:	<u>es:</u> 1-6				
									Sample Identification	fification	-	
Analyte	Maximum PB ^a (ug/l)	Maximum ICB/CCB ^a (ug/l)	Action Limit	RL	4	9						
В		4.2										
Fe		4.0		20.0	See PB	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

Page: Zof Z Reviewer: CR 2nd Reviewer: CR

Sample Identification Sample Identification Sample Identification Sample Identification 7.7 ဖ 3-6 Associated Samples: Associated Samples: Associated Samples: Associated Samples: No Qualifiers No Qualifiers No Qualifiers See PB 4 no/L /on ua/l 5.0 ᆔ 귙 몺 귒 Sample Concentration units, unless otherwise noted: Action Limit Action Limit Action Limit Action Limit Maximum ICB/CCB^a (ug/L) Maximum ICB/CCB^a (ug/l) Maximum ICB/CCB^a (ug/L) Maximum ICB/CCB^a 0.20 11.3 0.30 9.0 6.0 0.3 0.5 0.9 Maximum PB^a (ug/L) Maximum PB^a (ug/l) Maximum PB^a (ug/l) Maximum PB^a (ug/L) Analyte Analyte Analyte Analyte 툴 ₽ Ę Sa Ва 퇄 Ва હ જ

Page: 2 of 2 Reviewer: 42 2nd Reviewer: Reason Code: bl Raise to RL unless otherwise noted Sample Identification VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: NA Associated Samples: No Qualifiers LDC #: 21495D4 SDG #: See Cover METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000) Ζ Sample Concentration units, unless otherwise noted: Action Limit Maximum ICB/CCB^a (ug/l) 4.0 2.8 6.4 8.0 0.8 Maximum PB^a (ug/l)

Analyte

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

0.10

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Ва

LDC #: 21495D4

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

Reason: OF

2nd Reviewer:_ Reviewer.

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

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

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

Associated sample units: ug/L Blank 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

vification	IIIIICALIOII															
not olames	Sample Identification	5		0.10 / 0.30			0.110 / 0.200		5.3 / 10.0							
The state of the s		က					0.021 / 0.200	0.56 / 1.00								
		2	23.6 / 50.0						1.6 / 10.0							
		-							1.0 / 10.0							
		Action Level														
	Blank ID	FB060409 (SDG# R0903006)	2.8	0.10	3.8	2.3	0.008	0.04	2.0							
50	Analyte		Æ	Be	Fe	Mg	F	3	Zn							

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

Page: of Reviewer: CS

Field Blanks

МЕТНОD: Trace Metals (EPA SW846 6010В/6020/7000)

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

Were target analytes detected in the field blanks? N N X

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

Filter Blan Sampling date: 5/21/09 Soil factor applied Field blank type: (circle one) Field Blank / Rinsate / Other Sampling date: 5/21/09

Reason Code: br

4,6

Associated Samples:

F		T		T	1	1	T	T	7	П		Ī	 	1	 Ī	· - T	ï	 _
													,					
	tion																	
	Sample Identification						Made Const.											
	Sal																	
															1200			
		9	3.7 / 50.0	0.34 / 0.50								2.1 / 10.0						
		4					2.0 / 5.0				0.48 / 1.00							
		Action Level			1160													
	Blank ID	MC-3B-FILT (SDG# R0902886)	5.3	0.03	116	2.3	0.2	1.7	0.2	0.7	0.06	2.2						
	Analyte		A	Sb	Ca	Mg	Mn	Mo	Sr	ij	*	Zn						

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

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	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	А	bl
R0903404	M-19B	Copper	10.0U ug/L	А	bl
R0903404	M-34B	Copper	10.0U ug/L	А	bl
R0903404	M-125B	Tungsten	1.00U ug/L	А	bl
R0903404	M-125BDISS	Tungsten	1.00U ug/L	А	bl
R0903404	M-17AB	Copper	10.0U ug/L	А	bl
R0903404	M-17ABDISS	Copper	10.0U ug/L	А	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	А	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	А	bf
R0903404	H-38B	Aluminum Beryllium Thallium Zinc	50.0U ug/L 0.30U ug/L 0.200U ug/L 10.0U ug/L	А	bf
R0903404	M-125B	Beryllium Thallium Tungsten Zinc	0.30U ug/L 0.200U ug/L 1.00U ug/L 10.0U ug/L	А	bf
R0903404	M-128BDISS	Antimony Tungsten Zinc	0.50U ug/L 1.00U ug/L 10.0U ug/L	А	br
R0903404	M-125BDISS	Tungsten Zinc	1.00U ug/L 10.0U ug/L	А	br

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

R0903404 SDG #: Laboratory: Columbia Analytical Services Stage 2B

Reviewer: C 2nd Reviewer:

21495E4

LDC #:

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
l.	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	(L)
VII.	Duplicate Sample Analysis	A	DQ
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	\mathcal{N}_{-}	Not reviewed Not utilized
X.	Furnace Atomic Absorption QC	\ <u>\</u>	Not utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	SUN	
XIII.	Overall Assessment of Data	1	
XIV.	Field Duplicates	\mathcal{N}	
ΧV	Field Blanks	SW	Filter Blank = MC-3B-FILT (SDG x R0902886)
Note:	A = Acceptable ND = N	lo compound	FB = FB060409 (SD6 W R0903006) B = Trip block

N = Not provided/applicable

SW = See worksheet

R = Rinsate

TB = Trip blank

EB = Equipment blank FB = Field blank

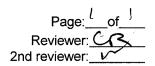
Validated Samples: waren

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	

otes:	

LDC #: <u>21295E4</u> SDG #: <u>R0903404</u>

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference



All circled elements are applicable to each sample.

Sample	Matrix	Target Analyte List (TAL)
<u>ID</u>		
	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		(A) Sb (As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe) Pb, Mg, Mo, Mn, Hg, Ni) Pt, K, Se, Ag, Na, Sp 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, Ti, Sn, Ti, W, U V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al Sh As Ba Be B Cd Ca Cr Co Cu Fe Ph 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, TK, 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) Sample Concentration units. unless otherwise noted:

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

Raise to RL unless otherwise noted Reason Code: bl

Sample Con	Sample Concentration units, unless otherwise noted:	nits, unless o	therwise not	ted: ug/L	/F	Assoc	Associated Samples:	ss: All				
									Sample Identification	lon		
Analyte	Maximum PBª (ug/l)	Maximum ICB/CCB ^a (ug/l)	Action Limit	RL	ო	7	∞					
В		6.7										
Ca	11.3											
Sr	0.10											
×	0.25	0.04		1.00	0.98	0.82	0.62					
Sample Con	Sample Concentration units, unless otherwise noted:	nits, unless o	therwise not	ted: ua/l	//	Assoc	Associated Samples:	2. 4°.				
									Sample Identification	ion		
Analyte	Maximum PB³ (ug/l)	Maximum ICB/CCB ^a (ug/l.)	Action Limit	RL	No Qualifiers							
Sr		0.20									-	
Sample Cor	Sample Concentration units. unless otherwise noted:	nits, unless o	therwise no	ted: ua/l		Assoc	Associated Samples:		3.5-11			
									Sample Identification	ion		
Analyte	Maximum PB ^a (ug/l)	Maximum ICB/CCB ^a (ug/l.)	Action Limit	RL	No Qualifiers							
Sr		0.10										
Sample Cor	Sample Concentration units, unless otherwise noted:	nits. unless o	therwise no	ted: ua/l	/L	Assoc	Associated Samples;	es: 3.5-11				The state of the s
									Sample Identification	ion		
Analyte	Maximum PB* (ug/l)	Maximum ICB/CCB ^a (ug/L)	Action Limit	RL	ဗ	S	9	10	11			The state of the s
Cu		1.0		10.0	3.0	3.6	7.7	8.3	8.9			
Sample Cor	Sample Concentration units, unless otherwise noted	nits, unless c	otherwise no	ted: ua/l	7/	Assoc	Associated Samples: 1-6. 9-11	es: 1-6. 9-11				
									Sample Identification	ion		
Analyte	Maximum PB ^a (ug/l.)	Maximum ICB/CCB ^a (119/1)	Action Limit	RL	No Qualifiers							Personal Association (Control of Control of
Mg		2.8										

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

Reason Code: bl Raise to RL unless otherwise noted VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: NA

Page: Of 2 Reviewer: C/2

Sample Identification Associated Samples: No Qualifiers 묎 Sample Concentration units. unless otherwise noted: Action Limit Maximum ICB/CCB^a (ug/L) 2.2 Maximum PB^a (uq/L) Analyte ₽

Associated Samples: 1.3-11 Sample Identification			Associated Samples: 2 Sample Identification		
	No Qualifiers		T	No Qualifiers	
red: ua/	RL		no <u>.paj</u>	RL	
therwise no	Action Limit		therwise no	Action Limit	
Sample Concentration units, unless otherwise noted:	Maximum ICB/CCB ^a (ug/L)	191	Sample Concentration units. unless otherwise noted:	Maximum ICB/CCB ^a	105
centration ur	Maximum PB³ (uq/l)		centration ur	Maximum PB ^a	
Sample Con	Analyte	Na	Sample Con	Analyte	Na

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

LDC #: 21495E4

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

Reason: bf

Reviewer._ 2nd Reviewer:

Were field blanks identified in this SDG?

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

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

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

Soil factor applied NA

Field blank type: (circle one) Field Blank / Rinsate / Other. Sampling date: 6/4/09

1, 2, 4, 7 Sample Identification Associated Samples: 0.122 / 0.200 0.82 / 1.00 0.10 / 0.30 1.0 / 10.0 0.072 / 0.200 0.10 / 0.30 37.4 / 50.0 1.4 / 10.0 0.092 / 0.200 0.10 / 0.30 5.3 / 10.0 N 6.2 / 10.0 Action Level (SDG# R0903006) FB060409 Blank ID 0.008 0.04 0.10 3.8 2.3 2.8 2.0 Analyte Zu Be Fe ξ F ≥ ₹

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".

SDG #: R0903243 LDC #: 21495E4

VALIDATION FINDINGS WORKSHEET

Page: of

2nd Reviewer._ Reviewer:(

Field Blanks

Reason Code: br

Were target analytes detected in the field blanks? **МЕТНОD**: Trace Metals (EPA SW846 6010В/6020/7000) Were field blanks identified in this SDG?

Y N N/A

N Associated sample units: ug/L Soil factor applied _ Sampling date: 5/21/09 Blank units: ug/L

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

3,8 Associated Samples:

7		T	Ť	T	T	T	T	T	T	T	T	$\overline{}$	Ī	Ī	Ī			\neg
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ntificati			-															
Sample Identification																		
Sa																		
										00	0.							
	ω .									0.62 / 1.00	0.8 / 10.0							
			0.50			·				0.98 / 1.00	1.7 / 10.0							
	3		0.24 / 0.50							0.98	1.7.1							
	Action Level			1160														
Blank ID	MC-3B-FILT (SDG# R0902886)	5.3	0.03	116	2.3	0.2	1.7	0.2	0.7	0.06	2.2							
Analyte		IA	qs	Ca	Mg	Mn	Mo	ν	-	3	Z							

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 SA56-0.5B SA176-0.5B RSAO3-0.5B SA182-0.5B SA182-0.5B SA182-0.5B SA201-0.5B SA166-0.5B RSAK4-0.5B
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	7.0 mg/Kg	10.5U mg/Kg
	Tin	3.8 mg/Kg	10.5U mg/Kg
RSAJ6-0.5B	Tin	4.4 mg/Kg	10.5U mg/Kg
RSAK6-0.5B	Boron	8.3 mg/Kg	10.4U mg/Kg
	Tin	4.1 mg/Kg	10.4U mg/Kg
RSAK8-0.5B	Tin	4.0 mg/Kg	10.4U mg/Kg
RSAL7-0.5B	Boron	4.5 mg/Kg	10.2U mg/Kg
	Tin	3.7 mg/Kg	10.2U mg/Kg
RSAL8-0.5B	Tin	4.3 mg/Kg	10.3U mg/Kg
SA35-0.5B	Boron	3.9 mg/Kg	10.4U mg/Kg
	Tin	3.9 mg/Kg	10.4U mg/Kg
SA55-0.5B	Boron	5.8 mg/Kg	10.3U mg/Kg
	Tin	4.0 mg/Kg	10.3U mg/Kg
SA56-0.5B	Boron	4.9 mg/Kg	10.3U mg/Kg
	Tin	3.4 mg/Kg	10.3U mg/Kg
SA176-0.5B	Tin	4.3 mg/Kg	10.4U mg/Kg
RSAO3-0.5B	Boron	5.6 mg/Kg	10.1U mg/Kg
	Tin	4.0 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	6.7 mg/Kg	10.4U mg/Kg
	Tin	4.5 mg/Kg	10.4U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAK4-0.5B	Boron	5.5 mg/Kg	10.2U mg/Kg
	Tin	4.2 mg/Kg	10.2U mg/Kg
RSAK4009-0.5B	Boron	5.3 mg/Kg	10.1U mg/Kg
	Tin	4.0 mg/Kg	10.1U mg/Kg
SA134-0.5B	Boron	8.3 mg/Kg	10.3U mg/Kg
	Tin	3.9 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 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	44.4 (75-125)	J- (all detects) UJ (all non-detects)	А
	Tungsten	50.5 (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 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)	А

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:

	Concentra	tion (ug/L)	RPD	Difference		
Analyte	RSAK4-0.5B	RSAK4009-0.5B	(Limits)	(Limits)	Flags	A or P
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)	-	-	-

	Concentration (ug/L)		RPD	Difference		
Analyte	RSAK4-0.5B	RSAK4009-0.5B	(Limits)	(Limits)	Flags	A or P
Manganese	409	383	7 (≤50)	-	-	-
Mercury	0.011	0.009	<u>-</u>	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 RSAL8-0.5B SA35-0.5B SA55-0.5B SA56-0.5B SA176-0.5B RSAO3-0.5B SA108-0.5B SA108-0.5B SA108-0.5B SA108-0.5B SA108-0.5B RSAK4-0.5B RSAK4-0.5B	Antimony Tungsten	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	А	Matrix spike analysis (%R) (m)
R0903184	SA127-0.5B RSAJ6-0.5B RSAK6-0.5B RSAK8-0.5B RSAL7-0.5B RSAL5-0.5B SA55-0.5B SA56-0.5B SA176-0.5B RSA03-0.5B SA182-0.5B SA106-0.5B SA182-0.5B SA201-0.5B SA184-0.5B RSAK4-0.5B RSAK4-0.5B	Calcium	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (Id)
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 RSAK4-0.5B	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 SA182-0.5B SA166-0.5B RSAK4-0.5B RSAK4-0.5B	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	А	bl
R0903184	RSAJ6-0.5B	Tin	10.5U mg/Kg	А	bl
R0903184	RSAK6-0.5B	Boron Tin	10.4U mg/Kg 10.4U mg/Kg	А	bl
R0903184	RSAK8-0.5B	Tin	10.4U mg/Kg	А	bl
R0903184	RSAL7-0.5B	Boron Tin	10.2U mg/Kg 10.2U mg/Kg	А	bl
R0903184	RSAL8-0.5B	Tin	10.3U mg/Kg	А	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	А	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	Α	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	А	bl
R0903184	SA182-0.5B	Tin	11.9U mg/Kg	A	þl
R0903184	SA201-0.5B	Tin	10.5U mg/Kg	А	bl
R0903184	SA166-0.5B	Boron Tin	10.4U mg/Kg 10.4U mg/Kg	А	bl
R0903184	RSAK4-0.5B	Boron Tin	10.2U mg/Kg 10.2U mg/Kg	А	bl
R0903184	RSAK4009-0.5B	Boron Tin	10.1U mg/Kg 10.1U mg/Kg	А	bl
R0903184	SA134-0.5B	Boron Tin	10.3U mg/Kg 10.3U mg/Kg	А	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

21495F4 LDC #:___ SDG #: R0903184

Stage 2B

Page: ' of ' Reviewer: C

Laboratory: Columbia Analytical Services

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: 6/5/09 - 6/11/09
11.	ICP/MS Tune	A	
! }].	Calibration	A,	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	W >
VII.	Duplicate Sample Analysis	54	00
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	\mathcal{N}	Not reviewed
X.	Furnace Atomic Absorption QC	\mathcal{N}_{-}	Nor Utilized
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	5W	((15,16)
ΧV	Field Blanks	5//	FB= FB07Z109-SU (SO61/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

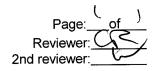
Validated Samples:

	80,1					
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



All circled elements are applicable to each sample.

		Target Analyte List (TAL)
Sample ID	Matrix	raiget Allalyte List (TAL)
1-17	50.1	Al, Sb, As, Ba, Be, B, Cd, 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: 189		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
V		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, 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 Ti, 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, Ti, Sn, Ti, W, U, V, Zn

Comments Mercury by CVAA if performed

LDC #: 21495F4_SDG #: R0903184_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:

Reason: bl

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Page: C Reviewer: C 2nd Reviewer: ___

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								Samp	Sample Identification	lon lon	28. 32. 32.			
Analyte	Maximum PB ^a	Maximum ICB/CCB ^a	Action	~	2	က	4	5	9	7	8	6	10	_
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
ప	0.07													
E E	0.8	4.0												
Mn	0.02													
Mo		09:0												
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
3		0.04												
								Samp	Sample Identification	ion				
Analyte	Maximum PB ^a (ma/Ka)	Maximum ICB/CCB ^a	Action Limit	12	13	14	15	16	17					
В	0.4	4.0				6.7 / 10.4	5.5 / 10.2	5.3 / 10.1	8.3 / 10.3					
ပ်	0.07													
e L	0.8	4.0												
Mn	0.02													
Mo		09:0												
a a	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					
M		0.04												
Sample Co	Sample Concentration units, unless otherwise noted	mits, unless	otherwise no	8.3	ma/Ka		Associat	Associated Samples:	-					
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Sample Concentration units, unless otherwise news.		Maximum ICB/CCB ^a	ي ا	$\ $
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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

Analyte	Maximum PB³ (mg/Kg)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifiers							
Ш		0.013									
Sample Cor	acentration u	Sample Concentration units, unless otherwise noted:	therwise not	ted: ma/Ka	٥	Associal	Associated Samples:	1-5, 15-17			
							Sam	Sample Identification	Ju Ju		
Analyte	Maximum PB ^a (mg/Kg)	Maximum ICB/CCB [®] (ug/l)	Action Limit	No Qualifiers							
Ва		06:0								:	
Sample Con	centration ur	Sample Concentration units, unless otherwise noted:	therwise not	ed: ma/Ka		Associat	Associated Samples:	6-14			
							Sam	191	u,		
Analyte	Maximum PB³ (mg/Kg)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifiers							
Ва		09:0									
Sample Cor	centration ur	Sample Concentration units. unless otherwise noted:	therwise not	ed: ma/Ka		Associat	Associated Samples:	15-17			
							Sam	Sample Identification	u	e de la composition della comp	
Analyte	Maximum PB ^a (mg/Kg)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifiers							
Mg		2.0									
Sr		0.20									
Sample Cor	centration u	Sample Concentration units, unless otherwise noted:	therwise not	ed: ma/Ka	p	Associat	Associated Samples:	6-8, 10-17)-17		
					•		Sam	Sample Identification	u		
Analyte	Maximum PB ^a (mg/Kg)	Maximum ICB/CCB [®] (ug/l.)	Action Limit	No Qualifiers							
Mn		0 80							•		

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

Page: 70 Reviewer: C.6 2nd Reviewer:

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2	Sample Identification					Sample Identification			6-14	Sample Identification				Sample Identification		
Associated Samples: 1-5	ample Id				Associated Samples: 1-5	ample Id				ample ld			.Se	ample Ic		
Sample	3				Sample	S			Associated Samples:	S			Associated Samples:	S		
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Ass					Ass				Ass				As			
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ma/Ka					ma/Ka				ma/Ka				ma/Ka			
ŭ		No Qualifiers			m m		No Qualifiers		Ш		No Qualifiers		ш		No Qualifiers	
noted:					noted:				noted:				noted:			
nerwise		Action Limit			herwise		Action Limit		herwise		Action Limit		herwise		Action Limit	
less of		Maximum ICB/CCB ^a (ug/l.)	0.40	0.10	nless oth		Maximum ICB/CCB ^a (ug/L)	200.0	nless of		Maximum ICB/CCB ^a (ug/L)	30.0	nless of		Maximum ICB/CCB ² (ug/l)	0:30
units, ut			0	0	units. ul				units. u			3	units. u			=
centration		Maximum PB ^a (mg/Kg)			centration		Maximum PB ^a (mg/Kg)		centration		Maximum PB ^a (mg/Kg)		centration		Maximum PB³ (mg/Kg)	
Sample Concentration units, unless otherwise noted:		Analyte	Mn	Sr	Sample Concentration units, unless otherwise noted:		Analyte	Na	Sample Concentration units, unless otherwise noted:		Analyte	Na	Sample Concentration units. unless otherwise noted:		Analyte	Mn

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

LDC #: 21495F4

SDG #: R0903184

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: 1 of 1 2nd Reviewer: Reviewer:

(PL)

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

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

Were target analytes detected in the field blanks?

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

Associated Samples: 41-13 A1 Sample Identification No Qualifiers Action Level 672 9 (SDG#: R0904016) FB072109-SO Blank ID 0.020 0.004 13.8 30.0 79.3 4.40 0.02 336 3.0 0.5 241 8.6 9.4 Analyte 퇻 Ba င္မ Еe В Mg Вa Zu ഗ് ≷ \supset ₹

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".

H Sb 172 SDG #: (RCG03184

VALIDATION FINDINGS WORKSHEET Matrix Spike Analysis

Reviewer: 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".

N/A

Was a matrix spike analyzed for each matrix in this SDG?

Were matrix spike percent recoveries (%R) within the control limits \$\infty 75-125? \rightarrow | If the sample concentration exceeded the spike concentration by a factor XXX NA

of 4 or more, no action was taken.

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

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations. LEVEL #K ONLY: ON NA X N(N/A)

Matrix Spike ID	Matrix So,'-	Analyte Sb	* T. T. T.	Associated Samples	Qualifications	
		3	So, 5			-
-						
·						

LDC #: 21495F4 SDG #: RO90518

VALIDATION FINDINGS WORKSHEET **Duplicate Analysis**

2nd Reviewer:_ 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".

Was a duplicate sample analyzed for each matrix in this SDG? XW WA

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.

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations. LEVEL IV ONLY:

-	IN INTERIOR	מוכחומופת ובפו	Wele lecalculated results acceptable:	1			
*	Duplicate ID	Matrix	Analyte	RPD (Limits)	Difference (Limits)	Associated Samples	Qualifications
<u>L</u>		So.1	රු	(025) 8.22		11 0	15/05/4 (Id)
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6	· chacker						
3	COINTING INS.						
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LDC #: 21495 円 SDG #: ROA03184

VALIDATION FINDINGS WORKSHEET ICP Serial Dilution

Reviewer:__ 2nd Reviewer:

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

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

Y N MA

SSC Qualifications Associated Samples し 12,7 <u>ک</u> ک 0.4 Ş んり : N Fre Analyte Matrk Soi Diluted Sample ID

SDIL 4S2

Comments:

LDC#: 21495F4 SDG#: See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page: of Reviewer: 2nd Reviewer:

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

XN NA YN NA Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs?

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	15	16	RPD	Difference	Limits	(Parent Only)
Aluminum	9460	8940	6			
Arsenic	1.68	1.57	10	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

Page: of Reviewer: 2nd Reviewer:

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

YN NA YN NA

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

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	15	16	RPD	Difference	Limits	(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		L.	
Vanadium	42.8	38.8	10			
Zinc	33.6	30.3	10			

V:\FIELD DUPLICATES\FD_inorganic\21495F4.wpd

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	4.5 mg/Kg	10.7U mg/Kg
	Molybdenum	0.30 mg/Kg	0.32U mg/Kg
	Tin	4.6 mg/Kg	10.7U mg/Kg
SA198-0.5B	Boron	3.4 mg/Kg	10.3U mg/Kg
	Antimony	0.6 mg/Kg	2.1U mg/Kg
	Tin	6.5 mg/Kg	10.3U mg/Kg
SA64-0.5B	Boron	5.9 mg/Kg	10.7U mg/Kg
	Tin	4.7 mg/Kg	10.7U mg/Kg
SA104-0.5B	Antimony	0.7 mg/Kg	2.0U mg/Kg
	Tin	4.6 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	6.6 mg/Kg	10.1U mg/Kg
	Tin	4.5 mg/Kg	10.1U mg/Kg
RSAN5-0.5B	Boron	7.3 mg/Kg	10.3U mg/Kg
	Tin	4.2 mg/Kg	10.3U mg/Kg
SA53-0.5B	Boron	3.6 mg/Kg	8.6U mg/Kg
	Tin	3.5 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	9.5 mg/Kg	10.7U mg/Kg
	Tin	4.5 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	1.1 mg/Kg	4.1U mg/Kg
	Tin	4.2 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	Antimony	43.1 (75-125)	J- (all detects)	A
(SA197-0.5B			UJ (all non-detects)	
SA198-0.5B	Tungsten	50.4 (75-125)	J- (all detects)	
SA64-0.5B	1		UJ (all non-detects)	1
SA104-0.5B	ŀ			
SA129-0.5B				i
SA70-0.5B				
SA60-0.5B	i			
SA150-0.5B				
RSAN5-0.5B			1	
SA53-0.5B				1
SA43009-0.5B				
SA40-0.5B				
SA200-0.5B				
RSAO6-0.5B				
SA51-0.5B				
SA43-0.5B)				
,				

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 SA43009-0.5B SA40-0.5B SA200-0.5B SA200-0.5B SA51-0.5B SA51-0.5B SA51-0.5B	Calcium	27.0 (≤20)	-	J (all detects) UJ (all non-detects)	Α

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 SA53-0.5B SA43009-0.5B SA43009-0.5B SA43009-0.5B SA40-0.5B SA200-0.5B SA200-0.5B SA51-0.5B SA51-0.5B	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)	Α

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:

	Concentrat	Concentration (mg/Kg)				
Analyte	SA201-28B	SA201009-28B	RPD (Limits)	Difference (Limits)	Flags	A or P
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)	-	<u>.</u>
Molybdenum	0.50	0.44	-	0.06 (≤0.32)	-	-
Nickel	8.39	8.95	0 (≤50)	-	<u>-</u>	-
Potassium	2040	2250	10 (≤50)	-	-	-
Silver	2.7	2.8	4 (≤50)	-		-
Sodium	1310	1370	4 (≤50)	-	-	-

	Concentration (mg/Kg)						
Analyte	SA201-28B	SA201009-28B	RPD (Limits)	Difference (Limits)	Flags	A or P	
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)	-	-	-	

	Concentrat	ion (mg/Kg)				
Analyte	SA43009-0.5B	SA43-0.5B	RPD (Limits)	Difference (Limits)	Flags	A or P
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)	•	-

	Concentration (mg/Kg)					
Analyte	SA43009-0.5B	SA43-0.5B	RPD (Limits)	Difference (Limits)	Flags	A or P
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)	-	<u>-</u>	-
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)	А
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 SA60-0.5B SA60-0.5B SA150-0.5B SA53-0.5B SA43009-0.5B SA43009-0.5B SA200-0.5B SA200-0.5B SA53-0.5B SA200-0.5B	Antimony Tungsten	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	А	Matrix spike analysis (%R) (m)
R0903443	SA197-0.5B SA198-0.5B SA64-0.5B SA104-0.5B SA109-0.5B SA60-0.5B SA60-0.5B SA150-0.5B SA53-0.5B SA43009-0.5B SA43009-0.5B SA200-0.5B SA200-0.5B SA51-0.5B SA51-0.5B	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 SA50-0.5B SA150-0.5B SA450-0.5B SA43009-0.5B SA43009-0.5B SA43009-0.5B SA40-0.5B SA200-0.5B SA4300-0.5B	Chromium Nickel Sodium Zinc	J (all detects) UJ (all non-detects)	Α	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 SA53-0.5B SA201-10B SA201-28B SA201-28B SA201009-28B SA43009-0.5B SA40-0.5B SA200-0.5B SA200-0.5B SA51-0.5B SA51-0.5B SA51-0.5B	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)	Α	Field duplicates (Difference) (fd)
R0903443	SA43009-0.5B SA43-0.5B	Tungsten	J (all detects)	Α	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	А	bl
R0903443	SA198-0.5B	Boron Antimony Tin	10.3U mg/Kg 2.1U mg/Kg 10.3U mg/Kg	А	bl
R0903443	SA64-0.5B	Boron Tin	10.7U mg/Kg 10.7U mg/Kg	А	bl
R0903443	SA104-0.5B	Antimony Tin	2.0U mg/Kg 10.1U mg/Kg	А	bl
R0903443	SA129-0.5B	Antimony	2.1U mg/Kg	А	bl
R0903443	SA70-0.5B	Tin	10.5U mg/Kg	Α	bl

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

_DC #:	21495G4	VALIDATION COMPLETENESS WORKSHEET
SDG #:	R0903443	Stage 2B

	Date:	9-18-09	Ì
	Page:	of\	
	Reviewer:	CC	
2nd	Reviewer:	1	

Laboratory: Columbia Analytical Services

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
1.	Technical holding times	A	Sampling dates: 6 19 07 - 6/24/09
II.	ICP/MS Tune	A	
111.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	SW	DIÓ
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	\mathcal{N}	Not reviewed
X.	Furnace Atomic Absorption QC	\mathcal{N}	Not reviewed Notutilized
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	K	
XIV.	Field Duplicates	SW	(12,13), (14,19)
χV	Field Blanks	SW	Filter Blande FB072109-SO (SOGW ROGO)

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:

	32311						
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 -	30		40	

Notes:		
	 <u> </u>	· · · · · · · · · · · · · · · · · · ·

LDC #: <u>21295G4</u> SDG #: <u>R0903443</u>

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: __of __ Reviewer: ____ 2nd reviewer: _____

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-19	50:1	Al, Sb, As, Ba, Be, B, Cd, 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: 72B	U	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg) Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
,		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
	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
	Ш	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
	il.	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
	1	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sh, As, Ba, Be, B, Cd, 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	5	Al, Sb) As, Ba, Be, B, Cd, 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 Ph, K, Se, Ag, Na, Sr, Th, Sn, Ti, W, U, V, Zn
GFAA	ll l	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Commente: Mercury by CVAA if performed

LDC #: 21495G4 SDG #: R0903443

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:

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Reviewer. 2nd Reviewer:

Page:

								Sam	Sample Identification	fion				
Analyte	Maximum PB ^a (mg/Kg)	Maximum ICB/CCB ^a (ug/l)	Action Limit	1	2	ю	4	5	9	7	ω	o	10	
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						
ప	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	8.0													
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
Ē	0.016													
								Sam	Sample Identification	lon				ci.
Analyte	Maximum PB ^a (mg/Kg)	Maximum ICB/CCB ^a (ug/L)	Action Limit	12	13	14	15	16	17	18	19			
В		8.0				9.5 / 10.7					8.7 / 10.6			
Sb		3.0												
ن	0.10													
Fe	1.1													
Mn	0.04					-								
Mg	0.8	4.0												
Mo	0.50													
Sr	0.04													
Na	19													
Se	0.8			1.1000					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			
Ħ	0.016													

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(Reason: b)

Page: of Reviewer: CAS Sample Identification Sample Identification Sample Identification Sample Identification Sample Identification Sample Identification 14, 18, 19 12-19 2-11 12-19 1-12 VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES Soil preparation factor applied: 100x Associated Samples: Associated Samples: Associated Samples: Associated Samples: Associated Samples: Associated Samples: ma/Ka ma/Ka ma/Ka ma/Ka LDC #: 21495G4 SDG #: R0903443 METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000) ma/Ka No Qualifiers No Qualifiers No Qualifiers No Qualifiers No Qualifiers No Qualifiers Sample Concentration units, unless otherwise noted: Sample Concentration units, unless otherwise noted: Sample Concentration units, unless otherwise noted: Sample Concentration units, unless otherwise noted: Sample Concentration units, unless otherwise noted: Sample Concentration units, unless otherwise noted: Action Limit Action Limit Action Limit Action Limit Action Limit Action Limit Maximum ICB/CCB^a (ug/L) Maximum ICB/CCB^a (ug/L) Maximum ICB/CCB^a (ug/l) Maximum ICB/CCB^a (ug/l.) Maximum ICB/CCB^a (ug/L) Maximum ICB/CCB^a (ug/L) 100.0 70.0 0.50 50.0 0.007 0.50 Maximum PB^a (mg/Kg) Maximum PB^a Maximum PB^a Maximum PB³ (mg/Kg) Maximum PB^a Maximum PB^a (mg/Kg) mg/Kg) (mg/Kg) mg/Kg) Analyte Analyte Analyte Analyte Analyte Analyte

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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

Recoon bl

Sample Con	centration ur	Sample Concentration units, unless otherwise noted:	therwise not		ma/Ka	Associ	Associated Samples: 7-12 Sample Identi	oles: 7-12 Sample Identification	ation			
Analyte	Maximum PB ^a (mq/Kq)	Maximum ICB/CCB ^a (uq/L)	Action Limit	No Qualifiers						-		
W		0.032										
Sample Con	centration ur	Sample Concentration units, unless otherwise noted:	therwise not		ma/Ka	Associr	Associated Samples: 13-19	oles: 13-19 Sample Identification	with.			
Analyte	Maximum PB³ (ma/Ka)	Maximum ICB/CCB ^a (ua/l.)	Action Limit	No Qualifiers								
W		0.022										

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

LDC #: 21495G4

SDG #: R0903443

VALIDATION FINDINGS WORKSHEET

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

Field Blanks

Were target analytes detected in the field blanks?

Were field blanks identified in this SDG?

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

Associated sample units: mg/Kg

Sampling date: 7/21/09

Blank units: ug/L

Y N N/A

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11-13

Associated Samples: Sample Identification Sampling date: 7/21/09 Soil factor applied 100x x 2xdil = 200x Field blank type: (circle one) Field Blank Rinsate / Other Filter Blank C No Qualifiers Action Level 672 9 FB072109-SO (SDG#: R0904016) Blank ID 0.004 13.8 0.020 30.0 79.3 4.40 0.02 8.6 336 3.0 9.4 0.5 241 Analyte င္မ Mg Zu Ва Fe Ъ 둘 Š ഗ് ≥ \supset ₹ \checkmark

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 #: 1000 HGS GY

VALIDATION FINDINGS WORKSHEET Matrix Spike Analysis

Reviewer: 2nd Reviewer:

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

NA.	
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identifie	
are	
ole questions are identified as "N/A".	
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<u>-</u>	
ns answered "N". Not applicable	146
or all questions	A. L
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below	1
se see qualifications below fo	1. A C
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Was a matrix spike analyzed for each matrix in this SDG?
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.

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

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations. LEVEL IN ONLY:

*	Matrix Spike ID	Matrix	Analyte		Associated Samples	Qualifications	
	20	150,1	35	1.54	1-10,14-19-1-16-1-	1 T-10514 (m)	
			3	V	プ J フラ		
				,			
				-			
	**						
1							
1							
Comr	comments: 20 Not from Arga	Som 6	10g 7				_

SDG #: (2000)

VALIDATION FINDINGS WORKSHEET **Duplicate Analysis**

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".

VN. N/A

Was a duplicate sample analyzed for each matrix in this SDG?

Y (AT) 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-IK ONLY:
Y N (N/A) We

14	I IN (IN/A) WE'E TECH	alculated res	uns acceptabl	er see Level IV Recalcul	Were recalculated results acceptable? See Level IV Hecalculation Worksheet for recalculations.	tions.	
*	# Duplicate ID	Matrix	Analyte	RPD (Umits)	Difference (Limits)	Associated Samples	Qualffications
	172	50.7	(a	(025) 0'LZ		-014-9-H-1202-1	1
Ö	Comments: NOT K	of them and	31-60				
				:			

VALIDATION FINDINGS WORKSHEET ICP Serial Dilution

Reviewer: 2nd Reviewer:

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

\succ	N NA Were recall	Weig Idealculated Ideals, mostymuse	وانسست			
		-	Amebito	2%	Associated Samples	
*	Diluted Sample ID	Gally 1		7	61-h1 01-1 ++ C	(BS) A 120 1
		9	7			
			\ \ \	10,5		
<u></u>			Na	13,6		
<u>_</u>			20	14.2		
1						
_						
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J	Comments:	Kow	900	7		

LDC#: 21495G4 SDG#: See Cover

VALIDATION FINDINGS WORKSHEET <u>Field Duplicates</u>

Page:	_o/
Reviewer:	CR
2nd Reviewer:_	√

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

 $\begin{pmatrix} Y N NA \\ Y N NA \end{pmatrix}$

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

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	12	13	RPD	Difference	Limits	(Parent Only)
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 <u>Field Duplicates</u>

Page: of Reviewer: 2nd Reviewer:

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

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

	Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	12	13	RPD	Difference	Limits	(Parent Only)
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	DUDI ICATES		

V:\FIELD DUPLICATES\FD_inorganic\21495G4.wpd

LDC#: <u>21495G4</u> SDG#: <u>See Cover</u>

VALIDATION FINDINGS WORKSHEET <u>Field Duplicates</u>

Page:___of___ Reviewer:_____ 2nd Reviewer:_____

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

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

Compound	Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
	14	19	RPD	Difference	Limits	(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#: <u>21495G4</u> SDG#: See Cover

VALIDATION FINDINGS WORKSHEET Field <u>Duplicates</u>

Page: of 7
Reviewer: CR
2nd Reviewer:

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

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

Compound	Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
	14	19	RPD	Difference	Limits	(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			

V:\FIELD DUPLICATES\FD_inorganic\21495G4a.wpd

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

RSA05-0.5B

SA152-10B

SA152-20B

OA 102-20D

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 RSA05-0.5B 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	6.2 mg/Kg	10.5U mg/Kg
	Molybdenum	0.25 mg/Kg	0.32U mg/Kg
	Tin	4.3 mg/Kg	10.5U mg/Kg
SA45009-0.5B	Boron	5.6 mg/Kg	10.2U mg/Kg
	Tin	3.8 mg/Kg	10.2U mg/Kg
SA187-0.5B	Tin	4.0 mg/Kg	10.2U mg/Kg
SA153-0.5B	Boron	8.9 mg/Kg	10.4U mg/Kg
	Tin	3.7 mg/Kg	10.4U mg/Kg
SA186-0.5B	Boron	9.7 mg/Kg	10.3U mg/Kg
	Tin	4.1 mg/Kg	10.3U mg/Kg
SA185-0.5B	Boron	5.6 mg/Kg	10.5U mg/Kg
	Tin	3.9 mg/Kg	10.5U mg/Kg
RSAO5-0.5B	Boron	10.2 mg/Kg	10.3U mg/Kg
	Tin	4.0 mg/Kg	10.3U mg/Kg
SA152-10B	Boron	6.4 mg/Kg	10.7U mg/Kg
	Tin	3.9 mg/Kg	10.7U mg/Kg
SA152-20B	Boron	6.8 mg/Kg	10.4U mg/Kg
	Tin	3.8 mg/Kg	10.4U mg/Kg
SA152-34B	Tin	4.6 mg/Kg	12.3U mg/Kg
SA50-0.5B	Boron	9.7 mg/Kg	10.2U mg/Kg
	Tin	5.3 mg/Kg	10.2U mg/Kg
SA54-0.5B	Boron	5.7 mg/Kg	9.9U mg/Kg
	Tin	3.9 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	8.7 mg/Kg	10.5U mg/Kg
	Molybdenum	0.32 mg/Kg	0.32U mg/Kg
	Tin	3.8 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 SA106-0.5B 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 SA45009-0.5B SA187-0.5B SA153-0.5B SA186-0.5B	Potassium Uranium	23.0 (≤20) 21.2 (≤20)	-	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	А
SA185-0.5B RSAO5-0.5B SA50-0.5B SA54-0.5B SA106-0.5B SA102-0.5B SA109-0.5B)					

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	29 (≤10) 11.1 (≤10)	SA45-0.5B SA45009-0.5B SA187-0.5B SA153-0.5B SA186-0.5B SA185-0.5B RSA05-0.5B SA50-0.5B SA54-0.5B SA106-0.5B SA106-0.5B 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)	А

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:

	Concentrati	ion (ug/Kg)	555	D.W		
Analyte	SA45-0.5B	SA45009-0.5B	RPD (Limits)	Difference (Limits)	Flags	A or P
Aluminum	9190	7660	18 (≤50)	-	-	-
Arsenic	2.15	221	-	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)	-	-

	Concentration (ug/Kg)					
Analyte	SA45-0.5B	SA45009-0.5B	RPD (Limits)	Difference (Limits)	Flags	A or P
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)	А
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)	-	-	-

	Concentration (ug/Kg)					
Analyte	SA45-0.5B	SA45009-0.5B	RPD (Limits)	Difference (Limits)	Flags	A or P
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 SA50-0.5B SA54-0.5B SA106-0.5B 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 SA106-0.5B SA102-0.5B	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 SA186-0.5B RSAO5-0.5B SA50-0.5B SA54-0.5B SA106-0.5B 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 RSA05-0.5B SA152-10B SA152-20B SA152-34B SA50-0.5B SA54-0.5B SA106-0.5B SA109-0.5B	All analytes reported below the PQL.	J (all detects)	Α	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)	Α	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	А	bl
R0903615	SA45009-0.5B	Boron Tin	10.2U mg/Kg 10.2U mg/Kg	А	bl
R0903615	SA187-0.5B	Tin	10.2U mg/Kg	А	bl
R0903615	SA153-0.5B	Boron Tin	10.4U mg/Kg 10.4U mg/Kg	А	bl
R0903615	SA186-0.5B	Boron Tin	10.3U mg/Kg 10.3U mg/Kg	А	bl
R0903615	SA185-0.5B	Boron Tin	10.5U mg/Kg 10.5U mg/Kg	А	bl
R0903615	RSAO5-0.5B	Boron Tin	10.3U mg/Kg 10.3U mg/Kg	А	bl
R0903615	SA152-10B	Boron Tin	10.7U mg/Kg 10.7U mg/Kg	А	bl
R0903615	SA152-20B	Boron Tin	10.4U mg/Kg 10.4U mg/Kg	А	bl
R0903615	SA152-34B	Tin	12.3U mg/Kg	А	bl
R0903615	SA50-0.5B	Boron Tin	10.2U mg/Kg 10.2U mg/Kg	А	bl
R0903615	SA54-0.5B	Boron Tin	9.9U mg/Kg 9.9U mg/Kg	А	bl
R0903615	SA106-0.5B	Tin	11.6U mg/Kg	А	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	А	bi

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

LDC #:	21495H4	VALIDATION COMPLETENESS WORKSHEET
 SDG #:	R0903615	Stage 2B
Laborator	ar Columbia Analytica	al Sorvices

Date: 9-160
Page: 1_of 1
Reviewer: C2
2nd Reviewer:

Laboratory: Columbia Analytical Services

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
1.	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	DQ .
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed Not Utilized
X.	Furnace Atomic Absorption QC	\mathcal{N}	NOTUTITED
XI.	ICP Serial Dilution	SW	,
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(1,7)
ΧV	Field Blanks	Sw	FilterBlan FB = FB07Z109-SO CSDSW REGIONOLO

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

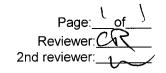
Validated Samples:

	<u> </u>					
1	SA45-0.5B	11	SA50-0.5B	21 PV	<u>881</u> 31	
2	SA452009-0.5B	12	SA54-0.5B	22	32	
3	SA187-0.5	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



All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-15	8:4	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zp
OC:1617	4	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
, J.		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
	-	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
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		Al, Sb, As, Ba, Be, B, Cd, 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, Sp, 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, (Ti) 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

SDG #: See Cover LDC #: 21495H4

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

Reason Code: bi

F

Associated Samples:

2nd Reviewer:

8.7 / 10.5 0.32 / 0.32 3.8 / 10.5 15 3.8 / 10.4 4 4.2 */* 11.6 5 3.9 / 9.9 5.7 / 9.9 7 5.3 / 10.2 9.7 / 10.2 7 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 9 6.4 / 10.7 6.8 / 10.4 δ ω 10.2 / 10.3 Sample Identification 8.9 / 10.4 | 9.7 / 10.3 | 5.6 / 10.5 | 9 S, 4 3.8 / 10.2 5.6 / 10.2 α 0.25 / 0.32 6.2 / 10.5 4.3 / 10.5 Action Limit Maximum ICB/CCB^a 0.059 0.009 (nd/L) 10.0 (mg/Kg) Maximum 0.003 0.019 1.30 PB 0.09 3.5 0.4 0.3 0.8 Analyte Mg ğ S Be æ ರ ≥ ₹ В

S: 2-8 Sample Identification		
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a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element. Note:

LDC #: 21495H4

SDG #: R0903615

VALIDATION FINDINGS WORKSHEET

Field Blanks

2nd Reviewer:__ Reviewer:_

Page: 1 of 1

Were target analytes detected in the field blanks?

Were field blanks identified in this SDG?

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

Associated sample units: mg/Kg

Sampling date: 7/21/09

Blank units: ug/L

Reason: H

8-10 Associated Samples: Sample Identification Sampling date: 7/21/09 Soil factor applied 100x x 2xdil = 200x Field blank type: (circle one) Feld Blank / Rinsate / Other Fitter Blank No Qualifiers Action Level 672 8 FB072109-SO (SDG#: R0904016) Blank ID 0.004 0.020 30.0 79.3 4.40 13.8 0.02 336 0.5 3.0 241 8.6 9.4 Analyte Σ Ra ₽ Zu Ва Sa Fe В જ ≥ ₹ ¥ \supset

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 # 209036 # SDG

VALIDATION FINDINGS WORKSHEET Matrix Spike Analysis

2nd Reviewer:_ Reviewer: Page:

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

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Was a matrix spike analyzed for each matrix in this SDG?
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. Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

LEVEL IN ONLY:

100 #: 21468HF 100 #: 35090361

VALIDATION FINDINGS WORKSHEET Duplicate Analysis

Page: of Reviewer:

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

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d "N". Not applicable questions are identified	
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N/A Was a duplicate sample analyzed for each matrix in this SDG?

Were all duplicate sample relative percent differences (RPD) < 20% for water samples and < 35% for sell 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-HONLY:

- [and accepture.				
*	Duplicate ID	Matrix	Analyte	RPD (Umits)	Difference (Umits)	Associated Samples	Qualifications
	17	 VS	1	23,6		17/11-15 PAT 1-2ª	15/UT/A (19)
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LDC #: 21495HY SDG #: 809036E

VALIDATION FINDINGS WORKSHEET ICP Serial Dilution

Page: Reviewer: 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". (A) N/A If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?

Were ICP serial dilution percent differences (%D) ≤10%? Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

Y N N/A IS THE STATE OF THE STA

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

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-	Olistad Sample ID	Matrix	Analyte	0%	- 11	ualifications
╬	Vinted Sample	1.89	と と	67	1-7,1-15 A++ -1,7CF	T/U7/4 (SQ)
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LDC#: 21495H4 SDG#: See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page: <u>(</u> Reviewer:	
2nd Reviewer:_	

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

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

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	1	2	RPD	Difference	Limits	(Parent Only)
Aluminum	9190	7660	18			
Arsenic	2.15	221		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

1	7
Page:	_of
Reviewer:_	C6 </td
2nd Reviewer:	

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

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

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	1	2	RPD	Difference	Limits	(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

SA114009-0.5BDUP

RSAN6-0.5BMS RSAN6-0.5BDUP

RSAN6-0.5B

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

0702-100

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

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 SA88-20B SA88-32B RSAK3-0.5B RSAK3-10B 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 SA134-09-31B 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 SA88-10B SA88-20B RSAK3-0.5B RSAK3-0.5B RSAK3-10B RSAK3-10B RSAK3-10B
ICB/CCB	Strontium	0.5 ug/L	SA82-0.5B SA82-10B SA82-29B RSAL3-10B RSAL3-30B SA134-10B SA134-20B SA134-31B SA134-099-31B 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	2.3 ug/L 14.4 ug/L 9.8 ug/L	50.0U ug/L 50.0U ug/L 20.0U ug/L
	Manganese	0.3 ug/L	5.0U ug/L
	Sodium	228 ug/L	300U ug/L
	Strontium	0.1 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	9.1 mg/Kg	9.8U mg/Kg
	Tin	4.0 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	7.0 mg/Kg	10.8U mg/Kg
	Molybdenum	0.26 mg/Kg	0.32U mg/Kg
	Tin	5.6 mg/Kg	10.8U mg/Kg
RSAK3-20B	Tin	7.4 mg/Kg	13.2U mg/Kg
RSAK3-31B	Tin	9.1 mg/Kg	17.1U mg/Kg
	Tungsten	0.28 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 SA134-09-31B SA88-10B SA88-20B SA88-20B SA88-32B RSAK3-0.5B RSAK3-10B RSAK3-10B RSAK3-20B

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)	А

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)	А

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)	А

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:

	Concentrat	ion (mg/Kg)				
Analyte	SA114-0.5B	SA114009-0.5B	RPD (Limits)	Difference (Limits)	Flags	A or P
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)	-	-	-

	Concentrat	Concentration (mg/Kg)				
Analyte	SA114-0.5B	SA114009-0.5B	RPD (Limits)	Difference (Limits)	Flags	A or P
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)	•	<u>-</u>
Titanium	396	369	7 (≤50)	-	_	-
Tungsten	2.820	3.250	14 (≤50)	-		-

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

	Concentration (ug/L)					
Analyte	SA134-31B	SA134009-31B	RPD (Limits)	Difference (Limits)	Flags	A or P
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)	-	•

	Concentra	Concentration (ug/L)		Difference		
Analyte	SA134-31B	SA134009-31B	RPD (Limits)	(Limits)	Flags	A or P
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 SA114-0.5B SA82-0.5B SA82-10B SA82-29B RSAL3-10B RSAL3-30B SA134-10B SA134-20B SA134-21B SA134-20B SA134-31B SA88-10B SA88-20B SA88-32B RSAK3-0.5B RSAK3-10B RSAK3-10B RSAK3-10B RSAK3-10B RSAK3-10B	All analytes reported below the PQL.	J (all detects)	Α	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	А	ы
R0903678	SA114-0.5B	Tin Cadmium	10.8U mg/Kg 0.11U mg/Kg	А	bl
R0903678	SA114009-0.5B	Tin	10.6U mg/Kg	A	bl
R0903678	RSAN6-0.5B	Tin	9.9U mg/Kg	А	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	А	bl
R0903678	SA82-29B	Tin	17.0U mg/Kg	А	bl
R0903678	RSAL3-10B	Tin	10.8U mg/Kg	А	bl
R0903678	RSAL3-30B	Tin	15.1U mg/Kg	Α	bl
R0903678	SA134-10B	Tin	10.9U mg/Kg	А	bl
R0903678	SA134-20B	Tin	10.2U mg/Kg	А	bl
R0903678	SA134-31B	Tin	14.6U mg/Kg	А	bl
R0903678	SA134009-31B	Tin	15.3U mg/Kg	А	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	А	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	А	bl
R0903678	RSAK3-31B	Tin Tungsten	17.1U mg/Kg 0.35U mg/Kg	А	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	А	bf
R0903678	RSAL3-30B	Tungsten	0.31U mg/Kg	А	bf
R0903678	RSAK3-31B	Tungsten	0.35U mg/Kg	Α	bf

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 2149514 Stage 2B SDG #: R0903678 Laboratory: Columbia Analytical Services

Date:	rcco
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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
l.	Technical holding times	A	Sampling dates: 7/1/09 - 7/2/09
11.	ICP/MS Tune	A	,
111.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW.	$M \supset M \supset M$
VII.	Duplicate Sample Analysis	A	QP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N.	Not reviewed Not utilized
X.	Furnace Atomic Absorption QC	\sim	Notutilized
XI.	ICP Serial Dilution	SW	,
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	X	
XIV.	Field Duplicates	Sh	(2,3),(11,12)
ΧV	Field Blanks	SW	FB=FB072109-SO (506* ROPOHO16) EB=1 (no 45)

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: 7350,

	TWATCH COLO	• -					
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:		

પુ**૧**5 લ્લ્ડ LDC #: <u>2125814</u> SDG #: <u>K0903678</u>

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

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All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-19,24	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, Zp
90:20,21	50.1	(Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Q: 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	50:\\x .	Al, Sb, As, Ba, Be, B, Cd, 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	1	Al Sb(As, Ba, Be, B, Cd, Ca, Cr) Co, Cu, Fe, Pb Mg, Mo, Mn, Hg, Ni, Pt) K, Se, Ag, Na, Sr, Ti) 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 #: 2149514_ 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

All Water Soil preparation factor applied: Associated Samples:

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							Sample Identification	ification			
Analyte	Maximum PB³ (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	-						
ΙĄ	·	2.9	4.9		2.3 / 50.0					The state of the s	
Ba			2.7								
В			16.9		14.4 / 50.0	79 (1997)					
Fe		3.8	5.8								
Mg		3.8	10.0		9.8 / 20.0						
Min		0.2	9.0		0.3 / 2.0						
Mo			9.0								
Na			187		228 / 300						

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

0.01

0.1

0.1 / 10.0

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 So

All Soil

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Sid in Sid					Bandin			Completed the control of the control	and Montification	STATE OF THE STATE			
Analyte	Maximum PB ^a (mg/Kg)	Maximum ICB/CCB ^a (ug/L)	Action	2	ю	24	4	5	2 9	8	o.	10	11
Ā		5.0											
В	2.4	20.0					9.1 / 9.8						
Fe	1.2												
Mo	09:0									and the second			
Mg	9.0												
Mn	0.02												
Na	24												
Sr	0.02									Approx.			
Sn	3.8			4.4 / 10.8	4.0 / 10.6	4.4 / 9.9	4.0 / 9.8 4.4	4.4 / 10.3 7.5	7.5/17.0 4.7/	4.7 / 10.8 6.2 / 15.1	.1 4.4 / 10.9	4.2 / 10.2	6.0 / 14.6
										Sample Id	Sample Identification		
Analyte	Maximum PB ^a (mg/Kg)	Maximum ICB/CCB ^a (ug/L)	Action Limit	12	13	14	15	16	17	18	19		
¥		5.0											
В	2.4	20.0			10.3 / 10.5			9.5 / 10.8	7.0 / 10.8				
Fe	1.2												
Mo	09:0								0.26 / 0.32				
Mg	9.0												
Mn	0.02												
Na	24												
Sr	0.02												
Sn	ю Ю			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

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Sample Co	Sample Concentration units, unless otherwise noted:	nits, unless c	otherwise no	noțed: ma/Ka Associated Samples: 4-19	
				Sample Identification	
Analyte	Maximum PB ^a (mg/Kg)	Maximum ICB/CCB* (ug/L)	Action Limit	n No Qualifiers	
Ва		4.00			
Ca		10.0			
Sample Co	Sample Concentration units, unless otherwise noted:	nits, unless o	otherwise no	noted: ma/Ka Associated Samples; 2, 3, 24	
				Sample Identification	
Analyte	Maximum PB³ (mg/Kg)	Maximum ICB/CCB ^a (ug/L)	Action Limit	n 2	
Ва		3.00			
<u>B</u>		0.20		0.07 / 0.11	
Na		200.0			
Sr		0.40			
Sample Cor	ncentration ur	nits, unless o	therwise not	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	Qualifiers	
Fe		7.0			
Mn		0.70			
Sr		09:0			
Sample Cor	Sample Concentration units, unless otherwise noted:	<u>nits, unless o</u>	therwise no	noted: mg/Kg Associated Samples: 2-13.24	
				Sample Identification	
Analyte	Maximum PB" (mg/Kg)	Maximum ICB/CCB ^a (ug/L)	Action Limit	Qualifiers	
e E		6.0			
Mn		09:0			

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

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

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Sample Identification Sample Identification Sample Identification Sample Identification Sample Identification 10, 13, 14, 16, 17 2.24.4.5.7.9 4-19, 24 4-13 Associated Samples: Associated Samples: Associated Samples: Associated Samples: Associated Samples: y M. Sient 35/95 P No Que Sample Concentration units, unless otherwise noted: ma/Ka \$ 14.0° Sample Concentration units, unless otherwise noted: ma/Ka No Qualifiers No Qualifiers Sample Concentration units, unless otherwise noted: ma/Ka Sample Concentration units, unless otherwise noted: ma/Ka No Qualifiers Sample Concentration units, unless otherwise noted: ma/Ka No Qualifiers Action Limit Action Limit Action Limit Action Limit Action Limit Maximum ICB/CCB^a (ug/L) Maximum ICB/CCB^a (ug/L) Maximum ICB/CCB^a (ug/L) Maximum ICB/CCB^a (ug/L) Maximum ICB/CCB^a (ug/L) 0.009 0.014 0.054 0.027 10.0 0.5 Maximum PB^a (mg/Kg) Maximum PB^a (mg/Kg) Maximum PB³ (mg/Kg) Maximum PB^a (mg/Kg) Maximum PB^a (mg/Kg) Analyte Analyte Analyte Analyte Analyte Be ₽ Be ≥ ≥ ര്

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

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

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SS		Maximum ICB/CCB ^a (ug/L)		_	
a		<u>F</u> SS	0.011	0.053	
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pits		<u> </u>	Ш		
Sample Concentration units, unless otherwise noted: ma/Ka		Maximum M PB ^a IC (mg/Kg)			
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M		0.053								***************************************	
Sample Con	centration u	Sample Concentration units, unless otherwise noted: mg/Kg	therwise not	ted: ma/Ka	Associ	Associated Samples: 11, 12, 15, 19	ss: 11. 12.	15. 19			
							Sam	Sample Identification	fion		
Analyte	Maximum PB ^a (mg/Kg)	Maximum ICB/CCB ^a (ug/L)	Action Limit	19							
M		0.023		0.28 / 0.35							

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

SDG #: R0903678 LDC #: 2149514

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page:_ Reviewer._ 2nd Reviewer:

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

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

Were target analytes detected in the field blanks?

Associated sample units: mg/Kg Soil factor applied _ Sampling date: 7/1/09 Blank units: ug/L

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

Reason code: be

No Associated Samples from Area 1-

Associated Samples:

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	Action Level																
ے اا	1	2.3	14.4	24.2	0.7	9.8	0.3	228	0.1								
Analyte Blank II		A	В	Ca	ర	Mg	Mn	Na	Sr								

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 #: 2149514

SDG #: R0903678

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: 1 of

2nd Reviewer: Reviewer:_

Reason Code: bf

Were field blanks identified in this SDG? **METHOD:** Trace Metals (EPA SW846 6010B/7000)

Were target analytes detected in the field blanks?

Sampling date: 7/21/09 Blank units: ug/L Y N N/A

Sampling date: 7/21/09 Soil factor applied 100x x 2xdil = 200x Field blank type: (circle one) Field Blank / Rinsate / Other Filter Blank

Associated sample units: mg/Kg

4-19

Associated Samples:

Sample Identification 0.28 / 0.35 9 0.26 / 0.31 ω 0.27 / 0.34 Action Level 672 9 FB072109-SO (SDG#: R0904016) Blank ID 0.004 0.020 336 13.8 30.0 79.3 4.40 0.02 0.5 3.0 8.6 9.4 241 Analyte Mg M Ba ပ္ပ Fe Р Š ≷ Zu Š ⊃ ₹ ¥

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".

VALIDATION FINDINGS WORKSHEET Matrix Spike Analysis

Reviewer: 2nd Reviewer:_

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

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

N/A

Was a matrix spike analyzed for each matrix in this SDG?

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.

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

LEVEL IX ONLY:

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

	Matrix Analyte %R Associated Samples																								
--	--------------------------------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

SDG #: 21495IY

VALIDATION FINDINGS WORKSHEET ICP Serial Dilution

Page: 2nd Reviewer:

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

N N/A

If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?

Y N N/A

Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

Y N N/A

Were recalculated results acceptable? See Fevel 10 December 21.

# Dilute	d Sample ID	Matrk	Analyte	%D	Associated Samples	Qualifications
22	23	55.1	たり	ا ا ا	7.3.24	LIUTIA CSA
			Y)	الک کا		
			.' <i>N</i>	10.7		
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Comments:		Not from gross	7 6			
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LDC#: 21495I4 SDG#: See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

2nd Reviewer:

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

XN NA Y)N NA

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

	Concentrati	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	2	3	RPD	Difference	Limits	(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

2nd Reviewer

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

<u>X N NA</u> Y)N NA

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

	Concentrati	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	2	3	RPD	Difference	Limits	(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			And the second s

V:\FIELD DUPLICATES\FD_inorganic\21495I4.wpd

LDC#:21495I4____SDG#: See Cover

VALIDATION FINDINGS WORKSHEET <u>Field Duplicates</u>

Page: of Reviewer: 2nd Reviewer:

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

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

	Concentration	on (mg/Kg)	(≤20)	(mg/Kg)	(mg/Kg) Limits	Qualifications
Compound	11	12	SO RPD	Difference	Limits	(Parent Only)
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

2nd Reviewer:

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

<u>AN NA</u>

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

	Concentration	on (mg/Kg)	(≤36)	(mg/Kg)	(mg/Kg) Limits	Qualifications
Compound	11	12	RPD	Difference	Limits	(Parent Only)
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-12AB 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	29.4 ug/L	50.0U ug/L
	Iron	19.3 ug/L	20.0U ug/L
	Manganese	1.3 ug/L	5.0U ug/L
	Tungsten	0.77 ug/L	1.00U ug/L
	Thallium	0.116 ug/L	0.200U ug/L
M-13AB	Aluminum	5.6 ug/L	50.0U ug/L
	Tungsten	0.76 ug/L	1.00U ug/L
	Thallium	0.043 ug/L	0.200U ug/L
M-13ABDISS	Aluminum	11.5 ug/L	50.0U ug/L
	Tungsten	0.71 ug/L	1.00U ug/L
M-13009AB	Aluminum	5.9 ug/L	50.0U ug/L
	Tungsten	0.70 ug/L	1.00U ug/L
	Thallium	0.029 ug/L	0.200U ug/L
M-13009ABDISS	Aluminum	4.4 ug/L	50.0U ug/L
	Tungsten	0.64 ug/L	1.00U ug/L
M-64B	Tungsten	0.80 ug/L	1.00U ug/L
EB062909-GW	Magnesium	2.6 ug/L	20.0U ug/L
	Manganese	0.3 ug/L	5.0U ug/L
	Strontium	0.1 ug/L	10.0U ug/L
M-25B	Aluminum	23.2 ug/L	50,0U ug/L
	Thallium	0.161 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	45.8 ug/L	50.0U ug/L
	Iron	12.9 ug/L	20.0U ug/L
	Manganese	2.2 ug/L	5.0U ug/L
M-110B	Tungsten	0.39 ug/L	1.00U ug/L
M-110BDISS	Iron	6.8 ug/L	20.0U ug/L
	Tungsten	0.41 ug/L	1.00U ug/L
I-ARB	Aluminum	9.4 ug/L	50.0U ug/L
	Tungsten	0.28 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)	А

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)	А

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	А	bl
R0903561	M-13AB	Aluminum Tungsten Thallium	50.0U ug/L 1.00U ug/L 0.200U ug/L	А	bl
R0903561	M-13ABDISS	Aluminum Tungsten	50.0U ug/L 1.00U ug/L	А	bl
R0903561	M-13009AB	Aluminum Tungsten Thallium	50.0U ug/L 1.00U ug/L 0.200U ug/L	А	bl
R0903561	M-13009ABDISS	Aluminum Tungsten	50.0U ug/L 1.00U ug/L	А	bl
R0903561	M-64B	Tungsten	1.00U ug/L	Α	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	А	bl
R0903561	M-25B	Aluminum Thallium	50.0U ug/L 0.200U ug/L	А	ld
R0903561	M-12AB	Thallium	0.200U ug/L	Α	bl
R0903561	M-12ABDISS	Aluminum Iron Manganese	50.0U ug/L 20.0U ug/L 5.0U ug/L	А	þl
R0903561	M-110B	Tungsten	1.00U ug/L	Α	bl
R0903561	M-110BDISS	Iron Tungsten	20.0U ug/L 1.00U ug/L	А	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

		rionox itoralgate rienderson	
LDC #:	21495J4	VALIDATION COMPLETENESS WORKSHEET	
SDG #:_	R0903561	Stage 2B	
l aborato	or Columbia Ana	alutical Services	

Reviewer: C 2nd Reviewer:

Laboratory: Columbia Analytical Services

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
1.	Technical holding times	A	Sampling dates: 6/25/09 - 7/1/09
11.	ICP/MS Tune	1	
111.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	·
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	A	D. R
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	
ΧV	Field Blanks	SW	EB=8 (ne especiated samples in a real

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

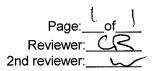
Validated Samples:

1	M-75B	11	M-12ABDISS	21	8BW1	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



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:15/6	· 1	(Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr(Tl) Sn, Ti,(W, U, V, Zn
Q(:17,8		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na (Si) Ti (Si) (Ti) W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ı	.11	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) Ti,(Sn, Ti,)W, U,(V, Zn)
ICP-MS	W	AI, Sb As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Ti) 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 Associated Samples:

Raise to RL unless otherwise noted

Reason Code: bl

2nd Reviewer:

0.28 9.4 4 0.41 6.8 13 0.39 7 12.9 45.8 2.2 Ξ 23.2 თ 5.6 0.3 0.1 ω Sample Identification 0.80 9 F 0.64 4.4 2 0.70 5.9 4 11.5 0.71 က 0.76 5.6 7 29.4 19.3 0.77 1.3 50.0 20.0 20.0 10.0 1.00 5.0 చ Sample Concentration units, unless otherwise noted: Action Limit Maximum ICB/CCB^a (1/611) 0.3 2.0 Maximum PB^a (1) 2.9 3.8 3.8 0.2 0. Analyte Mg 툴 હ ₹ ≥

Maximum Max (1991)		Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1. 2. 4. 6-10. 12. 14 Sample Identification	xximum PB³ Maximum ICB/CCB³ Action ICB/CCB³ RL 1 2 4 9 10	0.004 0.200 0.116 0.043 0.029 0.161 0.152
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9-14 Sample Identification				
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Associated Samples:				
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all les	Maximum ICB/CCB ^a (uq/L)	16.9	9.0	9.0
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Sample Concentration units, unless otherwise noted:	#			
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nnles	Maximum ICB/CCB ^a (uq/l)	2.7	5.8	10.0
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<u>tratior</u>	Maximum M PB ^a IC			
oncer	2			
Sample Concentration units, unless otherwise noted:	Analyte			
Sal		Ba	E B	Ĭ

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

Raise to RL unless otherwise noted

Page: Cof Seviewer: Cof 2nd Reviewer:

Sample Cor	ncentration u	Sample Concentration units, unless otherwise noted:	therwise not	ted: ua/l	/L	Associated Samples: 3. 5. 6. 7. 9-12. 14	4.
							intification
Analyte	Maximum PB ^a (uq/l)	Maximum ICB/CCB ^a (ug/l)	Action Limit	RL	No Qualifiers		
Ba		2.2					
Sample Cor	ncentration u	Sample Concentration units, unless otherwise noted:	therwise no	ted: ua/l	T	Associated Samples: 1.2.4	
Analyte	Maximum	Maximum ICB/CCB ^a	Action	RL		Sample Identification	ntitication
Ra	(1/611)						
3 H 3 e		3.8		20.0	See PB		
Sample Cor	ncentration u	Sample Concentration units, unless otherwise noted:	therwise no	1 . I		Associated Samples: 1-7. 9-12. 14	
						Sample Identification	untification
Analyte	Maximum PB ^a (110/1)	Maximum ICB/CCB ^a (uq/l)	Action Limit	RL	No Qualifiers		
Mg		5.9					
Sample Cor	ncentration u	Sample Concentration units, unless otherwise noted:	therwise no	ted: ua/l	//	Associated Samples: 7. 12-14.	
						Sample Identification	antification
Analyte	Maximum PB ^a (119/1)	Maximum ICB/CCB ^a (uq/l.)	Action Limit	RL	No Qualifiers		
Na		187					
Sample Co	ncentration u	Sample Concentration units, unless otherwise noted:	therwise no	ted: ua/l	1	Associated Samples: 1. 6. 9. 10	
						Sample Identification	antification
Analyte	Maximum PB ^a (ug/l)	Maximum ICB/CCB ^a (ug/l)	Action Limit	RL	No Qualifiers		
Na		211					
Sample Con	centration unit	Sample Concentration units. unless otherwise noted	wise noted:	na/L	Ass	Associated Samples: 11	
						Sample Identification	entification
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)

Sample Concentration units, unless otherwise noted:

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

Associated Samples:

e noted

Page: 0 Reviewer: Co

Reason Code: bl	Raise to RL unless otherwis	

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lentifica									
Sample Identification									
				400			, ,		

	∞						See PB	See PB	
	RL						20.0	5.0	
	Action Limit								
	Maximum ICB/CCB ^a (ug/l.)		6.0	9.8	6.7	6.0	4.1	9.0	62
	Maximum PB ^a (uq/l)								
	Analyte	Al	Ba	В	Fe	Мо	Mg	Mn	Na

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

LDC #: 21495J4

SDG #: See cover

VALIDATION FINDINGS WORKSHEET

Field Blanks

2nd Reviewer.

None associated ramples in Area 1 of X

Associated Samples:

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

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

Y N N/A A/N N/A

Associated sample units: Soil factor applied _ Sampling date: 6/29/09 Blank units: ug/L

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

Sample Identification Action Level Blank ID 2.6 0.3 0.4 7.7 0.1 ω Analyte ₹ Sa Mg હ F

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".

100 #: 21795JY 809 #: 180903561

VALIDATION FINDINGS WORKSHEET **ICP Serial Dilution**

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 ICR 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 was an identified as "N/A".

*	Dijuted Sample ID	Matrk	Analyte	%D	Associated Samples	Qualifications
		Water	13a	13,5	AH Nore 1	7/UJ/4 (Sd)
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Laboratory Data Consultants, Inc. **Data Validation Report**

Project/Site Name:

Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date:

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

SA202-10BDUP

SA202-28B

SA41-0.5BMS

RSAI3-10B

SA41-0.5BDUP

RSAI3-20B RSAI3-32B

SA188-0.5B

SA172-0.5B

SA41-0.5B

SA44-0.5B

SA42-0.5B

RSAI2-10B

RSAI2009-10B

RSAI2-20B

RSAI2-31B

RSAJ2-10B

RSAJ2-20B

RSAJ2-33B

RSAJ2009-33B

EB062609-SO

SA202-10BMS

Introduction

This data review covers 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).
- 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 RSAI2-10B RSAI2-20B RSAI2-20B RSAJ2-33B RSAJ2-33B RSAJ2-33B
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 RSAJ2-33B

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 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 79.3 ug/L 241 ug/L 4.40 ug/L 0.02 ug/L 8.6 ug/L	SA202-10B SA202-28B RSAI3-10B RSAI3-20B RSAI2-32B RSAI2-10B RSAI2-20B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-10B RSAJ2-33B RSAJ2-33B RSAJ2-33B

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:

(Associated Samples)	Analyte	%R (Limits)	Flag	A or P
SA202-10BMS (SA202-10B SA202-28B	Antimony Tungsten	38.5 (75-125)	J- (all detects) UJ (all non-detects)	А
RSAI3-10B	rungsten	50.1 (75-125)	J- (all detects) UJ (all non-detects)	
RSAI3-20B			(
RSAI3-32B				
RSAI2-10B				
RSAI2009-10B		İ		
RSAI2-20B				İ
RSAI2-31B				
RSAJ2-10B				ĺ
RSAJ2-20B				ĺ
RSAJ2-33B				
RSAJ2009-33B)				

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 RSAI2-32B RSAI2-10B RSAI2-20B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-33B RSAJ2-33B RSAJ2-33B	Calcium	58.5 (≤20)	-	J (all detects) UJ (all non-detects)	А

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	28 (≤10) 11.5 (≤10)	SA202-10B SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B RSAI2-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2-33B RSAJ2-33B	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	А

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)	А

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:

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

	Concentra	tion (mg/Kg)				
Analyte	RSAI2-10B	RSAI2009-10B	= RPD (Limits)	Difference (Limits)	Flags	A or P
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)	-	-	<u>-</u>
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)	-	-	-

	Concentrati	ion (mg/Kg)				
Analyte	RSAI2-10B	RSAI2009-10B	RPD (Limits)	Difference (Limits)	Flags	A or P
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)	-	-	•

	Concentra	tion (ug/L)				
Analyte	RSAJ2-33B	RSAJ2009-33B	RPD (Limits)	Difference (Limits)	Flags	A or P
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)	•	•

	Concentra	ition (ug/L)				
Analyte	RSAJ2-33B	RSAJ2009-33B	RPD (Limits)	Difference (Limits)	Flags	A or P
Molybdenum	1.14	1.17		0.03 (≤0.29)	-	<u>-</u>
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 RSAI2-32B RSAI2-10B RSAI2-20B 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)	А	Matrix spike analysis (%R) (m)
R0903584	SA202-10B SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B RSAI2-10B RSAI2-20B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B	Calcium	J (all detects) UJ (all non-detects)	. А	Duplicate sample analysis (RPD) (ld)
R0903584	SA202-10B SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B RSAI2-10B RSAI2-20B 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)	Α	ICP serial dilution (%D) (sd)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0903584	SA202-10B SA202-28B RSA13-10B RSA13-20B RSA13-32B SA188-0.5B SA17-2-0.5B SA41-0.5B SA42-0.5B RSA12-10B RSA12-10B RSA12-20B RSA12-31B RSA12-31B RSA12-10B RSA12-31B RSA12-33B RSA12-33B RSA12-33B	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	А	ы
R0903584	SA202-10B	Tin Boron	10.8U mg/Kg 10.8U mg/Kg	А	bl
R0903584	SA202-28B	Tin	11.4U mg/Kg	А	bl
R0903584	RSAI3-10B	Tin	10.9U mg/Kg	А	bl
R0903584	RSAI3-20B	Tin	10.7U mg/Kg	А	bl
R0903584	RSAI3-32B	Tin	9.6U mg/Kg	Α	bl
R0903584	SA188-0.5B	Tin	10.6U mg/Kg	Α	bl
R0903584	SA172-0.5B	Tin Boron	10.4U mg/Kg 10.4U mg/Kg	А	bl
R0903584	SA41-0.5B	Tin	10.7U mg/Kg	Α	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	А	bl
R0903584	SA42-0.5B	Tin Boron	10.0U mg/Kg 10.0U mg/Kg	A	bi
R0903584	RSAI2-10B	Tin Boron	10.9U mg/Kg 10.9U mg/Kg	А	bl
R0903584	RSAI2009-10B	Tin Boron	10.7U mg/Kg 10.7U mg/Kg	А	bl
R0903584	RSAI2-20B	Tin	10.9U mg/Kg	А	bl
R0903584	RSAI2-31B	Tin Tungsten Molybdenum	11.2U mg/Kg 0.11U mg/Kg 0.34U mg/Kg	А	bl
R0903584	RSAJ2-10B	Tin	10.7U mg/Kg	А	bl
R0903584	RSAJ2-20B	Tin	10.6U mg/Kg	А	bl
R0903584	RSAJ2-33B	Tin	9.5U mg/Kg	Α	bl
R0903584	RSAJ2009-33B	Tin	9.8U mg/Kg	А	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	А	be
R0903584	RSAI2009-10B	Boron	10.7U mg/Kg	А	be
R0903584	RSAI2-31B	Tungsten	0.11U mg/Kg	А	bf

VIET The s	#: R0903584 ratory: Columbia Analytic HOD: Metals (EPA SW 8 samples listed below were	al Se 46 M e revi	ALIDATIO	N COMP S B/6020/700	PLETE stage 2	NE 2B			Date: 9-7 Page: 1 of 1 Reviewer: 2 2nd Reviewer: 4		
/allua	ation findings worksheets			1							
	Validation	Area			Comments						
I,	Technical holding times			X	Sampling	g d	ates: 6/75/09-	6	126/04		
11.	ICP/MS Tune			71							
<u>III.</u>	Calibration			0							
IV.	Blanks										
V.	ICP Interference Check Sar	nple (I	CS) Analysis	4	- ^ <						
VI.	Matrix Spike Analysis			200	4	<u> </u>					
VII.				<u> </u>	100	\not)				
VIII.		(LCS)	7							
IX.	Internal Standard (ICP-MS)			\mathcal{N}	Not reviewed						
Χ.	Furnace Atomic Absorption	QC		\sim	Notutilized						
XI.	ICP Serial Dilution		···	SW							
XII.	Sample Result Verification			N				·			
XIII.	Overall Assessment of Data)		74							
XIV.	Field Duplicates			Su	اراا)		<u> </u>				
ΧV	Field Blanks			SW	EB=	<u>ر</u>	7, FB=FB0721C	<u> 48</u>) (506% ROACHO16)		
lote: /alidat	A = Acceptable N = Not provided/applicable SW = See worksheet red Samples:		R = Rin	o compounds sate eld blank	detected	į	D = Duplicate TB = Trip blank EB = Equipment blar	nk			
1	SA202-10B	11	RSAI2-10B		21		SA202-10BDUP	31	GBS		
2	SA202-28B	12	RSAI2009-10	В	22		SA41-0.5BMS	32	PBW		
3	RSAI3-10B	13	RSAI2-20B		23	\Box	SA41-0.5BDUP	33			
4	RSAI3-20B	14	RSAI2-31B		24	\Box		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	T		37			
8	SA41-0.5B	18	RSAJ2009-33	В	28	T		38			
9	SA44-0.5B	19	EB062609-S0		29	T		39			
10	SA42-0.5B	20	SA202-10BM	S	30			40			

Notes:

LDC #: <u>21495**i**</u> SDG #: <u>K0903584</u>

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page of Page Reviewer: 2nd reviewer:

All circled elements are applicable to each sample.

	1	
Sample ID	Matrix	Target Analyte List (TAL)
1-19	o Last	Al, Sb, As, Ba, Be, B, Cd, 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 Sh As Ba Be B Cd Ca Cr Co Cu Fe Ph Mg Mo Mn Hg Ni Pt K Se Ag Na Sr Tl Sn Ti W U V Zn
		Analysis Method
iCP	5W-	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn Hg (Ni, Pt, K, Se, Ag, Na, Sr) T (Sn, Ti) W, U, (V, Zn)
ICP-MS	1	Al, SDAS Ba Be, B, Cd, Ca Cr Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni P) K, Se, Ag, Na, Sr (Ti) 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

21495K4	: See Cover
LDC #: 21	SDG #: Set

METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000) Sample Concentration units, unless otherwise noted: ug/L

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

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							Sample Identification	lication		
Analyte	Maximum PB³ (mg/Kg)	Maximum PB ^a (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	19					
Ā		2.9	3.4		3.0 / 50.0					
В			16.9		2.7 / 50.0					
Ba			1.5							
Fe		3.8	3.8							
Mo			9.0		1.5 / 2.0					
Mg		3.8	5.9		9.9 / 20.0					
Mn		0.2	9.0		0.9 / 2.0					
Sr		0.1	0.3		0.3 / 10.0					
M			0.01							

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

LDC #: <u>21495K4</u> 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

All Soil Soil preparation factor applied: 100x Associated Samples:

Reason Code: bl

Page: $\frac{l}{CQ}$ 2nd Reviewer:

								Sam	Sample Identification	tion				
Analyte	Maximum PB ^a (mg/Kg)	Maximum ICB/CCB ^a (ug/L)	Action	-	2	က	4	Ŋ	9	7	ω	თ	10	1
Fe	0.8													
Ċ	90:0													
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
3		0.055												
								San	Sample Identification	fion				
Analyte	Maximum PB ^a (mg/Kg)	Maximum ICB/CCB ^a (ug/L)	Action	12	5	4	15	16	17	81				
Fe	0.8													
ö	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				
Μ		0.055				0.087 / 0.11								

Sample Concentration units, unless otherwise noted: mg/Kg

Associated Samples: 1-5, 7-13, 15-18

Sample Identification	12	6.2 / 10.7	
San	/	6.6 / 10.9	
	10	7.0/10.5 4.4/10.0 6.6/10.9 6.2/10.7	
	6	7.0 / 10.5	
	7	9.7 / 10.4	
	-	7.7 / 10.8 9.7 / 10.4	
	Action Limit		
	Analyte Maximum Maximum PB ^a ICB/CCB ^a (mg/Kg) (ug/L)		
•	Maximum PB³ (mg/Kg)	20.0	09.0
	Analyte	В	Mo

LDC #: <u>21495K4</u>
SDG #: <u>See Cover</u>

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: 1

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Reason Code: bl

					Sample Identification
Analyte	Maximum PB³ (mg/Kg)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifiers	
Be		600.0			
Sample Cor	ncentration un	Sample Concentration units, unless otherwise noted:	therwise not	ted: mg/Kg	Associated Samples: 18
					Sample Identification
Analyte	Maximum PB ^a (mg/Kg)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifiers	
A		3.0			
Ba		2.00			
Mg		6.0			
Sample Cor	ncentration u	Sample Concentration units, unless otherwise noted:	therwise no	ıted: mg/Kg	Associated Samples: 8-13, 15-17
	A				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 Co	ncentration u	Sample Concentration units, unless otherwise noted:	therwise no	oted: mg/Kg	Associated Samples: 1-5, 7
					Sample Identification

Sample Col	Sample Concentration units, unless otherwise noted: mg/Kg	nits, unless c	otherwise not	ed: mg/kg	William Towns of the Control of the	ASSOC	Associated Samples.) (C-1					
								Sa	Sample Identification	fication			
Analyte		Maximum Maximum PB ^a ICB/CCB ^a (mg/Kg) (ug/L)	Action Limit	No Qualifiers									
Ba		06:0								-	 		***
Mg		3.0											1
Mn		0:30											

LDC #: 21495K4

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

Sample Concentration units, unless otherwise noted: mg/Kg

VALIDATION FINDINGS WORKSHEET

PB/ICB/CCB QUALIFIED SAMPLES

Page: Sot Seviewer: GCA 2nd Reviewer:___

Reason Code: bl

8-13, 15-18 Soil preparation factor applied: 100x Associated Samples:

Sample Identification Sample Identification 6, 14 Associated Samples: Associated Samples: Sample Concentration units, unless otherwise noted: mg/Kg mg/Kg No Qualifiers 0.25 / 0.34 4 Sample Concentration units, unless otherwise noted: Action Limit Action Limit Maximum ICB/CCB^a Maximum ICB/CCB^a (ng/L) (<u>ng/L</u>) 0.40 0.60 0.90 0.3 3.0 9.0 9.0 0.4 Maximum PB^a Maximum (mg/Kg) (mg/Kg) PB^a Analyte Analyte 를 ŝ ξ ₹ ź

Analyte	Maximum PB³ (mg/Kg)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifiers	. Michel								
Ва		0.70											
Sample Cor	Sample Concentration units, unless otherwise noted: mg/Kg	nits, unless c	therwise not	ed: mg/Kg		Assoc	Associated Samples:	s: 14					
								S	Sample Identification	ification			
Analyte	Maximum PB ^a (ma/Ka)	Maximum ICB/CCB ^a (uq/L)	Action Limit	No Qualifiers								!	
Ва		0.90											
Fe		7.0											

Sample Identification

SDG #: R0903584 LDC #: 21495K4

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: of Reviewer: CRZ 2nd Reviewer: CRZ

Were field blanks identified in this SDG? **METHOD:** Trace Metals (EPA SW846 6010B/7000) Y N N/A

Were target analytes detected in the field blanks?

X/N N/A

Associated sample units:_ Blank units: ug/L

Sampling date: 6/26/09 Soil factor applied 200 Field blank type: (circle one) Field Blank / Rinsate / Other: Sampling date: 6/26/09

Associated Samples: 11-18

	,									 					 _
										:					
tion															
Sample Identification															
Saı															
	12		6.2 / 10.7												
	11		6.6 / 10.9												BANKA LA
	Action Level														
Blank ID	19	3.0	2.7	42.0	0.007	9.9	6.0	1.5	0.3						
Analyte		Al	В	Ca	Pb	Mg	Mn	Mo	Sr						

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

Page: 1_of_ 2nd Reviewer: Reviewer:

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

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

Were target analytes detected in the field blanks?

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

Filter Blank Sampling date: 7/21/09 Soil factor applied 100x x 2xdil = 200x Field blank type: (circle one) Field Blank / Rinsate / Other: Filter Blank Sampling date: 7/21/09

Reason Code: bf

1-5, 11-18

Associated Samples:

Sample Identification 0.087 / 0.11 4 Action Level 672 9 (SDG#: R0904016) FB072109-SO Blank ID 0.020 0.004 30.0 79.3 4.40 13.8 0.02 0.5 336 241 9.4 Analyte Ва Ca e E g § ξ Š Zn ഗ് ≥ \supset ₹ ¥

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".

VALIDATION FINDINGS WORKSHEET Matrix Spike Analysis

Reviewer: (2nd Reviewer: Page:

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".

N N/A

Was a matrix spike analyzed for each matrix in this SDG?

Y N/A

Were matrix spike percent recoveries (%R) within the control limits of 75-1257 if the sample concentration exceeded the spike concentration by a factor

of 4 or more, no action was taken.

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

LEVEL IV ONLY: N N/A

Comments:

LDC #: 21495KY SDG #: (3.0905587

VALIDATION FINDINGS WORKSHEET Duplicate Analysis

Reviewer: 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".

N. N/A

Was a duplicate sample analyzed for each matrix in this SDG?

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 taboratory duplicates, note in the Overall Assessment. Y NA NA

LEVEL AN ONLY:

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

<u> </u>	7 / L	Manue C. C.		(((((((((((((((((((-5 11 8	(C) 7/1/1/1
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S	Comments:					

100 #: 21495K4 809 #: 5-69 COVE

VALIDATION FINDINGS WORKSHEET ICP Serial Dilution

Page: Reviewer: 2nd Reviewer:

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

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

Note: If analyte concentrations were > 50X the IDL, way an TSP serial dilution analyzed?

Y N N/A

Note: If yes, professional judgement will be used to qualify the data.

EVEL IN ONLY:

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

Qualifications	1 16 Qua)		1-1-1-4	Ľ														
Associated Samples	Non-e_			71-12	つい													
%	75,57		Ċ	2.2	11.5													
Analyte	(Sz		(3	75												Arga)	
emple iD Matrix Analyte	Mara			50,71													t work to	
Olistad Sample ID		(5064 ROBO 3561)									-		r	,			Commonts X	

LDC#: <u>21495K4</u> SDG#: <u>See Cover</u>

VALIDATION FINDINGS WORKSHEET Field Duplicates

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

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

	Concentration		(≤50)	(mg/Kg)	(mg/Kg) Limits	Qualifications
Compound	0 30 11	C412	RPD	Difference		(Parent Only)
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

7 7
Page: <u>←</u> of <u> </u>
Reviewer:
2nd Reviewer:

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

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

	Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg) Limits	Qualifications
Compound	10	11	RPD	Difference	Limits	(Parent Only)
Thallium	0.094	0.076		0.018	(≤0.021)	
Tín	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			

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LDC#:21495K4___SDG#: See Cover

VALIDATION FINDINGS WORKSHEET _Field Duplicates

Page: Of Reviewer: 2nd Reviewer:

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

YN NA YN NA

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

	Concentration	on (mg/Kg)	(≤26) RPD	(mg/Kg)	(mg/Kg) Limits	Qualifications
Compound	17	18	RPD	Difference	Limits	(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

4 4
Page:of_\
Reviewer: CS
2nd Reviewer:

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

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

	Concentration (mg/Kg)		(≤36) (40)	(mg/Kg)	(mg/Kg)	Qualifications
Compound	17	18	RPD	Difference	Limits	(Parent Only)
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
ІСВ/ССВ	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 RSAL4-0.5B RSAL4-0.5B RSAL4-10B RSAL4-10B 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 RSAL4-09-0.5B 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 RSAL4-0.5B RSAL4-10B RSAL4-10B RSAL4-10B
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	7.7 mg/Kg	10.2U mg/Kg
	Tin	4.2 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	9.4 mg/Kg	10.5U mg/Kg
	Tin	4.5 mg/Kg	10.5U mg/Kg
RSAK4-20B	Boron	7.9 mg/Kg	10.3U mg/Kg
	Tin	4.1 mg/Kg	10.3U mg/Kg
RSAK4-31B	Tin	4.8 mg/Kg	12.3U mg/Kg
RSAL4-0.5B	Boron	5.1 mg/Kg	10.3U mg/Kg
	Tin	3.9 mg/Kg	10.3U mg/Kg
RSAL4009-0.5B	Boron	4.6 mg/Kg	10.2U mg/Kg
	Tin	4.0 mg/Kg	10.2U mg/Kg
RSAL4-10B	Boron	8.9 mg/Kg	10.7U mg/Kg
	Tin	4.3 mg/Kg	10.7U mg/Kg
RSAL4-28B	Tin	6.3 mg/Kg	15.1U mg/Kg
SA100-10B	Boron	9.8 mg/Kg	10.4U mg/Kg
	Tin	4.1 mg/Kg	10.4U mg/Kg
SA100-30B	Tin	4.9 mg/Kg	12.7U mg/Kg
SA69-0.5B	Boron	4.5 mg/Kg	10.5U mg/Kg
	Tin	4.2 mg/Kg	10.5U mg/Kg
SA69-10B	Boron	6.7 mg/Kg	10.7U mg/Kg
	Tin	4.1 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 79.3 ug/L 241 ug/L 4.40 ug/L 0.02 ug/L 0.004 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)	А
SA206-30BMS (All samples in SDG R0903729)	Beryllium Uranium	126.7 (75-125) 126.6 (75-125)	J+ (all detects) J+ (all detects)	А
SA206-30BMS (All samples in SDG R0903729)	Tungsten	62.6 (75-125)	J- (all detects) UJ (all non-detects)	А

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)	А

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)	А

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)	Α

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:

	Concentrat	ion (mg/Kg)				
Analyte	RSAL4-0.5B	RSAL4009-0.5B	RPD (Limits)	Difference (Limits)	Flags	A or P
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)	-	

	Concentrati	on (mg/Kg)		D		
Analyte	RSAL4-0.5B	RSAL4009-0.5B	RPD (Limits)	Difference (Limits)	Flags	A or P
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

				l .	
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 RSAL4-0.5B RSAL4-0.5B RSAL4-10B RSAL4-10B RSAL4-10B SA100-10B SA100-30B SA69-0.5B SA69-10B SA69-29B	Antimony	J- (all detects) R (all non-detects)	А	Matrix spike analysis (%R) (m)
R0903729	SA206-0.5B SA206-10B SA206-25B SA206-30B RSAK4-10B RSAK4-20B RSAK4-31B RSAL4-0.5B RSAL4-0.5B RSAL4-10B RSAL4-10B RSAL4-10B 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 RSAL4-0.5B RSAL4-10B RSAL4-10B RSAL4-28B SA100-10B SA100-30B SA69-0.5B SA69-10B SA69-29B	Tungsten	J- (all detects) UJ (all non-detects)	Α	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 RSAL4-0.5B RSAL4-10B RSAL4-10B RSAL4-10B RSAL4-10B 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) (Id)
R0903729	SA206-0.5B SA206-10B SA206-25B SA206-30B RSAK4-10B RSAK4-20B RSAK4-21B RSAL4-0.5B RSAL4-0.5B RSAL4-10B RSAL4-10B RSAL4-10B 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)	Α	ICP serial dilution (%D) (sd)
R0903729	SA206-0.5B SA206-10B SA206-25B SA206-30B RSAK4-10B RSAK4-20B RSAK4-31B RSAL4-0.5B RSAL4-0.5B RSAL4-0.5B RSAL4-10B RSAL4-10B RSAL4-10B RSAL4-28B SA100-10B SA100-30B SA69-0.5B SA69-10B SA69-29B	All analytes reported below the PQL.	J (all detects)	Α	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	А	ld
R0903729	SA206-10B	Tin	11.0U mg/Kg	А	þl
R0903729	SA206-25B	Tin	16.1U mg/Kg	А	bl
R0903729	SA206-30B	Tin	13.4U mg/Kg	А	bl
R0903729	RSAK4-10B	Boron Tin	10.5U mg/Kg 10.5U mg/Kg	А	bl
R0903729	RSAK4-20B	Boron Tin	10.3U mg/Kg 10.3U mg/Kg	А	bl
R0903729	RSAK4-31B	Tin	12.3U mg/Kg	А	bl
R0903729	RSAL4-0.5B	Boron Tin	10.3U mg/Kg 10.3U mg/Kg	А	bl
R0903729	RSAL4009-0.5B	Boron Tin	10.2U mg/Kg 10.2U mg/Kg	А	bl
R0903729	RSAL4-10B	Boron Tin	10.7U mg/Kg 10.7U mg/Kg	А	bl
R0903729	RSAL4-28B	Tin	15.1U mg/Kg	А	bl
R0903729	SA100-10B	Boron Tin	10.4U mg/Kg 10.4U mg/Kg	А	bl
R0903729	SA100-30B	Tin	12.7U mg/Kg	А	bl
R0903729	SA69-0.5B	Boron Tin	10.5U mg/Kg 10.5U mg/Kg	А	bl
R0903729	SA69-10B	Boron Tin	10.7U mg/Kg 10.7U mg/Kg	А	bl
R0903729	SA69-29B	Tin	12.7U mg/Kg	А	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

LDC ;	#: <u>21495L4</u>	_ VA			thgate Hen PLETENESS	derson S WORKSHEE	ΕT	Date: <u>9-2</u> 2
SDG	#: R0903729			S	stage 2B			Page: _of_ Reviewer: _<
Labor	ratory: <u>Columbia Analyl</u>	<u>ical Se</u>	<u>rvices</u>					Reviewer: C
METI	HOD: Metals (EPA SW	846 M	ethod 6010I	3/6020/700	00)			2nd Reviewer:
	amples listed below we ation findings workshee		ewed for ea	ch of the f	ollowing valida	ition areas. Valida	ation find	dings are noted in attached
	Validatio	n Area				Con	nments	
l.	Technical holding times			A	Sampling dates:	71610	9'-	7/7/09
11.	ICP/MS Tune			A				
111.	Calibration			A				
IV.	Blanks		•	5W				
V.	ICP Interference Check S	Sample (I	CS) Analysis	A				
VI.	Matrix Spike Analysis			SW	m >			
VII.	Duplicate Sample Analys	is		SW	De.			
VIII.	Laboratory Control Samp	les (LCS)	A	LCS			
IX.	Internal Standard (ICP-M	S)		N	Not re	viewed		
X.	Furnace Atomic Absorption	on QC		\sim	NO+U+	ilized		
XI.	ICP Serial Dilution			SW				
XII.	Sample Result Verification	n		N				
XIII.	Overall Assessment of D	ata		1		-		
XIV.	Field Duplicates			SW	(8,9)			
XV	Field Blanks			Su	FB=F	3072109-5	0 (50	16 W 30 19 16)
Note:	A = Acceptable N = Not provided/applica SW = See worksheet	ble	R = Rin	o compound: sate eld blank	s detected	D = Duplicate TB = Trip blank EB = Equipment b	olank	
Validat	ed Samples:		1					1000
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	SA206-10BM	S	27		37	
8	RSAL4-0.5B	18	SA206-10BD	UP	28		38	
9	RSAL4009-0.5B	19	SA206-30BM	S	29		39	
10	RSAL4-10B	20	SA206-30BD	UP	30		40	
Notes	 ::				,			

LDC #: <u>21495L4</u> SDG #: <u>K0903729</u>

VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: of Reviewer: 2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-16-	50:10	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC17B		Al, Sb, As, Ba, Be, B, Cd, 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:1920		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sh, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Ph, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
	-	Analysis Method
ICP	5	(Al, Sb, As, (Ba) Be, (B, Cd, 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	7	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Ti, 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 #: 21495<u>k</u>4 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

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Reviewer: CA 2nd Reviewer:__

				0.00				Sampl	Sample Identification	ation									
Analyte	Maximum PB ³ (mg/Kg)	Maximum Action ICB/CCB ^a Limit (ug/L)	Action	~	2	ю	4	5	9	2	80	თ	10	1	12	13	4-	15	16
A	0.5																		
В		8.0		7.7 / 10.2				9.4 / 10.5	7.97		5.1 / 10.3	4.6 /	8.9 /		9.8 /		4.5 /	6.7 /	
C	0.10																		
Fe	1.																		
Mn	0.04																		
Mg		2.0																	
Mo	0.10																		
ī	0.08																		
Sr		0:30																	
Sn	3.9			4.2 / 10.2	4.7 /	6.1 /	5.4 /	4.5 / 10.5	4.1 /	4.8 /	3.9 / 10.3	4.0 /	4.3 /	6.3 / 15.1	4.1 /	4.9 /	4.2 <i>/</i> 10.5	4.1 /	5.1 /

Sample Concentration units, unless otherwise noted: mg/Kg

Associated Samples:

16

Sample Identification No Qualifiers Action Limit Maximum ICB/CCB^a (ng/L) 3.00 0.20 4.0 Maximum PB^a (mg/Kg) Analyte Ва <u>e</u> ξ

Sample Concentration units, unless otherwise noted: mg/Kg

1-15 Associated Samples:

						Samp	Sample Identification	fion			
Analyte	Analyte Maximum Maximum PB ^a ICB/CCB ^a (mg/Kg) (ug/L)	Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifiers	 						
Ba		1.00									
Mn		0.10									

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

LDC #: <u>21495k/4</u> SDG #: <u>See Cover</u> **METHOD**: Trace metals (EPA SW 846 Method 6010B/6020/7000)

Reason Code: bl

Analyte Maximum Maximum Action CB/CCB ^a Limit Quence of the Maximum Maximum Action CB/CCB ^a CB	m Maximum ICB/CCB ³ (ug/L) 0.60 o.60 m units, unless of ICB/CCB ³ m Maximum ICB/CCB ³	Action		Sample Identification
Analyte Maximus (mg/Kg) Mo Sample Concentration PB** (mg/Kg) Mo Sample Concentration	m Maximum ICB/CCB ^a (ug/L) (ug/L) 0.60 units, unless of ICB/CCB ^a m Maximum ICB/CCB ^a	Action Limit	Ç Z	
Sample Concentration Analyte Maximu PB* (mg/Kg) Mo Sample Concentration	n units, unless of	-	Qualifiers	
Sample Concentration Analyte Maximu PB* (mg/Kg) Mo Sample Concentration	n units, unless of			
Analyte Maximu PB* (mg/Kg		therwise not	mg/Kg	Associated Samples: 8-16
Analyte Maximu PB³ (mg/Kg) Mo (Mg/Kg) Sample Concentration				Sample Identification
Mo Sample Concentration	I) (ng/L) [Action Limit	No Qualifiers	
Sample Concentration	0.5			
	ו units, unless ס	therwise not	mg/Kg	Associated Samples: 1-12
				Sample Identification
Analyte Maximum PB* (mg/Kg)	m Maximum ICB/CCB ^a (ug/L)	Action Limit	No Qualifiers	
Be	0.011			
M	0.053			
Sample Concentration units, unless otherwise noted:	o nnits, unless o	therwise not	mg/Kg	Associated Samples: 13-16
	e de la companya de l			Sample Identification
Analyte Maximum PB ^a (mg/Kg)	IM Maximum ICB/CCB ³ (ug/L)	Action Limit	No Qualifiers	
Be	90.00			
M	0.023			

LDC #: 21495L4

SDG #: R0903729

VALIDATION FINDINGS WORKSHEET

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2nd Reviewer: 1

Reviewer:_

Field Blanks

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

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

Were target analytes detected in the field blanks?

Reason Code: bf

₹

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

Sampling date: 7/21/09

Associated Samples: Sampling date: 7/21/09 Soil factor applied 100x x 2xdil = 200x Field blank type: (circle one)(Eield Blank) Rinsate / Other: Sample Identification No Qualifiers Action Level 672 9 (SDG#: R0904016) FB072109-SO Blank ID 0.004 0.020 13.8 79.3 30.0 4.40 0.02 336 3.0 8.6 241 9.4 0.5 Analyte င္ပ Fe РЬ Ĭg 돌 g Z റ് ≥ \supset Ва ₹ ¥

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".

VALIDATION FINDINGS WORKSHEET Matrix Spike Analysis

2nd Reviewer: 1 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".

N/A

Was a matrix spike analyzed for each matrix in this SDG?

Were matrix spike percent recoveries (%R) within the control limits of (75-125?) If the sample concentration exceeded the spike concentration by a factor AN A

of 4 or more, no action was taken.

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

LEVEL IV ONLY:

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

F	<u>, ĵ</u>	>									 	_				
Outsilettensteam	1	4 5 4	14	ノニケートのフトナ												
Associated Samples	コセ)												
8%	122	1		9.921												
Analyte	ર્જ	Re	3	()												
Matrix															21	
# Matrix Spike ID	61										·				Comments: All Area	

VALIDATION FINDINGS WORKSHEET **Duplicate Analysis**

Reviewer: 2nd Reviewer:

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

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

N/A

Was a duplicate sample analyzed for each matrix in this SDG?

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) We

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

*	Duplicate ID	Matrix	Analyte	RPD (Limits)	Difference (Limits)	Associated Samples	Qualifications
	20	1508	Ca	(925) 17'LL		114	17/UT A (W)
			20	70.1			
\Box	,		Ν÷	73 \$ 1)	
<u> </u>))
\perp							
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\Box							
	-						
S	Comments: All	1 Arga					
		,					

62150808 h75bh12

VALIDATION FINDINGS WORKSHEET ICP Serial Dilution

2nd Reviewer: 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".

Note: If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?

Y(N) N/A

Note: 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.

Y N N/A Wer Wer Y N/A N/A Is the LEVEL W ONLY:

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

Qualifications	1 5/UT/A	/ > ,										>			
Associated Samples	H1)														
%D	12,9	15.9	15,9	h'S1	15.1	16.7	1 '01	11, 3	12.5	7.11	13.3	21.8			
Analyte	Ra	3	0	44	ک ک	ž	え	۸۷	25	14	>	7			
Matrk	- - - -														
Diluted Sample ID	7		-												

SDIL.4S2

PI A A

Comments:

LDC#: 21495L4 SDG#: See Cover

VALIDATION FINDINGS WORKSHEET Field Duplicates

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

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

	Concentration	on (mg/Kg)	(≤50)	(mg/Kg)	(mg/Kg) Limits	Qualifications (Parent Only)	
Compound	8	9	RPD	Difference			
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 <u>Field Duplicates</u>

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Reviewer	: 02
2nd Reviewer:	1

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

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

	Concentration	on (mg/Kg)	(≤50) RPD	(mg/Kg)	(mg/Kg)	Qualifications (Parent Only)	
Compound	8	9		Difference	Limits		
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				

V:\FIELD DUPLICATES\FD_inorganic\21495L4.wpd