Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC# 21258

Metals

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 30 through July 2, 2008

LDC Report Date: September 2, 2009

Matrix: Soil

Parameters: Metals

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K0806117

Sample Identification

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

Introduction

This data review covers 12 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA 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)	Aluminum Calcium Manganese Tin Tungsten	1.1 mg/Kg 2.5 mg/Kg 0.08 mg/Kg 3.1 mg/Kg 0.093 mg/Kg	All samples in SDG K0806117
ICB/CCB	Calcium	20.0 ug/L	SA207-0.5B SA207-10B
ICB/CCB	Beryllium Barium Boron Chromium Silver Tungsten	0.015 ug/L 2.0 ug/L 5.0 ug/L 0.09 ug/L 0.014 ug/L 0.138 ug/L	All samples in SDG K0806117

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
SA207-0.5B	Tin	3.8 mg/Kg	12.5U mg/Kg
SA207-10B	Tin	3.0 mg/Kg	10.4U mg/Kg
SA207-20B	Tin	3.1 mg/Kg	10.3U mg/Kg
SA207-30B	Tin	2.8 mg/Kg	11.2U mg/Kg
SA207-40B	Tin	3.4 mg/Kg	11.3U mg/Kg
SA181-0.5B	Tin	3.0 mg/Kg	10.7U mg/Kg
SA181-10B	Tin	3.2 mg/Kg	10.7U mg/Kg
SA181-20B	Tin	2.9 mg/Kg	10.5U mg/Kg
SA181-30B	Tin	2.8 mg/Kg	10.4U mg/Kg
SA181-35B	Tin	3.2 mg/Kg	11.9U mg/Kg

No field blanks were identified 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) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
SA207-30BMS (All samples in SDG K0806117)	Antimony Manganese Tungsten	35.4 (75-125) 47.4 (75-125) 59.5 (75-125)	J- (all detects) UJ (all non-detects)	A
SA207-30BMS (All samples in SDG K0806117)	Strontium	159.8 (75-125)	J+ (all 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
SA207-30BDUP (All samples in SDG K0806117)	Barium Lead Manganese Silver Strontium	24.6 (≤20) 22 (≤20) 43.5 (≤20) - 58.9 (≤20)	- - - 0.059 mg/Kg (≤0.022) -	J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
SA207-30BL	Nickel	19 (≤10)	All samples in SDG K0806117	J (all detects) UJ (all non-detects)	A

XII. Sample Result Verification and Project Quantitation Limit

All sample result verifications were acceptable.

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG K0806117	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, 2008 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG K0806117

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0806117	SA207-0.5B SA207-10B SA207-20B SA207-30B SA207-40B SA181-0.5B SA181-10B SA181-20B SA181-30B SA181-35B	Antimony Manganese Tungsten	J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
K0806117	SA207-0.5B SA207-10B SA207-20B SA207-30B SA207-40B SA181-0.5B SA181-10B SA181-20B SA181-30B SA181-35B	Strontium	J+ (all detects)	A	Matrix spike analysis (%R) (m)
K0806117	SA207-0.5B SA207-10B SA207-20B SA207-30B SA207-40B SA181-0.5B SA181-10B SA181-20B SA181-30B SA181-35B	Barium Lead Manganese Strontium	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)
K0806117	SA207-0.5B SA207-10B SA207-20B SA207-30B SA207-40B SA181-0.5B SA181-10B SA181-20B SA181-30B SA181-35B	Silver	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (Difference) (ld)
K0806117	SA207-0.5B SA207-10B SA207-20B SA207-30B SA207-40B SA181-0.5B SA181-10B SA181-20B SA181-30B SA181-35B	Nickel	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0806117	SA207-0.5B SA207-10B SA207-20B SA207-30B SA207-40B SA181-0.5B SA181-10B SA181-20B SA181-30B SA181-35B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG K0806117

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0806117	SA207-0.5B	Tin	12.5U mg/Kg	A	bl
K0806117	SA207-10B	Tin	10.4U mg/Kg	A	bl
K0806117	SA207-20B	Tin	10.3U mg/Kg	A	bl
K0806117	SA207-30B	Tin	11.2U mg/Kg	A	bl
K0806117	SA207-40B	Tin	11.3U mg/Kg	A	bl
K0806117	SA181-0.5B	Tin	10.7U mg/Kg	A	bl
K0806117	SA181-10B	Tin	10.7U mg/Kg	A	bl
K0806117	SA181-20B	Tin	10.5U mg/Kg	A	bl
K0806117	SA181-30B	Tin	10.4U mg/Kg	A	bl
K0806117	SA181-35B	Tin	11.9U mg/Kg	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG K0806117

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 21258A4
SDG #: K0806117
Laboratory: Columbia Analytical Services

Date: 8-13-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/30/08 - 7/2/08
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	SW	Dup
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

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

Validated Samples: Soils

1	SA207-0.5B	11	SA207-30BMS	21	PBS1	31	
2	SA207-10B	12	SA207-30BDUP	22		32	
3	SA207-20B	13		23		33	
4	SA207-30B	14		24		34	
5	SA207-40B	15		25		35	
6	SA181-0.5B	16		26		36	
7	SA181-10B	17		27		37	
8	SA181-20B	18		28		38	
9	SA181-30B	19		29		39	
10	SA181-35B	20		30		40	

Notes: _____

LDC #: 2125844
SDG #: K0806117

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer:

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

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

LDC #: 21258A4
SDG #: K0506117

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

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

LDC #: 21258A4
SDG #: K0806117

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-10	Soil	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC: 11, 12	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP	Soil	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 21258A4
SDG #: K0806117

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason Code: bl

Reviewer: CR
2nd Reviewer:

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)
Soil preparation factor applied: 100x
Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: All except Ca CCB = 1 & 2 only.

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**	**1**	2	3	4	5	6	7	8	9	10	
Al	1.1													
Be		0.015												
Ba		2.0												
B		5.0												
Ca	2.5	20.0												
Cr		0.09												
Mn	0.08													
Mo														
Sn	3.1			3.8 / 12.5	3.0 / 10.4	3.1 / 10.3	2.8 / 11.2	3.4 / 11.3	3.0 / 10.7	3.2 / 10.7	2.9 / 10.5	2.8 / 10.4	3.2 / 11.9	
Ag		0.014												
W	0.093	0.138												

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 21258A4
SDG #: 150806117

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

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

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

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

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

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

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

LEVEL IV ONLY:

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

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
	11	Soil	Sb	35.4	All	J-/UJ/A (m)
			Mn	47.4	↓	↓
			Sr	159.8		J+det/A
			W	59.5	↓	J-/UJ/A ↓

Comments: _____

LDC #: 21258A4
SDG #: K080617

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Reviewer: CR
2nd Reviewer: L

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

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

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

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

LEVEL IV ONLY:

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

#	Duplicate ID	Matrix	Analyte	RPD (Limits)	Difference (Limits)	Associated Samples	Qualifications
	12	Soil	Ba	24.6 (20)		All	J/UJ/A (1d)
			Pb	22			
			Mn	43.5			
			Ag		0.059 (≤0.02)		
			Sr	58.9			

Comments:

LDC #: 21258A4
SDG #: 15080117

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: QR
2nd Reviewer: L

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

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

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

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	4	Soil	~~Cr~~	~~23~~	All	J/UJ/A (sd)
			Ni	19		
			~~Na~~	19.0		

Comments:

LDC #: 2125844
SDG #: K0806117

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: GR
2nd Reviewer: [illegible]

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

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

%R = Found x 100 / True

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

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	Ba	5055	5000	101	101	Y
	GFAA (Initial calibration)						
CCV3	CVAA (Initial calibration)	Hg	5.191	5.00	104	104	Y
ICV	ICP (Continuing calibration)	Hg	4.97	5.00	99	99	Y
	GFAA (Continuing calibration)						
CCV1	CVAA (Continuing calibration)	Hg	5.16	5.00	103	103	Y
ICV	ICP/MS (Initial calibration)	Cr	10.2	10.0	102	102	Y
CCV 4	ICP/MS (Continuing calibation)	Ag	25.0	25.0	100	100	Y

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

LDC #: 21258A4
SDG #: 180806117

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

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

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

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

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

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

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

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

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

Sample ID	Type of Analysis	Element	Found / S / I ~~(units)~~ ug/kg	True / D / SDR (units) ug/kg	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Cr	53.6 (ug/L)	50 (ug/L)	107	107	Y
LCS	Laboratory control sample	W	108.0	100	108.0	108.0	
11	Matrix spike	Se	(SSR-SR) 124	113.9	108.9	108.9	
12	Duplicate	Zn	18.7	18.8	0.5	0.5	
4	ICP serial dilution	Mn	879.20	905.00	2.9	2.9	

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 #: 21258A4
SDG #: 1508061 17

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: CR
2nd reviewer: V

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

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

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

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

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

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

Recalculation:

$$\frac{0.1579\ mg/L\ (0.1L)(2)}{0.00102\ kg\ (0.878)} = 35.3\ mg/kg$$

Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
4	Al	7190	7190	Y
	Sb	0.15	0.15	
	As	21.2	21.2	
	Ba	100	100	
	Be	0.313	0.313	
	Cd	0.084	0.084	
	Ca	159000	159000	
	Cr	9.78	9.78	
	Co	4.69	4.69	
	Cu	35.3	35.3	
	Fe	7460	7460	
	Pb	3.71	3.71	
	Mg	23000	23000	
	Mn	196	196	
	Hg	0.006	0.006	
	Mo	3.08	3.08	
	Ni	15.5	15.5	
	K	1540	1540	
	Ag	0.098	0.098	
	Na	726	726	
	Se	1810	1810	
	Tl	0.052	0.052	

LDC #: 21258A4
SDG #: K0806117

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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

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

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

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

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

Recalculation: See Previous Sheet

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

Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
4	Sn	2.8	2.8	Y
	Ti	486	486	↓
	W	0.42	0.42	
	U	4.200	4.200	
	V	34.5	34.5	
	Zn	18.7	18.7	✓

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: July 1 through July 2, 2008

LDC Report Date: August 21, 2009

Matrix: Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K0806119

Sample Identification

M-78B
M-55B
M-55DB
EB070208GW1
M-65B
M-78BMS
M-78BDUP

Introduction

This data review covers 7 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)	Boron Copper Lead Magnesium Molybdenum Sodium Thallium Zinc	4.4 ug/L 1.8 ug/L 0.089 ug/L 6.9 ug/L 1.3 ug/L 128 ug/L 0.186 ug/L 0.7 ug/L	All samples in SDG K0806119
ICB/CCB	Aluminum Antimony Boron Barium Cobalt Copper Lead Magnesium Sodium Thallium Tungsten	4.0 ug/L 0.014 ug/L 10.0 ug/L 2.0 ug/L 0.4 ug/L 2.1 ug/L 0.012 ug/L 3.3 ug/L 144 ug/L 0.016 ug/L 0.1 ug/L	All samples in SDG K0806119
ICB/CCB	Strontium	0.3 ug/L	M-78B M-55B M-55DB M-65B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Arsenic Strontium	1.4 ug/L 0.4 ug/L	EB070208GW1

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
M-78B	Antimony Cobalt Zinc	0.271 ug/L 0.8 ug/L 1.6 ug/L	0.500U ug/L 10.0U ug/L 10.0U ug/L
M-55B	Antimony Cobalt Zinc	0.246 ug/L 0.6 ug/L 0.8 ug/L	0.500U ug/L 10.0U ug/L 10.0U ug/L
M-55DB	Antimony Cobalt Zinc	0.246 ug/L 1.0 ug/L 1.0 ug/L	0.500U ug/L 10.0U ug/L 10.0U ug/L
EB070208GW1	Aluminum Boron Copper Thallium Tungsten Zinc Arsenic Strontium	9.7 ug/L 35.6 ug/L 1.8 ug/L 0.186 ug/L 0.4 ug/L 3.3 ug/L 1.5 ug/L 1.6 ug/L	50.0U ug/L 50.0U ug/L 10.0U ug/L 0.200U ug/L 1.0U ug/L 10.0U ug/L 2.0U ug/L 10.0U ug/L
M-65B	Aluminum Antimony Cobalt Copper Tungsten Zinc	38.2 ug/L 0.264 ug/L 0.3 ug/L 2.6 ug/L 0.8 ug/L 1.2 ug/L	50.0U ug/L 0.500U ug/L 10.0U ug/L 10.0U ug/L 1.0U ug/L 10.0U ug/L

Sample EB070208GW1 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
EB070208GW1	7/27/08	Aluminum	9.7 ug/L	M-65B
		Arsenic	1.5 ug/L	
		Boron	35.6 ug/L	
		Calcium	102 ug/L	
		Chromium	0.9 ug/L	
		Copper	1.8 ug/L	
		Iron	7.5 ug/L	
		Lead	0.256 ug/L	
		Magnesium	30.3 ug/L	
		Manganese	5.3 ug/L	
		Sodium	230 ug/L	
		Strontium	1.6 ug/L	
		Thallium	0.186 ug/L	
		Tungsten	0.4 ug/L	
		Zinc	3.3 ug/L	

Sample FB062408GWarea1 (from SDG K0805722) 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
FB062408GWarea1	6/24/08	Arsenic	1.6 ug/L	M-78B
		Boron	49 ug/L	M-55B
		Calcium	12.0 ug/L	M-55DB
		Iron	2.9 ug/L	M-65B
		Magnesium	1.2 ug/L	
		Tungsten	0.4 ug/L	

Sample PB061608B (from SDG K0805394) was identified as a pump blank. No metal contaminants were found in this blank with the following exceptions:

Pump Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
PB061608B	6/16/08	Aluminum	37.6 ug/L	M-78B
		Barium	1.8 ug/L	M-55B
		Boron	39.6 ug/L	M-55DB
		Calcium	265 ug/L	M-65B
		Cobalt	0.4 ug/L	
		Copper	1.0 ug/L	
		Iron	57.4 ug/L	
		Lead	0.785 ug/L	
		Magnesium	63.1 ug/L	
		Manganese	55.6 ug/L	
		Molybdenum	1.2 ug/L	
		Nickel	0.6 ug/L	
		Sodium	83.5 ug/L	
		Strontium	1.4 ug/L	
		Titanium	2.8 ug/L	
		Tungsten	0.5 ug/L	
		Zinc	6.1 ug/L	

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	Cobalt	0.8 ug/L	10.0U ug/L
	Lead	0.912 ug/L	0.912J+ ug/L
	Manganese	60.5 ug/L	60.5J+ ug/L
	Titanium	1.7 ug/L	10.0U ug/L
	Zinc	1.6 ug/L	10.0U ug/L
M-55B	Cobalt	0.6 ug/L	10.0U ug/L
	Lead	0.776 ug/L	0.776J+ ug/L
	Manganese	40.3 ug/L	40.3J+ ug/L
	Titanium	1.1 ug/L	10.0U ug/L
	Zinc	0.8 ug/L	10.0U ug/L
M-55DB	Cobalt	1.0 ug/L	10.0U ug/L
	Lead	0.940 ug/L	0.940J+ ug/L
	Manganese	39.9 ug/L	39.9J+ ug/L
	Titanium	0.8 ug/L	10.0U ug/L
	Zinc	1.0 ug/L	10.0U ug/L
M-65B	Aluminum	38.2 ug/L	50.0U ug/L
	Copper	2.6 ug/L	10.0U ug/L
	Lead	0.915 ug/L	0.915J+ ug/L
	Manganese	11.2 ug/L	11.2 J+ ug/L
	Tungsten	0.8 ug/L	1.0U ug/L
	Zinc	1.2 ug/L	10.0U ug/L
M-65B	Tungsten	0.8 ug/L	1.0U ug/L
M-65B	Aluminum	38.2 ug/L	50.0U ug/L
	Cobalt	0.3 ug/L	10.0U ug/L
	Copper	2.6 ug/L	10.0U ug/L
	Iron	33.0 ug/L	33.0J+ ug/L
	Lead	0.915 ug/L	0.915J+ ug/L
	Manganese	11.2 ug/L	11.2J+ ug/L
	Titanium	5.2 ug/L	10.0U ug/L
	Tungsten	0.8 ug/L	1.0U ug/L
	Zinc	1.2 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) analyses 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

Raw data were not reviewed for this SDG.

X. Furnace Atomic Absorption QC

All graphite furnace atomic absorption QC were within validation criteria.

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 QAPP PQLs were met with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
All samples in SDG K0806119	Selenium	Laboratory reporting limit reported at 6.0 ug/L.	PQL should be reported at 5.0 ug/L per the QAPP.	None	P

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG K0806119	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

Samples M-55B and M-55DB were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-55B	M-55DB				
Antimony	0.246	0.246	-	0 (≤0.5)	-	-
Arsenic	92.5	89.8	-	2.7 (≤20.0)	-	-
Barium	42.6	42.5	0 (≤30)	-	-	-
Boron	14600	14300	2 (≤30)	-	-	-
Calcium	509000	492000	3 (≤30)	-	-	-
Chromium	11600	11400	2 (≤30)	-	-	-
Cobalt	0.6	1.0	-	0.4 (≤10.0)	-	-
Lead	0.776	0.940	-	0.164 (≤0.200)	-	-
Magnesium	286000	277000	3 (≤30)	-	-	-
Manganese	40.3	39.9	1 (≤30)	-	-	-
Molybdenum	16.4	16.7	-	0.3 (≤10.0)	-	-
Platinum	0.36	0.32	-	0.04 (≤1.0)	-	-
Potassium	47200	46000	3 (≤30)	-	-	-
Selenium	9.7	9.2	-	0.5 (≤50.0)	-	-
Sodium	1660000	1610000	3 (≤30)	-	-	-
Strontium	14700	14200	3 (≤30)	-	-	-
Thallium	0.573	0.476	-	0.097 (≤0.200)	-	-
Titanium	1.1	0.8	-	0.3 (≤10.0)	-	-

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-55B	M-55DB				
Tungsten	2.5	2.4	-	0.1 (≤1.0)	-	-
Uranium	47.1	47.0	0 (≤30)	-	-	-
Vanadium	45.1	44.9	0 (≤30)	-	-	-
Zinc	0.8	1.0	-	0.2 (≤10.0)	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG K0806119

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0806119	M-78B M-55B M-55DB EB070208GW1 M-65B	Selenium	None	P	Sample result verification
K0806119	M-78B M-55B M-55DB EB070208GW1 M-65B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG K0806119

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0806119	M-78B	Antimony Cobalt Zinc	0.500U ug/L 10.0U ug/L 10.0U ug/L	A	bl
K0806119	M-55B	Antimony Cobalt Zinc	0.500U ug/L 10.0U ug/L 10.0U ug/L	A	bl
K0806119	M-55DB	Antimony Cobalt Zinc	0.500U ug/L 10.0U ug/L 10.0U ug/L	A	bl
K0806119	EB070208GW1	Aluminum Boron Copper Thallium Tungsten Zinc Arsenic Strontium	50.0U ug/L 50.0U ug/L 10.0U ug/L 0.200U ug/L 1.0U ug/L 10.0U ug/L 2.0U ug/L 10.0U ug/L	A	bl
K0806119	M-65B	Aluminum Antimony Cobalt Copper Tungsten Zinc	50.0U ug/L 0.500U ug/L 10.0U ug/L 10.0U ug/L 1.0U ug/L 10.0U ug/L	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG K0806119

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0806119	M-78B	Cobalt Lead Manganese Titanium Zinc	10.0U ug/L 0.912J+ ug/L 60.5J+ ug/L 10.0U ug/L 10.0U ug/L	A	bp
K0806119	M-55B	Cobalt Lead Manganese Titanium Zinc	10.0U ug/L 0.776J+ ug/L 40.3J+ ug/L 10.0U ug/L 10.0U ug/L	A	bp
K0806119	M-55DB	Cobalt Lead Manganese Titanium Zinc	10.0U ug/L 0.940J+ ug/L 39.9J+ ug/L 10.0U ug/L 10.0U ug/L	A	bp
K0806119	M-65B	Aluminum Copper Lead Manganese Zinc	50.0U ug/L 10.0U ug/L 0.915J+ ug/L 11.2 J+ ug/L 10.0U ug/L	A	bp,be
K0806119	M-65B	Tungsten	1.0U ug/L	A	bp,bf,be
K0806119	M-65B	Cobalt Iron Titanium	10.0U ug/L 33.0J+ ug/L 10.0U ug/L	A	bp

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage ~~2B~~ 4 2B

LDC #: 21258B4
SDG #: K0806119
Laboratory: Columbia Analytical Services

Date: 8-13-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: L

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/1/08 - 7/2/08
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	SW	
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	A	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	A	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	SW	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(2,3)
XV	Field Blanks	SW	EB=4, PB=PB061608B (SDG#: K0805394), FB=FB062408GW area 1 (SDG# K0805722)

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

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

D = Duplicate
TB = Trip blank
EB = Equipment blank
PB = Pump Blank

Validated Samples: water

1	M-78B	11	PBW1	21		31	
2	M-55B	12		22		32	
3	M-55DB	13		23		33	
4	EB070208GW1	14		24		34	
5	M-65B	15		25		35	
6	M-78BMS	16		26		36	
7	M-78BDUP	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 21258B4
SDG #: K0806119

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [signature]

All circled elements are applicable to each sample.

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

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

Comments: Mercury by CVAA if performed

LDC #: 21258B4
SDG #: K0806119

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

METHOD: Trace metals (EPA SW 846 Method 6010/6020/7000)
Soil preparation factor applied: NA
Raise to RL.
Reason Code: bl
Sample Concentration units, unless otherwise noted: ug/L
Associated Samples: All except Sr = 1-3, 5.

					Sample Identification									
Analyte	**Maximum PB[a] (ug/l)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**	**RL**	**1**	2	3	4	5					
Al		4.0		50.0				9.7	38.2					
Sb		0.014		0.500	0.271	0.246	0.246		0.264					
B	4.4	10.0		50.0				35.6						
Ba		2.0												
Co		0.4		10.0	0.8	0.6	1.0		0.3					
Cu	1.8	2.1		10.0				1.8	2.6					
Pb	0.089	0.012												
Mg	6.9	3.3												
Mo	1.3													
Sr		0.3												
Na	128	144												
Tl	0.186	0.016		0.200				0.186						
W		0.1		1.0				0.4	0.8					
Zn	0.7			10.0	1.6	0.8	1.0	3.3	1.2					

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

					Sample Identification									
Analyte	**Maximum PB[a] (ug/l)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**	**RL**	**4**									
As		1.4		2.0	1.5									
Sr		0.4		10.0	1.6									

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

LDC #: 21258B4
SDG #: K0806119

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer:

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

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

Raise to RL unless otherwise noted with J+
Reason Code: ~~be~~ CR bp

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 6/16/08 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: (PB)
Associated Samples: All except 4

Analyte	Blank ID		Sample identification											
	PB061608B (SDG#: K0805394)	Action Level	RL	1	2	3	5							
Al	37.6		50.0				38.2							
Ba	1.8													
B	39.6													
Ca	265	2650												
Co	0.4		10.0	0.8	0.6	1.0	0.3							
Cu	1.0		10.0				2.6							
Fe	57.4	574					33.0 J+							
Pb	0.785	7.85		0.912 J+	0.776 J+	0.940 J+	0.915 J+							
Mg	63.1	631												
Mn	55.6	556		60.5 J+	40.3 J+	39.9 J+	11.2 J+							
Mo	1.2													
Ni	0.6													
Na	83.5													
Sr	1.4													
Ti	2.8		10.0	1.7	1.1	0.8	5.2							
W	0.5		1.0				0.8							
Zn	6.1		10.0	1.6	0.8	1.0	1.2							

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

LDC #: 21258B4
SDG #: K0806119

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer:

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

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

Reason Code: be

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 7/2708 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: (EB) Associated Samples: 5

Analyte	Blank ID	Sample Identification											
	4	Action Level	5										
Al	9.7		38.2 / 50.0										
As	1.5												
B	35.6												
Ca	102	1020											
Cr	0.9												
Cu	1.8		2.6 / 10.0										
Fe	7.5												
Pb	0.256	2.56	0.915 J+										
Mg	30.3	303											
Mn	5.3	53	11.2 J+										
Na	230	2300											
Sr	1.6												
Tl	0.186												
W	0.4		0.8 / 1.0										
Zn	3.3		1.2 / 10.0										

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

LDC #: 21258B4
SDG #: K0806119

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: L

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

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

Reason Code: ~~fb~~ bf

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 6/24/08 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: All except 4

Analyte	Blank ID	Sample Identification										
	FB062408GWarea1 (SDG#: K0805722)	Action Level	5									
As	1.6											
B	49											
Ca	12.0											
Fe	2.9											
Mg	1.2											
W	0.4		0.8 / 1.0									

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

LDC #: 21258B4
SDG #: 150806119

VALIDATION FINDINGS WORKSHEET
ICP Interference Check Sample

Reviewer: CR
2nd Reviewer: u

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 Were ICP interference check samples performed as required?
Y (N) N/A Were the AB solution percent recoveries (%R) within the control limits of 80-120% ?
LEVEL IV ONLY:
Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	ICS Identification	Analyte	Finding	Associated Samples	Qualifications
	7-15-08	ICS-AB(13:57	Mg	18	All	No quals (Samples < 90% ICSA

Comments: _____

LDC #: 21258B4
SDG #: R0806119

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 1 of 1
Reviewer: CR
2nd Reviewer

METHOD: Trace metals (EPA SW-846 6010/7000)

#	Sample ID	Analyte	Lab Limit ~~Result (units)~~	QUAPP Limit ~~RL (units)~~	Finding	Qualifications
	All	Se	@ 6.0 ug/L	5.0 ~~ug~~/L ug	Lab Limit > QUAPP Limit	None/P

Comments:

LDC#: 21258B4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer:

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

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

Compound	Concentration (ug/L) 2	Concentration (ug/L) 3	(≤30) RPD	(ug/L) Difference	(ug/L) Limits	Qualifications (Parent Only)
Antimony	0.246	0.246		0	(≤0.5)	
Arsenic	92.5	89.8		2.7	(≤20.0)	
Barium	42.6	42.5	0			
Boron	14600	14300	2			
Calcium	509000	492000	3			
Chromium	11600	11400	2			
Cobalt	0.6	1.0		0.4	(≤10.0)	
Lead	0.776	0.940		0.164	(≤0.200)	
Magnesium	286000	277000	3			
Manganese	40.3	39.9	1			
Molybdenum	16.4	16.7		0.3	(≤10.0)	
Platinum	0.36	0.32		0.04	(≤1.0)	
Potassium	47200	46000	3			
Selenium	9.7	9.2		0.5	(≤50.0)	
Sodium	1660000	1610000	3			
Strontium	14700	14200	3			
Thallium	0.573	0.476		0.097	(≤0.200)	
Titanium	1.1	0.8		0.3	(≤10.0)	
Tungsten	2.5	2.4		0.1	(≤1.0)	

LDC#: 21258B4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: [illegible]

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

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

Compound	Concentration (ug/L) 2	Concentration (ug/L) 3	(≤30) RPD	(ug/L) Difference	(ug/L) Limits	Qualifications (Parent Only)
Uranium	47.1	47.0	0			
Vanadium	45.1	44.9	0			
Zinc	0.8	1.0		0.2	(≤10.0)	

V:\FIELD DUPLICATES\FD_inorganic\21258B4.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: July 7 through July 8, 2008

LDC Report Date: September 2, 2009

Matrix: Soil

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K0806216

Sample Identification

SA67-.5B
SA67-10B
SA67-20B
SA67-30B
SA67-35B
RSAN2-0.5B
RSAN2-10B
RSAN2-20B
SA47-0.5B
SA47-10B
SA47-20B
SA47-30B
SA47-35B
SA183-0.5B
SA67-.5BMS
SA67-.5BDUP

Introduction

This data review covers 16 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)	Calcium Copper Magnesium Manganese Tin Zinc	7.8 mg/Kg 0.3 mg/Kg 1.1 mg/Kg 0.04 mg/Kg 3.1 mg/Kg 0.5 mg/Kg	All samples in SDG K0806216
ICB/CCB	Antimony Boron Barium Calcium Tungsten	0.04 ug/L 5.0 ug/L 2.0 ug/L 20.0 ug/L 0.10 ug/L	All samples in SDG K0806216
ICB/CCB	Magnesium	4.0 ug/L	SA67-.5B SA67-10B SA67-20B RSAN2-0.5B RSAN2-10B RSAN2-20B SA47-0.5B SA47-10B SA47-20B SA183-0.5B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Magnesium	7.0 ug/L	SA67-30B SA67-35B SA47-30B SA47-35B

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
SA67-.5B	Boron Tin	3.1 mg/Kg 3.0 mg/Kg	4.0U mg/Kg 10.0U mg/Kg
SA67-10B	Tin	3.2 mg/Kg	10.7U mg/Kg
SA67-20B	Tin	3.2 mg/Kg	10.6U mg/Kg
SA67-30B	Tin	3.4 mg/Kg	10.8U mg/Kg
SA67-35B	Tin	2.8 mg/Kg	9.4U mg/Kg
RSAN2-0.5B	Tin Tungsten	3.0 mg/Kg 0.16 mg/Kg	10.5U mg/Kg 0.21U mg/Kg
RSAN2-10B	Tin Tungsten	3.2 mg/Kg 0.15 mg/Kg	10.7U mg/Kg 0.21U mg/Kg
RSAN2-20B	Tin	3.2 mg/Kg	11.0U mg/Kg
SA47-0.5B	Tin	3.2 mg/Kg	10.7U mg/Kg
SA47-10B	Tin Tungsten	3.2 mg/Kg 0.22 mg/Kg	12.1U mg/Kg 0.24U mg/Kg
SA47-20B	Tin	3.0 mg/Kg	10.3U mg/Kg
SA47-30B	Tin	3.4 mg/Kg	10.9U mg/Kg
SA47-35B	Tin	2.9 mg/Kg	10.4U mg/Kg
SA183-0.5B	Boron Tin	3.0 mg/Kg 3.4 mg/Kg	4.3U mg/Kg 10.8U mg/Kg

No field blanks were identified in this SDG.

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met with the following exceptions:

ICS ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
ICSAB (7/31/08 17:35)	Magnesium	18 (80-120)	SA67-.5B SA67-10B SA67-20B RSAN2-0.5B RSAN2-10B RSAN2-20B SA47-0.5B SA47-10B SA47-20B SA183-0.5B	None	P
ICSAB (8/1/08 10:18)	Magnesium	18 (80-120)	SA67-30B SA67-35B SA47-30B SA47-35B	None	P

VI. Matrix Spike Analysis

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

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
SA67-.5BMS (All samples in SDG K0806216)	Antimony Tungsten	52.3 (75-125) 60.5 (75-125)	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A

VII. Duplicate Sample Analysis

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

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
SA67-.5BDUP (All samples in SDG K0806216)	Calcium Silver	31.3 (≤20) -	- 0.031 mg/Kg (≤0.025)	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

Raw data were not reviewed for this SDG.

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
SA67-.5BL	Iron Lead Nickel Zinc	10.5 (≤10) 46 (≤10) 28 (≤10) 14.6 (≤10)	All samples in SDG K0806216	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 K0806216	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, 2008 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG K0806216

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0806216	SA67-.5B SA67-10B SA67-20B SA67-30B SA67-35B RSAN2-0.5B RSAN2-10B RSAN2-20B SA47-0.5B SA47-10B SA47-20B SA47-30B SA47-35B SA183-0.5B	Magnesium	None	P	ICP interference check sample analysis (%R)
K0806216	SA67-.5B SA67-10B SA67-20B SA67-30B SA67-35B RSAN2-0.5B RSAN2-10B RSAN2-20B SA47-0.5B SA47-10B SA47-20B SA47-30B SA47-35B SA183-0.5B	Antimony Tungsten	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
K0806216	SA67-.5B SA67-10B SA67-20B SA67-30B SA67-35B RSAN2-0.5B RSAN2-10B RSAN2-20B SA47-0.5B SA47-10B SA47-20B SA47-30B SA47-35B SA183-0.5B	Calcium	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0806216	SA67-.5B SA67-10B SA67-20B SA67-30B SA67-35B RSAN2-0.5B RSAN2-10B RSAN2-20B SA47-0.5B SA47-10B SA47-20B SA47-30B SA47-35B SA183-0.5B	Silver	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (Difference) (ld)
K0806216	SA67-.5B SA67-10B SA67-20B SA67-30B SA67-35B RSAN2-0.5B RSAN2-10B RSAN2-20B SA47-0.5B SA47-10B SA47-20B SA47-30B SA47-35B SA183-0.5B	Iron Lead Nickel Zinc	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)
K0806216	SA67-.5B SA67-10B SA67-20B SA67-30B SA67-35B RSAN2-0.5B RSAN2-10B RSAN2-20B SA47-0.5B SA47-10B SA47-20B SA47-30B SA47-35B SA183-0.5B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG K0806216

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0806216	SA67-.5B	Boron Tin	4.0U mg/Kg 10.0U mg/Kg	A	bl
K0806216	SA67-10B	Tin	10.7U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0806216	SA67-20B	Tin	10.6U mg/Kg	A	bl
K0806216	SA67-30B	Tin	10.8U mg/Kg	A	bl
K0806216	SA67-35B	Tin	9.4U mg/Kg	A	bl
K0806216	RSAN2-0.5B	Tin Tungsten	10.5U mg/Kg 0.21U mg/Kg	A	bl
K0806216	RSAN2-10B	Tin Tungsten	10.7U mg/Kg 0.21U mg/Kg	A	bl
K0806216	RSAN2-20B	Tin	11.0U mg/Kg	A	bl
K0806216	SA47-0.5B	Tin	10.7U mg/Kg	A	bl
K0806216	SA47-10B	Tin Tungsten	12.1U mg/Kg 0.24U mg/Kg	A	bl
K0806216	SA47-20B	Tin	10.3U mg/Kg	A	bl
K0806216	SA47-30B	Tin	10.9U mg/Kg	A	bl
K0806216	SA47-35B	Tin	10.4U mg/Kg	A	bl
K0806216	SA183-0.5B	Boron Tin	4.3U mg/Kg 10.8U mg/Kg	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG K0806216

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21258C4
SDG #: K0806216
Laboratory: Columbia Analytical Services

Date: 8-13-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: LW

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/7/08 - 7/8/08
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	SW	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	SW	Dup
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

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

Validated Samples: SOILS

1	~~SA67-0.5B~~ SA67-.5B	11	SA47-20B	21	PBS1	31	
2	SA67-10B	12	SA47-30B	22		32	
3	SA67-20B	13	SA47-35B	23		33	
4	SA67-30B	14	SA183-0.5B	24		34	
5	SA67-35B	15	SA67-0.5BMS	25		35	
6	RSAN2-0.5B	16	SA67-0.5BDUP	26		36	
7	RSAN2-10B	17		27		37	
8	RSAN2-20B	18		28		38	
9	SA47-0.5B	19		29		39	
10	SA47-10B	20		30		40	

Notes: _____

LDC #: 21258C4
SDG #: K0806216

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

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

Comments: Mercury by CVAA if performed

LDC #: 21258C4
SDG #: K0806216

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason Code: bl

Reviewer: CR
2nd Reviewer: ✓

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

				Sample Identification													
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**	**1**	**2**	3	4	5	6	7	8	9	10	11	12	13	14
Sb		0.04															
B		5.0		3.1 / 4.0													3.0 / 4.3
Ba		2.0															
Ca	7.8	20.0															
Cu	0.3																
Mg	1.1																
Mn	0.04																
Sn	3.1			3.0 / 10.0	3.2 / 10.7	3.2 / 10.6	3.4 / 10.8	2.8 / 9.4	3.0 / 10.5	3.2 / 10.7	3.2 / 11.0	3.2 / 10.7	3.2 / 12.1	3.0 / 10.3	3.4 / 10.9	2.9 / 10.4	3.4 / 10.8
W		0.10							0.16 / ~~0.24~~ 0.21	0.15 / 0.21			0.22 / 0.24				
Zn	0.5																

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 1-3, 6-11, 14

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**	**No Qualifiers**										
Mg		4.0												

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 4,5,12,13

				Sample Identification										
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**	**No Qualifiers**										
Mg		7.0												

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

LDC #: 21258C4
SDG #: R0806216

VALIDATION FINDINGS WORKSHEET
ICP Interference Check Sample

Reviewer: CR
2nd Reviewer:

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

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

(Y) N N/A Were ICP interference check samples performed as required?

Y (N) N/A Were the AB solution percent recoveries (%R) within the control limits of 80-120% ?

LEVEL IV ONLY:

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

#	Date	ICS Identification	Analyte	Finding	Associated Samples	Qualifications
	7/31/08	ICS AB (17:35)	Mg	18	1-3,6-11,14	None / P (samples < 90% ICS A)
	8/1/08	ICS AB (10:18)	Mg	18	4,5,12,13	

Comments:

LDC #: 21258C4
SDG #: R0806246

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

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

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

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

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

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

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

LEVEL IV ONLY:

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

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
	15	Soil	Sb	52.3	All	J-/UJ/A (m)
			W	60.5	↓	↓

Comments: _____

LDC #: 21258C4
SDG #: 1508062A6

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Reviewer: CR
2nd Reviewer: [illegible]

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

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

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

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

LEVEL IV ONLY:

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

#	Duplicate ID	Matrix	Analyte	RPD (Limits)	Difference (Limits)	Associated Samples	Qualifications
	16	Soil	Ca	31.3		All	J/UJ/A (10)
			Ag		0.031 (≤0.025)	J	J

Comments: _____

LDC #: 21258C4
SDG #: K0806216

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

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

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

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

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

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	1	Soil	Cr	9	All	J / UJ / A (sd)
			Fe	10.5		
			Pb	46		
			Ni	28		
			Zn	14.6		

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: July 8 through July 11, 2008

LDC Report Date: August 17, 2009

Matrix: Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K0806221

Sample Identification

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

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)	Magnesium Strontium	3.1 ug/L 0.3 ug/L	All samples in SDG K0806221
ICB/CCB	Antimony Boron Iron Lead Magnesium Platinum Strontium Sodium Thallium Tungsten	0.030 ug/L 7.6 ug/L 5.5 ug/L 0.009 ug/L 5.5 ug/L 0.01 ug/L 0.3 ug/L 182 ug/L 0.007 ug/L 0.1 ug/L	All samples in SDG K0806221

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-39B	Antimony	0.145 ug/L	0.500U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
M-69B	Antimony Lead Thallium Tungsten	0.144 ug/L 0.185 ug/L 0.118 ug/L 0.5 ug/L	0.500U ug/L 0.200U ug/L 0.200U ug/L 1.0U ug/L
I-8B	Antimony Platinum Tungsten	0.117 ug/L 0.90 ug/L 0.4 ug/L	0.500U ug/L 1.00U ug/L 1.0U ug/L
M-96BF	Antimony Platinum	0.337 ug/L 0.13 ug/L	0.500U ug/L 1.00U ug/L
TR-4B	Lead	0.095 ug/L	0.200U ug/L
M-48B	Antimony Lead	0.227 ug/L 0.098 ug/L	0.500U ug/L 0.200U ug/L
CLD3-RB	Antimony	0.200 ug/L	0.500U ug/L
CLD1-RB	Iron	12.6 ug/L	20.0U ug/L
M-123B	Antimony Thallium Tungsten	0.165 ug/L 0.066 ug/L 0.5 ug/L	0.500U ug/L 0.200U ug/L 1.0U ug/L
M-124B	Antimony Tungsten	0.155 ug/L 0.45 ug/L	0.500U ug/L 1.0U ug/L

Sample FB062408GWarea1 (from SDG K0805722) 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
FB062408GWarea1	6/24/08	Arsenic Boron Calcium Iron Magnesium Tungsten	1.6 ug/L 49 ug/L 12.0 ug/L 2.9 ug/L 1.2 ug/L 0.4 ug/L	All samples in SDG K0806221

Sample PB061608B (from SDG K0805394) was identified as a pump blank. No metal contaminants were found in this blank with the following exceptions:

Pump Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
PB061608B	6/16/08	Aluminum	37.6 ug/L	M-39B
		Barium	1.8 ug/L	TR-2B
		Boron	39.6 ug/L	M-69B
		Calcium	265 ug/L	I-BB
		Cobalt	0.4 ug/L	M-96BF
		Copper	1.0 ug/L	M-48B
		Iron	57.4 ug/L	CLD3-RB
		Lead	0.785 ug/L	CLD1-RB
		Magnesium	63.1 ug/L	M-123B
		Manganese	55.6 ug/L	M-124B
		Molybdenum	1.2 ug/L	
		Nickel	0.6 ug/L	
		Sodium	83.5 ug/L	
		Strontium	1.4 ug/L	
		Titanium	2.8 ug/L	
		Tungsten	0.5 ug/L	
		Zinc	6.1 ug/L	

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-39B	Cobalt	0.5 ug/L	10.0U ug/L
	Iron	25.9 ug/L	25.9J+ ug/L
	Lead	0.250 ug/L	0.250J+ ug/L
	Manganese	3.4 ug/L	5.0U ug/L
	Nickel	4.5 ug/L	20.0U ug/L
	Titanium	3.3 ug/L	10.0U ug/L
	Zinc	0.7 ug/L	10.0U ug/L
TR-2B	Iron	297 ug/L	297J+ ug/L
	Lead	0.250 ug/L	0.250J+ ug/L
	Manganese	11.9 ug/L	11.9J+ ug/L
	Molybdenum	8.8 ug/L	10.0U ug/L
	Nickel	1.3 ug/L	20.0U ug/L
	Titanium	9.8 ug/L	10.0U ug/L
	Zinc	3.4 ug/L	10.0U ug/L
M-69B	Iron	37.8 ug/L	37.8J+ ug/L
	Lead	0.185 ug/L	0.200U ug/L
	Manganese	10.0 ug/L	10.0J+ ug/L
	Titanium	0.9 ug/L	10.0U ug/L
	Tungsten	0.5 ug/L	1.0U ug/L
	Zinc	2.9 ug/L	10.0U ug/L
M-69B	Tungsten	0.5 ug/L	1.0U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
I-BB	Aluminum Cobalt Iron Lead Manganese Tungsten Zinc	37.2 ug/L 0.4 ug/L 96.4 ug/L 0.359 ug/L 12.7 ug/L 0.4 ug/L 5.6 ug/L	50.0U ug/L 10.0U ug/L 96.4J+ ug/L 0.359J+ ug/L 12.7J+ ug/L 1.0U ug/L 10.0U ug/L
I-BB	Tungsten	0.4 ug/L	1.0U ug/L
M-96BF	Cobalt Copper Lead Manganese Nickel Zinc	1.2 ug/L 1.2 ug/L 1.350 ug/L 43.3 ug/L 2.1 ug/L 4.2 ug/L	10.0U ug/L 10.0U ug/L 1.350J+ ug/L 43.3J+ ug/L 20.0U ug/L 10.0U ug/L
M-48B	Aluminum Cobalt Lead Manganese Nickel Zinc	31.9 ug/L 0.5 ug/L 0.098 ug/L 35.7 ug/L 1.4 ug/L 3.8 ug/L	50.0U ug/L 10.0U ug/L 0.200U ug/L 35.7J+ ug/L 20.0U ug/L 10.0U ug/L
CLD3-RB	Aluminum Lead Manganese Zinc	48.3 ug/L 0.325 ug/L 3.5 ug/L 7.0 ug/L	50.0U ug/L 0.325J+ ug/L 5.0U ug/L 10.0U ug/L
CLD1-RB	Aluminum Cobalt Iron Lead Manganese Nickel Zinc	28.7 ug/L 3.0 ug/L 12.6 ug/L 0.311 ug/L 268 ug/L 4.9 ug/L 2.6 ug/L	50.0U ug/L 10.0U ug/L 20.0U ug/L 0.311J+ ug/L 268J+ ug/L 20.0U ug/L 10.0U ug/L
CLD1-RB	Iron	12.6 ug/L	20.0U ug/L
M-123B	Cobalt Iron Lead Manganese Molybdenum Titanium Tungsten Zinc	0.6 ug/L 108 ug/L 0.231 ug/L 49.0 ug/L 8.3 ug/L 4.5 ug/L 0.5 ug/L 3.1 ug/L	10.0U ug/L 108J+ ug/L 0.231J+ ug/L 49.0J+ ug/L 10.0U ug/L 10.0U ug/L 1.0U ug/L 10.0U ug/L
M-123B	Tungsten	0.5 ug/L	1.0U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
M-124B	Cobalt Iron Lead Manganese Tungsten Zinc	0.3 ug/L 296 ug/L 0.327 ug/L 10.7 ug/L 0.45 ug/L 3.2 ug/L	10.0U ug/L 296J+ ug/L 0.327J+ ug/L 10.7J+ ug/L 1.0U ug/L 10.0U ug/L
M-124B	Tungsten	0.45 ug/L	1.0U 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) analyses 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

Raw data were not reviewed for this SDG.

X. Furnace Atomic Absorption QC

All graphite furnace atomic absorption QC were within validation criteria.

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-96BFL	Potassium	20 (≤10)	All samples in SDG K0806221	J (all detects) UJ (all non-detects)	A

XII. Sample Result Verification and Project Quantitation Limit

All sample result verifications were acceptable.

The QAPP PQLs were met with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
All samples in SDG K0806221	Selenium	Laboratory reporting limit reported at 6.0 ug/L.	PQL should be reported at 5.0 ug/L per the QAPP.	None	P

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG K0806221	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, 2008 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG K0806221

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0806221	M-39B TR-2B M-69B I-BB M-96BF TR-4B M-48B CLD3-RB CLD1-RB M-123B M-124B	Potassium	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)
K0806221	M-39B TR-2B M-69B I-BB M-96BF TR-4B M-48B CLD3-RB CLD1-RB M-123B M-124B	Selenium	None	P	Sample result verification
K0806221	M-39B TR-2B M-69B I-BB M-96BF TR-4B M-48B CLD3-RB CLD1-RB M-123B M-124B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG K0806221

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0806221	M-39B	Antimony	0.500U ug/L	A	bl
K0806221	M-69B	Antimony Lead Thallium Tungsten	0.500U ug/L 0.200U ug/L 0.200U ug/L 1.0U ug/L	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0806221	I-BB	Antimony Platinum Tungsten	0.500U ug/L 1.00U ug/L 1.0U ug/L	A	bl
K0806221	M-96BF	Antimony Platinum	0.500U ug/L 1.00U ug/L	A	bl
K0806221	TR-4B	Lead	0.200U ug/L	A	bl
K0806221	M-48B	Antimony Lead	0.500U ug/L 0.200U ug/L	A	bl
K0806221	CLD3-RB	Antimony	0.500U ug/L	A	bl
K0806221	CLD1-RB	Iron	20.0U ug/L	A	bl
K0806221	M-123B	Antimony Thallium Tungsten	0.500U ug/L 0.200U ug/L 1.0U ug/L	A	bl
K0806221	M-124B	Antimony Tungsten	0.500U ug/L 1.0U ug/L	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG K0806221

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0806221	M-39B	Cobalt Iron Lead Manganese Nickel Titanium Zinc	10.0U ug/L 25.9J+ ug/L 0.250J+ ug/L 5.0U ug/L 20.0U ug/L 10.0U ug/L 10.0U ug/L	A	bp
K0806221	TR-2B	Iron Lead Manganese Molybdenum Nickel Titanium Zinc	297J+ ug/L 0.250J+ ug/L 11.9J+ ug/L 10.0U ug/L 20.0U ug/L 10.0U ug/L 10.0U ug/L	A	bp

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0806221	M-69B	Iron Lead Manganese Titanium Tungsten Zinc	37.8J+ ug/L 0.200U ug/L 10.0J+ ug/L 10.0U ug/L 1.0U ug/L 10.0U ug/L	A	bp
K0806221	M-69B	Tungsten	1.0U ug/L	A	bf
K0806221	I-BB	Aluminum Cobalt Iron Lead Manganese Tungsten Zinc	50.0U ug/L 10.0U ug/L 96.4J+ ug/L 0.359J+ ug/L 12.7J+ ug/L 1.0U ug/L 10.0U ug/L	A	bp
K0806221	I-BB	Tungsten	1.0U ug/L	A	bf
K0806221	M-96BF	Cobalt Copper Lead Manganese Nickel Zinc	10.0U ug/L 10.0U ug/L 1.350J+ ug/L 43.3J+ ug/L 20.0U ug/L 10.0U ug/L	A	bp
K0806221	M-48B	Aluminum Cobalt Lead Manganese Nickel Zinc	50.0U ug/L 10.0U ug/L 0.200U ug/L 35.7J+ ug/L 20.0U ug/L 10.0U ug/L	A	bp
K0806221	CLD3-RB	Aluminum Lead Manganese Zinc	50.0U ug/L 0.325J+ ug/L 5.0U ug/L 10.0U ug/L	A	bp
K0806221	CLD1-RB	Aluminum Cobalt Iron Lead Manganese Nickel Zinc	50.0U ug/L 10.0U ug/L 20.0U ug/L 0.311J+ ug/L 268J+ ug/L 20.0U ug/L 10.0U ug/L	A	bp
K0806221	CLD1-RB	Iron	20.0U ug/L	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0806221	M-123B	Cobalt Iron Lead Manganese Molybdenum Titanium Tungsten Zinc	10.0U ug/L 108J+ ug/L 0.231J+ ug/L 49.0J+ ug/L 10.0U ug/L 10.0U ug/L 1.0U ug/L 10.0U ug/L	A	bp
K0806221	M-123B	Tungsten	1.0U ug/L	A	bf
K0806221	M-124B	Cobalt Iron Lead Manganese Tungsten Zinc	10.0U ug/L 296J+ ug/L 0.327J+ ug/L 10.7J+ ug/L 1.0U ug/L 10.0U ug/L	A	bp
K0806221	M-124B	Tungsten	1.0U ug/L	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21258D4 Date: 8-13-09
SDG #: K0806221 Page: 1 of 1
Laboratory: Columbia Analytical Services Reviewer: CR
2nd Reviewer: M

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/8/08 - 7/11/08
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	SW	
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	A	Dup
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	A	
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	SW	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	SW	FB= FB062408GWarea7 (SDG# K0805722) PB= PB061608B (SDG# K0805394)

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

Validated Samples:
Water

1	M-39B	11	M-124B	21	PBW1	31	
2	TR-2B	12	M-96BFMS	22		32	
3	M-69B	13	M-96BFDUP	23		33	
4	I-BB	14	CLD3-RBMS	24		34	
5	M-96BF	15	CLD3-RBDUP	25		35	
6	TR-4B	16		26		36	
7	M-48B	17		27		37	
8	CLD3-RB	18		28		38	
9	CLD1-RB	19		29		39	
10	M-123B	20		30		40	

Notes: _____

LDC #: 21258D4
SDG #: K0806221

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

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

Comments: Mercury by CVAA if performed

LDC #: 21258D4
SDG #: K0806221

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Raise to RL.
Reason Code: bl

Reviewer: CR
2nd Reviewer:

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

					Sample Identification									
Analyte	**Maximum PB[a] (ug/l)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**	**RL**	**1**	3	4	5	6	7	8	9	10	11
Sb		0.030		0.500	0.145	0.144	0.117	0.337		0.227	0.200		0.165	0.155
B		7.6												
Fe		5.5		20.0								12.6		
Pb		0.009		0.200		0.185			0.095	0.098				
Mg	3.1	5.5												
Pt		0.01		1.00			0.90	0.13						
Sr	0.3	0.3												
Na		182												
Tl		0.007		0.200		0.118							0.066	
W		0.1		1.0		0.5	0.4						0.5	0.45

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 21258D4
SDG #: K0806221

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: ✓

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

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

Raise to RL.
Reason Code: bf

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 6/24/08 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: All

Analyte	Blank ID	Sample Identification										
	FB062408GWarea1 (SDG#: K0805722)	Action Level	3	4	9	10	11					
As	1.6											
B	49											
Ca	12.0											
Fe	2.9	20.0			12.6							
Mg	1.2											
W	0.4	1.0	0.5	0.4		0.5	0.45					

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 #: 21258D4
SDG #: K0806221

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer:

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

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

Raise to RL unless otherwise noted with J+
Reason Code: ~~be~~ CR bp

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 6/16/08 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: (PB) Associated Samples: All except 6

Analyte	Blank ID		Sample Identification										
	PB061608B (SDG#: K0805394)	Action Level	RL	1	2	3	4	5	7	8	9	10	11
Al	37.6		50.0				37.2		31.9	48.3	28.7		
Ba	1.8												
B	39.6												
Ca	265	2650											
Co	0.4		10.0	0.5			0.4	1.2	0.5		3.0	0.6	0.3
Cu	1.0		10.0					1.2					
Fe	57.4	574	20.0	25.9 J+	297 J+	37.8 J+	96.4 J+				12.6	108 J+	296 J+
Pb	0.785	7.85	0.200	0.250 J+	0.250 J+	0.185	0.359 J+	1.350 J+	0.098	0.325 J+	0.311 J+	0.231 J+	0.327 J+
Mg	63.1	631							~~35.7 J+~~				
Mn	55.6	556	5.0	3.4	11.9 J+	10.0 J+	12.7 J+	43.3 J+	35.7 J+	3.5	268 J+	49.0 J+	10.7 J+
Mo	1.2		10.0		8.8							8.3	
Ni	0.6		20.0	4.5	1.3			2.1	1.4		4.9		
Na	83.5												
Sr	1.4												
Ti	2.8		10.0	3.3	9.8	0.9						4.5	
W	0.5		1.0			0.5	0.4					0.5	0.45
Zn	6.1		10.0	0.7	3.4	2.9	5.6	4.2	3.8	7.0	2.6	3.1	3.2

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

LDC #: 21258D4
SDG #: R0806221

VALIDATION FINDINGS WORKSHEET
ICP Interference Check Sample

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

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

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

Y N N/A Were ICP interference check samples performed as required?
Y (N) N/A Were the AB solution percent recoveries (%R) within the control limits of 80-120%?
LEVEL IV ONLY:
Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	ICS Identification	Analyte	Finding	Associated Samples	Qualifications
	8/1/08	ICSAB(10:18)	Mg	18	All	No Quals (samples ≤ 90% ICSA)

Comments:

LDC #: 21258D4
SDG #: 1508622-1

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

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

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

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

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

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	5	water	15	20	All	J | UJ | A ~~(y)~~ (sd)

Comments:

SDIL_4S2

LDC #: 21258D1
SDG #: 1508062221

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW-846 6010/7000)

#	Sample ID	Analyte	Lab Limit ~~Result (units)~~	QUAPP Limit ~~RL (units)~~	Finding	Qualifications
1	~~AB~~ AM	Se	@ 6.0 ug/L	5.0 ~~mg~~/L ug	Lab Limit > QUAPP Limit	None/P

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: July 8 through July 9, 2008

LDC Report Date: September 3, 2009

Matrix: Soil

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K0806275

Sample Identification

SA183-10B	SA183-10BDUP
SA183-10BD	
SA183-20B	
SA183-30B	
SA183-33B	
RSA04-0.5B	
RSA04-10B	
RSA04-20B	
RSA04-30B	
RSA04-36B	
RSAN2-30B	
RSAN2-30BD	
RSAN2-35B	
RSA02-0.5B	
RSA02-10B	
RSA02-20B	
RSA02-20BD	
RSA02-30B	
RSA02-33B	
SA183-10BMS	

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)	Barium Calcium Tin Titanium Zinc	0.2 mg/Kg 1.4 mg/Kg 3.0 mg/Kg 0.06 mg/Kg 0.5 mg/Kg	All samples in SDG K0806275
ICB/CCB	Calcium	20.0 ug/L	SA183-20B SA183-33B RSA04-0.5B RSA04-10B RSA04-20B RSA04-30B RSA04-36B RSAN2-30B RSAN2-30BD RSAN2-35B RSA02-0.5B RSA02-10B RSA02-20B RSA02-20BD RSA02-30B RSA02-33B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Magnesium	6.0 ug/L	RSA02-0.5B RSA02-10B RSA02-20B RSA02-20BD RSA02-30B RSA02-33B
ICB/CCB	Mercury	0.020 ug/L	SA183-10B SA183-10BD SA183-20B SA183-30B SA183-33B RSA04-0.5B RSA04-10B RSA04-20B RSA04-30B RSA04-36B RSAN2-30B RSAN2-30BD RSAN2-35B RSA02-0.5B
ICB/CCB	Boron Tungsten	5.0 ug/L 0.051 ug/L	All samples in SDG K0806275

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
SA183-10B	Boron Mercury Tin Tungsten	3.8 mg/Kg 0.007 mg/Kg 2.9 mg/Kg 0.19 mg/Kg	4.2U mg/Kg 0.019U mg/Kg 10.5U mg/Kg 0.21U mg/Kg
SA183-10BD	Mercury Tin Tungsten	0.007 mg/Kg 3.0 mg/Kg 0.17 mg/Kg	0.020U mg/Kg 10.9U mg/Kg 0.21U mg/Kg
SA183-20B	Mercury Tin	0.011 mg/Kg 3.4 mg/Kg	0.025U mg/Kg 10.5U mg/Kg
SA183-30B	Mercury Tin	0.002 mg/Kg 3.2 mg/Kg	0.019U mg/Kg 11.7U mg/Kg
SA183-33B	Mercury Tin	0.004 mg/Kg 3.4 mg/Kg	0.018U mg/Kg 10.9U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSA04-0.5B	Boron Mercury Tin	3.6 mg/Kg 0.019 mg/Kg 3.0 mg/Kg	4.2U mg/Kg 0.020U mg/Kg 10.5U mg/Kg
RSA04-10B	Mercury Tin Tungsten	0.003 mg/Kg 3.3 mg/Kg 0.15 mg/Kg	0.016U mg/Kg 10.9U mg/Kg 0.22U mg/Kg
RSA04-20B	Mercury Tin	0.003 mg/Kg 3.6 mg/Kg	0.019U mg/Kg 12.2U mg/Kg
RSA04-30B	Tin	2.9 mg/Kg	10.6U mg/Kg
RSA04-36B	Mercury Tin	0.006 mg/Kg 3.3 mg/Kg	0.018U mg/Kg 10.8U mg/Kg
RSAN2-30B	Mercury Tin	0.009 mg/Kg 3.5 mg/Kg	0.020U mg/Kg 11.6U mg/Kg
RSAN2-30BD	Mercury Tin	0.007 mg/Kg 3.4 mg/Kg	0.018U mg/Kg 11.2U mg/Kg
RSAN2-35B	Mercury Tin Tungsten	0.007 mg/Kg 3.4 mg/Kg 0.19 mg/Kg	0.021U mg/Kg 10.8U mg/Kg 0.22U mg/Kg
RSA02-0.5B	Mercury Tin	0.015 mg/Kg 2.9 mg/Kg	0.016U mg/Kg 10.7U mg/Kg
RSA02-10B	Tin Tungsten	3.1 mg/Kg 0.16 mg/Kg	10.6U mg/Kg 0.21U mg/Kg
RSA02-20B	Tin Tungsten	3.2 mg/Kg 0.20 mg/Kg	11.8U mg/Kg 0.24U mg/Kg
RSA02-20BD	Tin Tungsten	3.6 mg/Kg 0.21 mg/Kg	11.2U mg/Kg 0.23U mg/Kg
RSA02-30B	Tin Tungsten	3.3 mg/Kg 0.13 mg/Kg	10.7U mg/Kg 0.21U mg/Kg
RSA02-33B	Tin Tungsten	2.7 mg/Kg 0.17 mg/Kg	10.3U mg/Kg 0.21U mg/Kg

No field blanks were identified 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) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
SA183-10BMS (All samples in SDG K0806275)	Antimony	50.5 (75-125)	J- (all detects) UJ (all non-detects)	A
	Tungsten	58.3 (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
SA183-10BMS (All samples in SDG K0806275)	Barium	21.0 (≤20)	-	J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

Raw data were not reviewed for this SDG.

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
SA183-10BL	Cobalt Nickel Zinc	11.9 (≤10) 21 (≤10) 16.3 (≤10)	All samples in SDG K0806275	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 K0806275	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 SA183-10B and SA183-10BD, samples RSAN2-30B and RSAN2-30BD, and samples RSA02-20B and RSA02-20BD were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA183-10B	SA183-10BD				
Aluminum	8160	11900	37 (≤50)	-	-	-
Antimony	0.11	0.08	-	0.03 (≤0.05)	-	-
Arsenic	2.09	2.97	-	0.88 (≤1.08)	-	-
Barium	158	263	50 (≤50)	-	-	-
Beryllium	0.442	0.504	13 (≤50)	-	-	-
Boron	3.8	7.2	-	3.4 (≤10.9)	-	-
Cadmium	0.169	0.163	-	0.006 (≤0.043)	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA183-10B	SA183-10BD				
Calcium	27400	49900	58 (≤50)	-	J (all detects)	A
Chromium	7.84	9.71	21 (≤50)	-	-	-
Cobalt	6.01	7.09	-	1.08 (≤2.17)	-	-
Copper	16.5	17.3	5 (≤50)	-	-	-
Iron	16200	17600	8 (≤50)	-	-	-
Lead	9.92	8.99	10 (≤50)	-	-	-
Magnesium	7790	15500	66 (≤50)	-	J (all detects)	A
Manganese	406	398	2 (≤50)	-	-	-
Mercury	0.007	0.007	-	0 (≤0.020)	-	-
Molybdenum	0.33	0.42	-	0.09 (≤0.11)	-	-
Nickel	12.7	15.0	17 (≤50)	-	-	-
Potassium	1650	1980	-	330 (≤435)	-	-
Silver	0.035	0.031	-	0.004 (≤0.026)	-	-
Sodium	410	739	57 (≤50)	-	J (all detects)	A
Strontium	185	303	-	118 (≤435)	-	-
Thallium	0.093	0.090	-	0.003 (≤0.043)	-	-
Tin	2.9	3.0	-	0.1 (≤10.9)	-	-
Titanium	815	851	4 (≤50)	-	-	-
Tungsten	0.19	0.17	-	0.02 (≤0.43)	-	-
Uranium	1.100	2.200	67 (≤50)	-	J (all detects)	A

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA183-10B	SA183-10BD				
Vanadium	43.9	46.4	6 (≤50)	-	-	-
Zinc	29.6	31.9	7 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	RSAN2-30B	RSAN2-30BD				
Aluminum	25500	25200	1 (≤50)	-	-	-
Antimony	0.15	0.18	-	0.03 (≤0.06)	-	-
Arsenic	20.9	19.5	7 (≤50)	-	-	-
Barium	252	578	79 (≤50)	-	J (all detects)	A
Beryllium	0.977	0.967	1 (≤50)	-	-	-
Boron	36.8	35.0	-	1.8 (≤11.6)	-	-
Cadmium	0.234	0.223	-	0.011 (≤0.046)	-	-
Calcium	7370	8000	8 (≤50)	-	-	-
Chromium	31.9	24.6	26 (≤50)	-	-	-
Cobalt	7.30	7.46	-	0.16 (≤2.31)	-	-
Copper	19.0	19.0	0 (≤50)	-	-	-
Iron	19700	19700	0 (≤50)	-	-	-
Lead	12.7	12.4	2 (≤50)	-	-	-
Magnesium	51500	50200	3 (≤50)	-	-	-
Manganese	606	648	7 (≤50)	-	-	-
Mercury	0.009	0.007	-	0.002 (≤0.020)	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	RSAN2-30B	RSAN2-30BD				
Molybdenum	1.20	1.17	3 (≤50)	-	-	-
Nickel	14.6	14.1	3 (≤50)	-	-	-
Platinum	0.03	0.03	-	0 (≤0.23)	-	-
Potassium	5380	5390	0 (≤50)	-	-	-
Sodium	6150	5590	10 (≤50)	-	-	-
Strontium	143	155	-	12 (≤462)	-	-
Thallium	0.327	0.318	3 (≤50)	-	-	-
Tin	3.5	3.4	-	0.1 (≤11.6)	-	-
Titanium	955	984	3 (≤50)	-	-	-
Tungsten	0.69	0.76	-	0.07 (≤0.46)	-	-
Uranium	4.100	3.900	5 (≤50)	-	-	-
Vanadium	46.2	47.9	4 (≤50)	-	-	-
Zinc	50.4	50.6	0 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	RSA02-20B	RSA02-20BD				
Aluminum	21200	18900	11 (≤50)	-	-	-
Antimony	0.11	0.12	-	0.01 (≤0.06)	-	-
Arsenic	24.5	17.8	32 (≤50)	-	-	-
Barium	51.7	100	-	48.3 (≤23.6)	J (all detects)	A
Beryllium	0.770	0.665	15 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	RSA02-20B	RSA02-20BD				
Boron	30.8	25.4	-	5.4 (≤11.8)	-	-
Cadmium	0.166	0.151	-	0.015 (≤0.047)	-	-
Calcium	6400	15500	83 (≤50)	-	J (all detects)	A
Chromium	30.6	25.8	17 (≤50)	-	-	-
Cobalt	6.26	6.32	-	0.06 (≤2.36)	-	-
Copper	15.3	16.7	9 (≤50)	-	-	-
Iron	18700	19600	5 (≤50)	-	-	-
Lead	11.0	9.75	12 (≤50)	-	-	-
Magnesium	41200	34400	18 (≤50)	-	-	-
Manganese	255	298	16 (≤50)	-	-	-
Mercury	0.002U	0.005	-	0.003 (≤0.021)	-	-
Molybdenum	0.56	1.06	-	0.5 (≤0.12)	J (all detects)	A
Nickel	12.0	12.7	6 (≤50)	-	-	-
Platinum	0.03	0.02U	-	0.01 (≤0.24)	-	-
Potassium	4580	4000	14 (≤50)	-	-	-
Sodium	1600	1640	2 (≤50)	-	-	-
Strontium	135	457	-	322 (≤472)	-	-
Thallium	0.261	0.202	25 (≤50)	-	-	-
Tin	3.2	3.6	-	0.4 (≤11.8)	-	-
Titanium	848	914	7 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	RSA02-20B	RSA02-20BD				
Tungsten	0.20	0.21	-	0.01 (≤0.47)	-	-
Uranium	14	9.900	34 (≤50)	-	-	-
Vanadium	55.2	54.2	2 (≤50)	-	-	-
Zinc	40.7	37.4	8 (≤50)	-	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG K0806275

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0806275	SA183-10B SA183-10BD SA183-20B SA183-30B SA183-33B RSA04-0.5B RSA04-10B RSA04-20B RSA04-30B RSA04-36B RSAN2-30B RSAN2-30BD RSAN2-35B RSA02-0.5B RSA02-10B RSA02-20B RSA02-20BD RSA02-30B RSA02-33B	Antimony Tungsten	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
K0806275	SA183-10B SA183-10BD SA183-20B SA183-30B SA183-33B RSA04-0.5B RSA04-10B RSA04-20B RSA04-30B RSA04-36B RSAN2-30B RSAN2-30BD RSAN2-35B RSA02-0.5B RSA02-10B RSA02-20B RSA02-20BD RSA02-30B RSA02-33B	Barium	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (id)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0806275	SA183-10B SA183-10BD SA183-20B SA183-30B SA183-33B RSA04-0.5B RSA04-10B RSA04-20B RSA04-30B RSA04-36B RSAN2-30B RSAN2-30BD RSAN2-35B RSA02-0.5B RSA02-10B RSA02-20B RSA02-20BD RSA02-30B RSA02-33B	Cobalt Nickel Zinc	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)
K0806275	SA183-10B SA183-10BD SA183-20B SA183-30B SA183-33B RSA04-0.5B RSA04-10B RSA04-20B RSA04-30B RSA04-36B RSAN2-30B RSAN2-30BD RSAN2-35B RSA02-0.5B RSA02-10B RSA02-20B RSA02-20BD RSA02-30B RSA02-33B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
K0806275	SA183-10B SA183-10BD	Calcium Magnesium Sodium Uranium	J (all detects) J (all detects) J (all detects) J (all detects)	A	Field duplicates (RPD) (fd)
K0806275	RSAN2-30B RSAN2-30BD	Barium	J (all detects)	A	Field duplicates (RPD) (fd)
K0806275	RSA02-20B RSA02-20BD	Barium Molybdenum	J (all detects) J (all detects)	A	Field duplicates (Difference) (fd)
K0806275	RSA02-20B RSA02-20BD	Calcium	J (all detects)	A	Field duplicates (RPD) (fd)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG K0806275

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0806275	SA183-10B	Boron Mercury Tin Tungsten	4.2U mg/Kg 0.019U mg/Kg 10.5U mg/Kg 0.21U mg/Kg	A	bl
K0806275	SA183-10BD	Mercury Tin Tungsten	0.020U mg/Kg 10.9U mg/Kg 0.21U mg/Kg	A	bl
K0806275	SA183-20B	Mercury Tin	0.025U mg/Kg 10.5U mg/Kg	A	bl
K0806275	SA183-30B	Mercury Tin	0.019U mg/Kg 11.7U mg/Kg	A	bl
K0806275	SA183-33B	Mercury Tin	0.018U mg/Kg 10.9U mg/Kg	A	bl
K0806275	RSA04-0.5B	Boron Mercury Tin	4.2U mg/Kg 0.020U mg/Kg 10.5U mg/Kg	A	bl
K0806275	RSA04-10B	Mercury Tin Tungsten	0.016U mg/Kg 10.9U mg/Kg 0.22U mg/Kg	A	bl
K0806275	RSA04-20B	Mercury Tin	0.019U mg/Kg 12.2U mg/Kg	A	bl
K0806275	RSA04-30B	Tin	10.6U mg/Kg	A	bl
K0806275	RSA04-36B	Mercury Tin	0.018U mg/Kg 10.8U mg/Kg	A	bl
K0806275	RSAN2-30B	Mercury Tin	0.020U mg/Kg 11.6U mg/Kg	A	bl
K0806275	RSAN2-30BD	Mercury Tin	0.018U mg/Kg 11.2U mg/Kg	A	bl
K0806275	RSAN2-35B	Mercury Tin Tungsten	0.021U mg/Kg 10.8U mg/Kg 0.22U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0806275	RSA02-0.5B	Mercury Tin	0.016U mg/Kg 10.7U mg/Kg	A	bl
K0806275	RSA02-10B	Tin Tungsten	10.6U mg/Kg 0.21U mg/Kg	A	bl
K0806275	RSA02-20B	Tin Tungsten	11.8U mg/Kg 0.24U mg/Kg	A	bl
K0806275	RSA02-20BD	Tin Tungsten	11.2U mg/Kg 0.23U mg/Kg	A	bl
K0806275	RSA02-30B	Tin Tungsten	10.7U mg/Kg 0.21U mg/Kg	A	bl
K0806275	RSA02-33B	Tin Tungsten	10.3U mg/Kg 0.21U mg/Kg	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG K0806275

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21258E4
SDG #: K0806275
Laboratory: Columbia Analytical Services

Date: 8-13-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: M

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/8/08 - 7/9/08
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	SW	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	SW	Dup
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(1,2), (11,12), (16,17)
XV	Field Blanks	N	

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

Validated Samples: soils

1	SA183-10B	11	RSAN2-30B	21	SA183-10BDUP	31	PBS1
2	SA183-10BD	12	RSAN2-30BD	22		32	
3	SA183-20B	13	RSAN2-35B	23		33	
4	SA183-30B	14	RSA02-0.5B	24		34	
5	SA183-33B	15	RSA02-10B	25		35	
6	RSA04-0.5B	16	RSA02-20B	26		36	
7	RSA04-10B	17	RSA02-20BD	27		37	
8	RSA04-20B	18	RSA02-30B	28		38	
9	RSA04-30B	19	RSA02-33B	29		39	
10	RSA04-36B	20	SA183-10BMS	30		40	

Notes:

LDC #: 21258E4
SDG #: K0806275

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-19	soil	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:2024	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Analysis Method

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

Comments: Mercury by CVAA if performed

LDC #: 21258E4
SDG #: K0806275
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 except Ca CCB = 3, 5-19, Mg = 14-19, Hg = 1-14.

Reviewer: CR
2nd Reviewer:

				Sample Identification									
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**1**	**2**	3	4	5	6	7	8	9	10
Ba	0.2												
B		5.0		3.8 / 4.2					3.6 / 4.2				
Ca	1.4	20.0											
Mg		6.0											
Hg		0.020		0.007 / 0.019	0.007 / 0.020	0.011 / 0.025	0.002 / 0.019	0.004 / 0.018	0.019 / 0.020	0.003 / 0.016	0.003 / 0.019		0.006 / 0.018
Sn	3.0			2.9 / 10.5	3.0 / 10.9	3.4 / 10.5	3.2 / 11.7	3.4 / 10.9	3.0 / 10.5	3.3 / 10.9	3.6 / 12.2	2.9 / 10.6	3.3 / 10.8
Ti	0.06												
W		0.051		0.19 / 0.21	0.17 / 0.21					0.15 / 0.22			
Zn	0.5												

				Sample Identification									
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum ICB/CCB[a] (ug/L)**	**Action Limit**	**11**	**12**	**13**	14	15	16	17	18	19	
Ba	0.2												
B		5.0											
Ca	1.4	20.0											
Mg		6.0											
Hg		0.020		0.009 / 0.020	0.007 / 0.018	0.007 / 0.021	0.015 / 0.016						
Sn	3.0			3.5 / 11.6	3.4 / 11.2	3.4 / 10.8	2.9 / 10.7	3.1 / 10.6	3.2 / 11.8	3.6 / 11.2	3.3 / 10.7	2.7 / 10.3	
Ti	0.06												
W		0.051				0.19 / 0.22		0.16 / 0.21	0.20 / 0.24	0.21 / 0.23	0.13 / 0.21	0.17 / 0.21	
Zn	0.5												

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

LDC #: 21258E4
SDG #: R0806275

VALIDATION FINDINGS WORKSHEET
ICP Interference Check Sample

Reviewer: CR
2nd Reviewer: L

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

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

Y N N/A Were ICP interference check samples performed as required?

Y N N/A Were the AB solution percent recoveries (%R) within the control limits of 80-120% ?

LEVEL IV ONLY:

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

#	Date	ICS Identification	Analyte	Finding	Associated Samples	Qualifications
	8/1/08	ICSAB (10:18)	Mg	18	All	None (sampled <90% ICSA)

Comments:

LDC #: 21258E4
SDG #: I50806275

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

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

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

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

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

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

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

LEVEL IV ONLY:

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

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
	20	Soil	Sb	50.5	All	J- / UJ / A (m)
			W	58.3	↓	↓

Comments:

LDC #: 21258E4
SDG #: R0606275

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

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

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

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

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

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

LEVEL IV ONLY:

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

#	Duplicate ID	Matrix	Analyte	RPD (Limits)	Difference (Limits)	Associated Samples	Qualifications
	21	soil	Ba	21.0		All	J/UJ/A (1d)

Comments:

LDC #: 21258E4
SDG #: 150606275

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

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

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

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

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

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	1	~~Soil~~	~~Fe~~	~~14~~ CR	All	J/UJ/A (SD)
			Co	11.9		
			~~Pb~~	~~73~~ CR		
			Ni	21		
			Zn	16.3		

Comments:

LDC#: 21258E4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer:

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

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

Compound	Concentration (mg/Kg) 1	Concentration (mg/Kg) 2	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Aluminum	8160	11900	37			
Antimony	0.11	0.08		0.03	(≤0.05)	
Arsenic	2.09	2.97		0.88	(≤1.08)	
Barium	158	263	50			
Beryllium	0.442	0.504	13			
Boron	3.8	7.2		3.4	(≤10.9)	
Cadmium	0.169	0.163		0.006	(≤0.043)	
Calcium	27400	49900	58			Jdet/A fd
Chromium	7.84	9.71	21			
Cobalt	6.01	7.09		1.08	(≤2.17)	
Copper	16.5	17.3	5			
Iron	16200	17600	8			
Lead	9.92	8.99	10			
Magnesium	7790	15500	66			Jdet/A fd
Manganese	406	398	2			
Mercury	0.007	0.007		0	(≤0.020)	
Molybdenum	0.33	0.42		0.09	(≤0.11)	
Nickel	12.7	15.0	17			
Potassium	1650	1980		330	(≤435)	

LDC#: 21258E4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: 1

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

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

Compound	Concentration (mg/Kg) 1	Concentration (mg/Kg) 2	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Silver	0.035	0.031		0.004	(≤0.026)	
Sodium	410	739	57			Jdet/A fd
Strontium	185	303		118	(≤435)	
Thallium	0.093	0.090		0.003	(≤0.043)	
Tin	2.9	3.0		0.1	(≤10.9)	
Titanium	815	851	4			
Tungsten	0.19	0.17		0.02	(≤0.43)	
Uranium	1.100	2.200	67			Jdet/A fd
Vanadium	43.9	46.4	6			
Zinc	29.6	31.9	7			

LDC#: 21258E4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer:

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

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

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	11	12				
Aluminum	25500	25200	1			
Antimony	0.15	0.18		0.03	(≤0.06)	
Arsenic	20.9	19.5	7			
Barium	252	578	79			Jdet/A fd
Beryllium	0.977	0.967	1			
Boron	36.8	35.0		1.8	(≤11.6)	
Cadmium	0.234	0.223		0.011	(≤0.046)	
Calcium	7370	8000	8			
Chromium	31.9	24.6	26			
Cobalt	7.30	7.46		0.16	(≤2.31)	
Copper	19.0	19.0	0			
Iron	19700	19700	0			
Lead	12.7	12.4	2			
Magnesium	51500	50200	3			
Manganese	606	648	7			
Mercury	0.009	0.007		0.002	(≤0.020)	
Molybdenum	1.20	1.17	3			
Nickel	14.6	14.1	3			
Platinum	0.03	0.03		0	(≤0.23)	

LDC#: 21258E4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: ER
2nd Reviewer:

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

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

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	11	12				
Potassium	5380	5390	0			
Sodium	6150	5590	10			
Strontium	143	155		12	(≤462)	
Thallium	0.327	0.318	3			
Tin	3.5	3.4		0.1	(≤11.6)	
Titanium	955	984	3			
Tungsten	0.69	0.76		0.07	(≤0.46)	
Uranium	4.100	3.900	5			
Vanadium	46.2	47.9	4			
Zinc	50.4	50.6	0			

LDC#: 21258E4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: VC

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

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

Compound	Concentration (mg/Kg) 16	Concentration (mg/Kg) 17	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Aluminum	21200	18900	11			
Antimony	0.11	0.12		0.01	(≤0.06)	
Arsenic	24.5	17.8	32			
Barium	51.7	100		48.3	(≤23.6)	Jdet/A fd
Beryllium	0.770	0.665	15			
Boron	30.8	25.4		5.4	(≤11.8)	
Cadmium	0.166	0.151		0.015	(≤0.047)	
Calcium	6400	15500	83			Jdet/A fd
Chromium	30.6	25.8	17			
Cobalt	6.26	6.32		0.06	(≤2.36)	
Copper	15.3	16.7	9			
Iron	18700	19600	5			
Lead	11.0	9.75	12			
Magnesium	41200	34400	18			
Manganese	255	298	16			
Mercury	0.002U	0.005		0.003	(≤0.021)	
Molybdenum	0.56	1.06		0.5	(≤0.12)	Jdet/A fd
Nickel	12.0	12.7	6			
Platinum	0.03	0.02U		0.01	(≤0.24)	

LDC#: 21258E4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: 1

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

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

Compound	Concentration (mg/Kg) 16	Concentration (mg/Kg) 17	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Potassium	4580	4000	14			
Sodium	1600	1640	2			
Strontium	135	457		322	(≤472)	
Thallium	0.261	0.202	25			
Tin	3.2	3.6		0.4	(≤11.8)	
Titanium	848	914	7			
Tungsten	0.20	0.21		0.01	(≤0.47)	
Uranium	14	9.900	34			
Vanadium	55.2	54.2	2			
Zinc	40.7	37.4	8			

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: July 10 through July 11, 2008

LDC Report Date: September 2, 2009

Matrix: Soil

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K0806357

Sample Identification

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

Introduction

This data review covers 31 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	1.1 mg/Kg	RSAL2-0.5B
	Calcium	3.7 mg/Kg	RSAL2-10B
	Copper	0.2 mg/Kg	RSAL2-20B
	Magnesium	1.2 mg/Kg	RSAL2-20BD
	Manganese	0.60 mg/Kg	RSAL2-30B
	Mercury	0.009 mg/Kg	RSAL2-37B
	Nickel	0.11 mg/Kg	RSAL2-40B
	Tin	3.1 mg/Kg	RSAK2-0.5B
	Titanium	0.1 mg/Kg	RSAK2-10B
	Zinc	0.4 mg/Kg	RSAK2-20B
			RSAK2-20BD
			RSAK2-30B
			RSAK2-35B
			RSAJ8-0.5B
			RSAJ8-10B
			RSAJ8-20B
			RSAJ8-30B
			RSAJ8-33B
			RSAI7-0.5B
			RSAI7-10B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Aluminum Beryllium Calcium Manganese Nickel Tin Tungsten	0.8 mg/Kg 0.015 mg/Kg 2.8 mg/Kg 0.74 mg/Kg 0.15 mg/Kg 3.0 mg/Kg 0.11 mg/Kg	RSAI7-20B RSAI7-30B
ICB/CCB	Boron Barium Calcium Copper	8.0 ug/L 2.0 ug/L 30.0 ug/L 1.0 ug/L	RSAI7-20B RSAI7-30B
PB (prep blank)	Aluminum Calcium Copper Iron Manganese Nickel Tin Zinc	0.8 mg/Kg 6.9 mg/Kg 1.1 mg/Kg 2.4 mg/Kg 0.80 mg/Kg 0.14 mg/Kg 2.7 mg/Kg 0.6 mg/Kg	RSAI7-32B
ICB/CCB	Boron Barium Calcium	8.0 ug/L 2.0 ug/L 10.0 ug/L	RSAI7-32B
ICB/CCB	Tungsten	0.10 ug/L	RSAI7-10B RSAI7-20B RSAI7-30B RSAI7-32B
ICB/CCB	Tungsten	0.06 ug/L	RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-30B RSAK2-35B RSAJ8-0.5B RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B
ICB/CCB	Beryllium	0.012 ug/L	RSAI7-10B RSAI7-32B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Beryllium Nickel Thallium	0.018 ug/L 0.18 ug/L 0.008 ug/L	RSAI7-20B RSAI7-30B
ICB/CCB	Calcium	7.0 ug/L	RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B
ICB/CCB	Aluminum Calcium Iron Magnesium	8.0 ug/L 20.0 ug/L 10.0 ug/L 9.0 ug/L	RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B
ICB/CCB	Calcium	6.0 ug/L	RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-30B RSAK2-35B RSAJ8-0.5B RSAJ8-10B
ICB/CCB	Barium	1.0 ug/L	RSAI7-0.5B RSAI7-10B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAL2-0.5B	Tin	2.9 mg/Kg	10.1U mg/Kg
RSAL2-10B	Mercury Tin Tungsten	0.005 mg/Kg 3.1 mg/Kg 0.17 mg/Kg	0.019U mg/Kg 10.7U mg/Kg 0.21U mg/Kg
RSAL2-20B	Mercury Tin	0.012 mg/Kg 3.4 mg/Kg	0.019U mg/Kg 11.3U mg/Kg
RSAL2-20BD	Mercury Tin	0.010 mg/Kg 3.4 mg/Kg	0.020U mg/Kg 11.1U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAL2-30B	Mercury Tin Tungsten	0.008 mg/Kg 3.5 mg/Kg 0.18 mg/Kg	0.020U mg/Kg 10.8U mg/Kg 0.22U mg/Kg
RSAL2-37B	Mercury Tin	0.008 mg/Kg 3.3 mg/Kg	0.019U mg/Kg 10.7U mg/Kg
RSAL2-40B	Mercury Tin Tungsten	0.005 mg/Kg 3.2 mg/Kg 0.19 mg/Kg	0.019U mg/Kg 10.3U mg/Kg 0.21U mg/Kg
RSAK2-0.5B	Mercury Tin	0.018 mg/Kg 3.0 mg/Kg	0.020U mg/Kg 10.0U mg/Kg
RSAK2-10B	Mercury Tin Tungsten	0.007 mg/Kg 3.0 mg/Kg 0.17 mg/Kg	0.020U mg/Kg 10.5U mg/Kg 0.21U mg/Kg
RSAK2-20B	Mercury Tin Tungsten	0.008 mg/Kg 3.0 mg/Kg 0.16 mg/Kg	0.020U mg/Kg 10.6U mg/Kg 0.21U mg/Kg
RSAK2-20BD	Mercury Tin Tungsten	0.006 mg/Kg 3.0 mg/Kg 0.13 mg/Kg	0.020U mg/Kg 10.7U mg/Kg 0.21U mg/Kg
RSAK2-30B	Mercury Tin Tungsten	0.009 mg/Kg 3.2 mg/Kg 0.20 mg/Kg	0.020U mg/Kg 10.6U mg/Kg 0.21U mg/Kg
RSAK2-35B	Mercury Tin Tungsten	0.005 mg/Kg 4.7 mg/Kg 0.13 mg/Kg	0.019U mg/Kg 14.6U mg/Kg 0.21U mg/Kg
RSAJ8-0.5B	Tin	3.5 mg/Kg	10.5U mg/Kg
RSAJ8-10B	Mercury Tin Tungsten	0.009 mg/Kg 3.1 mg/Kg 0.10 mg/Kg	0.017U mg/Kg 10.8U mg/Kg 0.22U mg/Kg
RSAJ8-20B	Mercury Tin	0.013 mg/Kg 3.4 mg/Kg	0.020U mg/Kg 11.9U mg/Kg
RSAJ8-30B	Mercury Tin Tungsten	0.005 mg/Kg 3.1 mg/Kg 0.20 mg/Kg	0.019U mg/Kg 10.3U mg/Kg 0.21U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAJ8-33B	Mercury Tin	0.002 mg/Kg 2.5 mg/Kg	0.019U mg/Kg 10.2U mg/Kg
RSAI7-0.5B	Mercury Tin Tungsten	0.013 mg/Kg 3.0 mg/Kg 0.18 mg/Kg	0.019U mg/Kg 11.9U mg/Kg 0.24U mg/Kg
RSAI7-10B	Mercury Tin Tungsten	0.008 mg/Kg 3.1 mg/Kg 0.19 mg/Kg	0.020U mg/Kg 10.8U mg/Kg 0.22U mg/Kg
RSAI7-20B	Tin Tungsten	3.2 mg/Kg 0.14 mg/Kg	10.3U mg/Kg 0.21U mg/Kg
RSAI7-30B	Tin	3.4 mg/Kg	11.0U mg/Kg
RSAI7-32B	Tin	2.9 mg/Kg	10.7U mg/Kg

No field blanks were identified 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) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
RSAL2-0.5BMS (RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-30B RSAK2-35B RSAJ8-0.5B RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B)	Antimony Tungsten	35.0 (75-125) 69.5 (75-125)	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
RSAI7-32BMS (RSAI7-32B)	Antimony Tungsten	26.1 (75-125) 58.9 (75-125)	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
SA48-0.5BMS (RSAI7-20B RSAI7-30B)	Antimony Tungsten	36.8 (75-125) 58.2 (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
RSAL2-0.5BDUP (RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-30B RSAK2-35B RSAJ8-0.5B RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B)	Beryllium Cadmium Chromium Manganese Silver Thallium	24 (≤20) - 22.4 (≤20) 27.5 (≤20) -	- 0.102 mg/Kg (≤0.04) - - 0.027 mg/Kg (≤0.02) 0.098 mg/Kg (≤0.040)	J (all detects) UJ (all non-detects)	A
RSAI7-32BDUP (RSAI7-32B)	Silver	-	0.034 mg/Kg (≤0.021)	J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

Raw data were not reviewed for this SDG.

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
RSAL2-0.5BL	Cobalt Nickel Zinc	18.7 (≤10) 21 (≤10) 18.2 (≤10)	RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-30B RSAK2-35B RSAJ8-0.5B RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B	J (all detects) UJ (all non-detects)	A
RSAI7-32BL	Cobalt Copper Manganese Nickel Strontium Titanium Vanadium Zinc	23.1 (≤10) 13.3 (≤10) 12.5 (≤10) 29 (≤10) 10.9 (≤10) 11.4 (≤10) 10.3 (≤10) 18.0 (≤10)	RSAI7-32B	J (all detects) UJ (all non-detects)	A
SA48-0.5BL	Cobalt Nickel Strontium Titanium Vanadium Zinc	18.0 (≤10) 23 (≤10) 12.5 (≤10) 11.6 (≤10) 12.1 (≤10) 18.9 (≤10)	RSAI7-20B RSAI7-30B	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 K0806357	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 RSAL2-20B and RSAL2-20BD and samples RSAK2-20B and RSAK2-20BD were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	RSAL2-20B	RSAL2-20BD				
Aluminum	9840	8240	18 (≤50)	-	-	-
Antimony	0.14	0.15	-	0.01 (≤0.06)	-	-
Arsenic	11.0	9.62	13 (≤50)	-	-	-
Barium	283	205	32 (≤50)	-	-	-
Beryllium	0.580	0.561	3 (≤50)	-	-	-
Boron	10.0	7.3	-	2.7 (≤5.7)	-	-
Cadmium	0.128	0.115	-	0.013 (≤0.044)	-	-
Calcium	24900	25200	1 (≤50)	-	-	-
Chromium	8.90	8.48	5 (≤50)	-	-	-
Cobalt	6.42	6.42	-	0 (≤2.26)	-	-
Copper	17.2	21.2	21 (≤50)	-	-	-
Iron	13700	14100	3 (≤50)	-	-	-
Lead	8.51	7.95	7 (≤50)	-	-	-
Magnesium	27400	21900	22 (≤50)	-	-	-
Manganese	377	347	8 (≤50)	-	-	-
Mercury	0.012	0.010	-	0.002 (≤0.020)	-	-
Molybdenum	0.66	0.64	3 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	RSAL2-20B	RSAL2-20BD				
Nickel	12.2	10.5	15 (≤50)	-	-	-
Potassium	2270	1920	17 (≤50)	-	-	-
Silver	0.045	0.037	-	0.008 (≤0.023)	-	-
Sodium	1250	1150	8 (≤50)	-	-	-
Strontium	343	211	48 (≤50)	-	-	-
Thallium	0.097	0.086	-	0.011 (≤0.044)	-	-
Tin	3.4	3.4	-	0 (≤11.1)	-	-
Titanium	869	923	6 (≤50)	-	-	-
Tungsten	0.34	0.25	-	0.09 (≤0.22)	-	-
Uranium	3.300	3.200	3 (≤50)	-	-	-
Vanadium	50.4	51.6	2 (≤50)	-	-	-
Zinc	27.1	26.9	1 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	RSAK2-20B	RSAK2-20BD				
Aluminum	8540	7570	12 (≤50)	-	-	-
Antimony	0.20	0.14	35 (≤50)	-	-	-
Arsenic	4.03	4.87	-	0.84 (≤1.07)	-	-
Barium	170	144	17 (≤50)	-	-	-
Beryllium	0.472	0.431	9 (≤50)	-	-	-
Boron	4.5	4.0	-	0.5 (≤5.3)	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	RSAK2-20B	RSAK2-20BD				
Cadmium	0.138	0.109	-	0.029 (≤0.043)	-	-
Calcium	62400	54500	14 (≤50)	-	-	-
Chromium	5.45	5.55	2 (≤50)	-	-	-
Cobalt	5.30	4.53	-	0.77 (≤2.14)	-	-
Copper	20.4	29.3	36 (≤50)	-	-	-
Iron	12700	10300	21 (≤50)	-	-	-
Lead	7.29	8.05	10 (≤50)	-	-	-
Magnesium	10900	10100	8 (≤50)	-	-	-
Manganese	291	242	18 (≤50)	-	-	-
Mercury	0.008	0.006	-	0.002 (≤0.020)	-	-
Molybdenum	0.24	0.20	-	0.04 (≤0.11)	-	-
Nickel	10.8	11.2	4 (≤50)	-	-	-
Potassium	1810	1710	6 (≤50)	-	-	-
Silver	0.043	0.026	-	0.017 (≤0.021)	-	-
Sodium	1130	941	18 (≤50)	-	-	-
Strontium	296	276	7 (≤50)	-	-	-
Thallium	0.080	0.079	-	0.001 (≤0.043)	-	-
Tin	3.0	3.0	-	0 (≤10.7)	-	-
Titanium	712	585	20 (≤50)	-	-	-
Tungsten	0.16	0.13	-	0.03 (≤0.21)	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	RSAK2-20B	RSAK2-20BD				
Uranium	1.800	1.700	6 (≤50)	-	-	-
Vanadium	35.5	29.1	20 (≤50)	-	-	-
Zinc	25.9	27.0	4 (≤50)	-	-	-

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SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0806357	RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-30B RSAK2-35B RSAJ8-0.5B RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B RSAI7-20B RSAI7-30B RSAI7-32B	Antimony Tungsten	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
K0806357	RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-30B RSAK2-35B RSAJ8-0.5B RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B	Beryllium Chromium Manganese	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (Id)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0806357	RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-30B RSAK2-35B RSAJ8-0.5B RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B	Cadmium Silver Thallium	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (Difference) (Id)
K0806357	RSAI7-32B	Silver	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (Difference) (Id)
K0806357	RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-30B RSAK2-35B RSAJ8-0.5B RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B	Cobalt Nickel Zinc	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)
K0806357	RSAI7-32B	Cobalt Copper Manganese Nickel Strontium Titanium Vanadium Zinc	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0806357	RSAI7-20B RSAI7-30B	Cobalt Nickel Strontium Titanium Vanadium Zinc	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)
K0806357	RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-30B RSAK2-35B RSAJ8-0.5B RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B RSAI7-20B RSAI7-30B RSAI7-32B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

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Metals - Laboratory Blank Data Qualification Summary - SDG K0806357

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0806357	RSAL2-0.5B	Tin	10.1U mg/Kg	A	bl
K0806357	RSAL2-10B	Mercury Tin Tungsten	0.019U mg/Kg 10.7U mg/Kg 0.21U mg/Kg	A	bl
K0806357	RSAL2-20B	Mercury Tin	0.019U mg/Kg 11.3U mg/Kg	A	bl
K0806357	RSAL2-20BD	Mercury Tin	0.020U mg/Kg 11.1U mg/Kg	A	bl
K0806357	RSAL2-30B	Mercury Tin Tungsten	0.020U mg/Kg 10.8U mg/Kg 0.22U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0806357	RSAL2-37B	Mercury Tin	0.019U mg/Kg 10.7U mg/Kg	A	bl
K0806357	RSAL2-40B	Mercury Tin Tungsten	0.019U mg/Kg 10.3U mg/Kg 0.21U mg/Kg	A	bl
K0806357	RSAK2-0.5B	Mercury Tin	0.020U mg/Kg 10.0U mg/Kg	A	bl
K0806357	RSAK2-10B	Mercury Tin Tungsten	0.020U mg/Kg 10.5U mg/Kg 0.21U mg/Kg	A	bl
K0806357	RSAK2-20B	Mercury Tin Tungsten	0.020U mg/Kg 10.6U mg/Kg 0.21U mg/Kg	A	bl
K0806357	RSAK2-20BD	Mercury Tin Tungsten	0.020U mg/Kg 10.7U mg/Kg 0.21U mg/Kg	A	bl
K0806357	RSAK2-30B	Mercury Tin Tungsten	0.020U mg/Kg 10.6U mg/Kg 0.21U mg/Kg	A	bl
K0806357	RSAK2-35B	Mercury Tin Tungsten	0.019U mg/Kg 14.6U mg/Kg 0.21U mg/Kg	A	bl
K0806357	RSAJ8-0.5B	Tin	10.5U mg/Kg	A	bl
K0806357	RSAJ8-10B	Mercury Tin Tungsten	0.017U mg/Kg 10.8U mg/Kg 0.22U mg/Kg	A	bl
K0806357	RSAJ8-20B	Mercury Tin	0.020U mg/Kg 11.9U mg/Kg	A	bl
K0806357	RSAJ8-30B	Mercury Tin Tungsten	0.019U mg/Kg 10.3U mg/Kg 0.21U mg/Kg	A	bl
K0806357	RSAJ8-33B	Mercury Tin	0.019U mg/Kg 10.2U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0806357	RSAI7-0.5B	Mercury Tin Tungsten	0.019U mg/Kg 11.9U mg/Kg 0.24U mg/Kg	A	bl
K0806357	RSAI7-10B	Mercury Tin Tungsten	0.020U mg/Kg 10.8U mg/Kg 0.22U mg/Kg	A	bl
K0806357	RSAI7-20B	Tin Tungsten	10.3U mg/Kg 0.21U mg/Kg	A	bl
K0806357	RSAI7-30B	Tin	11.0U mg/Kg	A	bl
K0806357	RSAI7-32B	Tin	10.7U mg/Kg	A	bl

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Metals - Field Blank Data Qualification Summary - SDG K0806357

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21258F4
SDG #: K0806357
Laboratory: Columbia Analytical Services

Date: 8-13-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer:

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: ~~7/8/08~~ ~~6/30/08~~ - 7/11/08 ~~7/10/08~~
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	SW	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	SW	D.S
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(3,4), (10,11)
XV	Field Blanks	N	

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

Validated Samples: 50, 1

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

Notes:

LDC #: 21258F4
SDG #: K0806357

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: L

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-23	Soil	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:24,25	↓	Al, Sb, As, Ba, Be, B, Cd, 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:26,27		Al, Sb, As, Ba, Be, B, Cd, 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:28,29		Al, Sb, As, Ba, Be, B, Cd, 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:30,31		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP	Soil	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 21258F4
SDG #: K0809357

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

bl

METHOD: Trace metals (EPA SW 846 Method 6020/6010B/7000)
Soil preparation factor applied: 100x
Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 1-20

					Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1	2	3	4	5	6	7	8	9	10
Al	1.1													
Ca	3.7													
Cu	0.2													
Mg	1.2													
Mn	0.60					*								
Hg	0.009					0.005/0.019	0.012/0.019	0.010/0.020	0.008/0.020	0.008/0.019	0.005/0.019	0.018/0.020	0.007/0.020	0.008/0.020
Ni	0.11													
Sn	3.1				2.9 / 10.1	3.1 /10.7	3.4 / 11.3	3.4 / 11.1	3.5 / 10.8	3.3 / 10.7	3.2 / 10.3	3.0 / 10.0	3.0 / 10.5	3.0 / 10.6
Ti	0.1													
Zn	0.4													

					Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	11	12	13	14	15	16	17	18	19	20
Al	1.1													
Ca	3.7													
Cu	0.2													
Mg	1.2													
Mn	0.60													
Hg	0.009				0.006/0.020	0.009/0.020	0.005/0.019		0.009/0.017	0.013/0.020	0.005/0.019	0.002/0.019	0.013/0.019	0.008/0.020
Ni	0.11													
Sn	3.1				3.0 / 10.7	3.2 / 10.6	4.7 / 14.6	3.5 / 10.5	3.1 / 10.8	3.4 / 11.9	3.1 / 10.3	2.5 / 10.2	3.0 / 11.9	3.1 / 10.8
Ti	0.1													
Zn	0.4													

LDC #: 21258F4
SDG #: K0809357
METHOD: Trace metals (EPA SW 846 Method 6020/6010B/7000)

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

hl

Reviewer: CR
2nd Reviewer: L

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 21, 22

					Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	21	22								
Al	0.8													
B			8.0											
Ba			2.0											
Be	0.015													
Ca	2.8		30.0											
Cu			1.0											
Mn	0.74													
Ni	0.15													
Sn	3.0				3.2 / 10.3	3.4 / 11.0								
W	0.11				0.14 / 0.21									

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 23

					Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	23									
Al	0.8													
B			8.0											
Ba			2.0											
Ca	6.9		10.0											
Cu	1.1													
Fe	2.4													
Mn	0.80													
Ni	0.14													
Sn	2.7				2.9 / 10.7									
Zn	0.6													

LDC #: 21258F4
SDG #: K0809357
METHOD: Trace metals (EPA SW 846 Method 6020/6010B/7000)

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

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 20-23

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	Sample Identification: 20	21								
W			0.10		0.19 / 0.22	See PB								

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-19

Analyte	Maximum ICB/CCB[a] (ug/l)	Action Limit	Sample Identification: 2	5	7	9	10	11	12	13	15	17	19	
W	0.06		0.17 / 0.21	0.18 / 0.22	0.19 / 0.21	0.17 / 0.21	0.16 / 0.21	0.13 / 0.21	0.20 / 0.21	0.13 / 0.21	0.10 / 0.22	0.20 / 0.21	0.18 / 0.24	

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 20, 23

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	Sample Identification: No Qualifiers									
Be			0.012											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 21, 22

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	Sample Identification: No Qualifiers									
Be			0.018											
Ni			0.18											
Tl			0.008											

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

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	Sample Identification: No Qualifiers									
Ca			7.0											

LDC #: 21258F4
SDG #: K0809357
METHOD: Trace metals (EPA SW 846 Method 6020/6010B/7000)

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

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 16-20

					Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
Al			8.0											
Ca			20.0											
Fe			10.0											
Mg			9.0											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 6-15

					Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
Ca			6.0											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 19, 20

					Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
Ba			1.0											

LDC #: 21258F4
SDG #: I5080635

VALIDATION FINDINGS WORKSHEET
ICP Interference Check Sample

Reviewer: CR
2nd Reviewer: 1

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

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

(Y) N N/A Were ICP interference check samples performed as required?

Y (N) N/A Were the AB solution percent recoveries (%R) within the control limits of 80-120%?

LEVEL IV ONLY:

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

#	Date	ICS Identification	Analyte	Finding	Associated Samples	Qualifications
	8/4/08	ICSAB (14:25)	Mg	18%	21-23	No Qual (samples < 90% ICSA)
	8/12/08	ICSAB (10:45)	Mg	18	1-20	✓

Comments:

LDC #: 21258#4
SDG #: seeaer

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

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

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

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

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

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

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

LEVEL IV ONLY:

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

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
1	24	Soil	Sb	35.0	1-20	J/UJ/A (m)
			W	69.5		
2	30	Soil	Sb *	26.1	23	
			W	58.9	↓	
3	SA48-0.5B	Soil	Sb	36.8	21,22	
	(SDG# K0506358)		W	58.2	↓	

Comments: * Post Spike = 93%

LDC #: 21258F4
SDG #: F0806357

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Reviewer: CR
2nd Reviewer: [illegible]

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

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

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

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

LEVEL IV ONLY:

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

#	Duplicate ID	Matrix	Analyte	RPD (Limits) (≤20)	Difference (Limits)	Associated Samples	Qualifications
	25	Soil	Be	24 (≤20)		1-20	J / UJ / A (1d)
			Cd		0.102 (≤0.04)		
			Cr	22.4			
			Mn	27.5			
			Ag		0.027 (≤0.02)		
			Tl		0.098 (≤0.040)	↓	
	31	Soil	Ag		0.034 (≤0.021)	23	↓

Comments: _____

LDC #: 21258F4
SDG #: K080635

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: CR
2nd Reviewer: CR

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

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

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

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	1	Soil	~~Co~~	~~18.7~~		J/UJ/A (sd)
			Co	18.7	1-20	
			Ni	21		
			Zn	18.2		
	23	Soil	Co	23.1	23	
			V	13.3		
			Mn	12.5		
			Ni	29		
			Sc	10.9		
			Ti	11.4		
			V	10.3		
			Zn	18.0		
	SA48-0.5B (SDG# K080635B)	Soil	Co	18.0	21,22	
			Ni	23		
			Sc	12.5		
			Ti	11.6		
			V	12.1		
			Zn	18.9		

Comments:

LDC#: 21258F4 **VALIDATION FINDINGS WORKSHEET**
SDG#: See Cover **Field Duplicates**

Reviewer: CR
2nd Reviewer:

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

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

Compound	Concentration (mg/Kg) 3	Concentration (mg/Kg) 4	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Aluminum	9840	8240	18			
Antimony	0.14	0.15		0.01	(≤0.06)	
Arsenic	11.0	9.62	13			
Barium	283	205	32			
Beryllium	0.580	0.561	3			
Boron	10.0	7.3		2.7	(≤5.7)	
Cadmium	0.128	0.115		0.013	(≤0.044)	
Calcium	24900	25200	1			
Chromium	8.90	8.48	5			
Cobalt	6.42	6.42		0	(≤2.26)	
Copper	17.2	21.2	21			
Iron	13700	14100	3			
Lead	8.51	7.95	7			
Magnesium	27400	21900	22			
Manganese	377	347	8			
Mercury	0.012	0.010		0.002	(≤0.020)	
Molybdenum	0.66	0.64	3			
Nickel	12.2	10.5	15			
Potassium	2270	1920	17			

LDC#: 21258F4 **VALIDATION FINDINGS WORKSHEET** Page: 2 of 4
SDG#: See Cover **Field Duplicates** Reviewer: CR
2nd Reviewer:

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

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

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	3	4				
Silver	0.045	0.037		0.008	(≤0.023)	
Sodium	1250	1150	8			
Strontium	343	211	48			
Thallium	0.097	0.086		0.011	(≤0.044)	
Tin	3.4	3.4		0	(≤11.1)	
Titanium	869	923	6			
Tungsten	0.34	0.25		0.09	(≤0.22)	
Uranium	3.300	3.200	3			
Vanadium	50.4	51.6	2			
Zinc	27.1	26.9	1			

V:\FIELD DUPLICATES\FD_inorganic\21258F4.wpd

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	10	11				
Aluminum	8540	7570	12			
Antimony	0.20	0.14	35			
Arsenic	4.03	4.87		0.84	(≤1.07)	
Barium	170	144	17			
Beryllium	0.472	0.431	9			
Boron	4.5	4.0		0.5	(≤5.3)	

LDC#: 21758F4 **VALIDATION FINDINGS WORKSHEET**
SDG#: See Cover **Field Duplicates**

Reviewer: CR
2nd Reviewer: V

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

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

Compound	Concentration (mg/Kg) 10	Concentration (mg/Kg) 11	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Cadmium	0.138	0.109		0.029	(≤0.043)	
Calcium	62400	54500	14			
Chromium	5.45	5.55	2			
Cobalt	5.30	4.53		0.77	(≤2.14)	
Copper	20.4	29.3	36			
Iron	12700	10300	21			
Lead	7.29	8.05	10			
Magnesium	10900	10100	8			
Manganese	291	242	18			
Mercury	0.008	0.006		0.002	(≤0.020)	
Molybdenum	0.24	0.20	~~18~~ CR	0.04	(≤0.11)	
Nickel	10.8	11.2	4			
Potassium	1810	1710	6			
Silver	0.043	0.026		0.017	(≤0.021)	
Sodium	1130	941	18			
Strontium	296	276	7			
Thallium	0.080	0.079		0.001	(≤0.043)	
Tin	3.0	3.0		0	(≤10.7)	
Titanium	712	585	20			

LDC#: 21258F4 **VALIDATION FINDINGS WORKSHEET**
SDG#: See Cover **Field Duplicates**

Reviewer: CR
2nd Reviewer:

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

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

Compound	Concentration (mg/Kg) 10	Concentration (mg/Kg) 11	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Tungsten	0.16	0.13		0.03	(≤0.21)	
Uranium	1.800	1.700	6			
Vanadium	35.5	29.1	20			
Zinc	25.9	27.0	4			

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: July 9 through July 10, 2008

LDC Report Date: September 2, 2009

Matrix: Soil

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K0806358

Sample Identification

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

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 Beryllium Calcium Manganese Nickel Tin Tungsten	0.8 mg/Kg 0.015 mg/Kg 2.8 mg/Kg 0.74 mg/Kg 0.15 mg/Kg 3.0 mg/Kg 0.11 mg/Kg	All samples in SDG K0806358
ICB/CCB	Boron	8.0 ug/L	All samples in SDG K0806358
ICB/CCB	Barium	1.0 ug/L	SA46-0.5B SA46-10B SA46-20B SA46-30B SA46-30BD SA48-0.5B SA48-10B SA48-20B SA48-30B SA48-35B RSAJ7-0.5B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Calcium	8.0 ug/L	SA46-0.5B SA46-10B SA46-20B SA46-30B SA46-30BD SA48-10B SA48-20B SA48-30B SA48-35B RSAJ7-0.5B
ICB/CCB	Barium Calcium Copper Nickel Thallium	2.0 ug/L 3.0 ug/L 1.0 ug/L 0.18 ug/L 0.008 ug/L	RSAJ7-10B RSAJ7-20B RSAK7-0.5B RSAK7-10B RSAK7-10BD RSAK7-20B RSAK7-27B
ICB/CCB	Tungsten	0.10 ug/L	SA48-0.5B RSAJ7-10B RSAJ7-20B RSAK7-0.5B RSAK7-10B RSAK7-10BD RSAK7-20B RSAK7-27B
ICB/CCB	Calcium Beryllium Nickel	3.0 ug/L 0.017 ug/L 0.08 ug/L	SA48-0.5B
ICB/CCB	Beryllium	0.018 ug/L	SA46-0.5B SA46-10B SA46-30B SA48-10B SA48-20B RSAJ7-0.5B RSAJ7-10B RSAJ7-20B RSAK7-0.5B RSAK7-10B RSAK7-10BD RSAK7-20B RSAK7-27B
ICB/CCB	Nickel Tungsten	0.13 ug/L 0.09 ug/L	SA46-0.5B SA46-10B SA46-30B SA48-10B SA48-20B RSAJ7-0.5B

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
SA46-0.5B	Boron Tin Tungsten	3.9 mg/Kg 3.7 mg/Kg 0.22 mg/Kg	4.8U mg/Kg 11.9U mg/Kg 0.24U mg/Kg
SA46-10B	Tin	2.9 mg/Kg	10.4U mg/Kg
SA46-20B	Tin	3.6 mg/Kg	11.7U mg/Kg
SA46-30B	Tin	3.6 mg/Kg	11.9U mg/Kg
SA46-30BD	Tin	3.8 mg/Kg	11.5U mg/Kg
SA48-0.5B	Tin	6.0 mg/Kg	11.2U mg/Kg
SA48-10B	Tin Tungsten	3.8 mg/Kg 0.15 mg/Kg	12.2U mg/Kg 0.24U mg/Kg
SA48-20B	Tin	3.2 mg/Kg	11.4U mg/Kg
SA48-30B	Tin Tungsten	3.5 mg/Kg 0.17 mg/Kg	10.9U mg/Kg 0.21U mg/Kg
SA48-35B	Tin Tungsten	3.6 mg/Kg 0.18 mg/Kg	10.5U mg/Kg 0.22U mg/Kg
RSAJ7-0.5B	Tin	3.7 mg/Kg	10.7U mg/Kg
RSAJ7-10B	Tin Tungsten	3.0 mg/Kg 0.17 mg/Kg	10.6U mg/Kg 0.21U mg/Kg
RSAJ7-20B	Tin	3.0 mg/Kg	10.4U mg/Kg
RSAK7-0.5B	Tin	3.8 mg/Kg	11.0U mg/Kg
RSAK7-10B	Tin	3.5 mg/Kg	12.1U mg/Kg
RSAK7-10BD	Tin	3.0 mg/Kg	10.8U mg/Kg
RSAK7-20B	Tin	3.2 mg/Kg	10.7U mg/Kg
RSAK7-27B	Tin	3.5 mg/Kg	11.2U mg/Kg

No field blanks were identified 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) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
SA48-0.5BMS (All samples in SDG K0806358)	Antimony	36.8 (75-125)	J- (all detects) UJ (all non-detects)	A
	Tungsten	58.2 (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

Raw data were not reviewed for this SDG.

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
SA48-0.5BL	Cobalt Nickel Strontium Titanium Vanadium Zinc	18.0 (≤10) 23 (≤10) 12.5 (≤10) 11.6 (≤10) 12.1 (≤10) 18.9 (≤10)	All samples in SDG K0806358	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 K0806358	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 SA46-30B and SA46-30BD and samples RSAK7-10B and RSAK7-10BD were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA46-30B	SA46-30BD				
Aluminum	21400	22900	7 (≤50)	-	-	-
Antimony	0.23	0.20	-	0.03 (≤0.06)	-	-
Arsenic	19.6	22.1	12 (≤50)	-	-	-
Barium	206	201	2 (≤50)	-	-	-
Beryllium	0.901	0.905	0 (≤50)	-	-	-
Boron	48.2	47.3	2 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA46-30B	SA46-30BD				
Cadmium	0.177	0.164	-	0.013 (≤0.047)	-	-
Calcium	19900	34100	53 (≤50)	-	J (all detects)	A
Chromium	16.9	22.1	27 (≤50)	-	-	-
Cobalt	7.04	7.02	-	0.02 (≤2.37)	-	-
Copper	19.7	20.1	2 (≤50)	-	-	-
Iron	19200	19200	0 (≤50)	-	-	-
Lead	11.2	9.39	18 (≤50)	-	-	-
Magnesium	46400	52000	11 (≤50)	-	-	-
Manganese	556	596	7 (≤50)	-	-	-
Mercury	0.009	0.007	-	0.002 (≤0.019)	-	-
Molybdenum	0.80	0.96	18 (≤50)	-	-	-
Nickel	14.0	15.7	11 (≤50)	-	-	-
Potassium	4810	4610	4 (≤50)	-	-	-
Sodium	2720	2800	3 (≤50)	-	-	-
Strontium	127	138	8 (≤50)	-	-	-
Thallium	0.268	0.302	12 (≤50)	-	-	-
Tin	3.6	3.8	-	0.2 (≤11.9)	-	-
Titanium	911	862	6 (≤50)	-	-	-
Tungsten	0.54	0.51	-	0.03 (≤0.23)	-	-
Uranium	3.300	3.900	17 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	SA46-30B	SA46-30BD				
Vanadium	46.7	44.2	6 (≤50)	-	-	-
Zinc	48.0	49.7	3 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	RSAK7-10B	RSAK7-10BD				
Aluminum	10300	11100	7 (≤50)	-	-	-
Antimony	0.16	0.16	-	0 (≤0.06)	-	-
Arsenic	4.26	4.91	-	0.65 (≤1.22)	-	-
Barium	153	182	17 (≤50)	-	-	-
Beryllium	0.563	0.492	13 (≤50)	-	-	-
Boron	8.8	8.8	-	0 (≤4.8)	-	-
Cadmium	0.121	0.125	-	0.004 (≤0.049)	-	-
Calcium	37900	42700	12 (≤50)	-	-	-
Chromium	6.80	7.82	14 (≤50)	-	-	-
Cobalt	6.87	6.72	-	0.15 (≤2.41)	-	-
Copper	17.2	16.7	3 (≤50)	-	-	-
Iron	16200	17600	8 (≤50)	-	-	-
Lead	7.38	7.69	4 (≤50)	-	-	-
Magnesium	14000	12900	8 (≤50)	-	-	-
Manganese	328	310	6 (≤50)	-	-	-
Mercury	0.008	0.007	-	0.001 (≤0.020)	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flag	A or P
	RSAK7-10B	RSAK7-10BD				
Molybdenum	0.15	0.20	-	0.05 (≤0.12)	-	-
Nickel	11.1	11.9	7 (≤50)	-	-	-
Potassium	2090	2260	8 (≤50)	-	-	-
Sodium	977	1010	3 (≤50)	-	-	-
Strontium	328	391	18 (≤50)	-	-	-
Thallium	0.063	0.085	-	0.022 (≤0.049)	-	-
Tin	3.5	3.0	-	0.5 (≤12.1)	-	-
Titanium	831	906	9 (≤50)	-	-	-
Tungsten	0.37	0.28	-	0.09 (≤0.24)	-	-
Uranium	2.100	2.300	9 (≤50)	-	-	-
Vanadium	46.6	47.4	2 (≤50)	-	-	-
Zinc	29.1	29.3	1 (≤50)	-	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG K0806358

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0806358	SA46-0.5B SA46-10B SA46-20B SA46-30B SA46-30BD SA48-0.5B SA48-10B SA48-20B SA48-30B SA48-35B RSAJ7-0.5B RSAJ7-10B RSAJ7-20B RSAK7-0.5B RSAK7-10B RSAK7-10BD RSAK7-20B RSAK7-27B	Antimony Tungsten	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
K0806358	SA46-0.5B SA46-10B SA46-20B SA46-30B SA46-30BD SA48-0.5B SA48-10B SA48-20B SA48-30B SA48-35B RSAJ7-0.5B RSAJ7-10B RSAJ7-20B RSAK7-0.5B RSAK7-10B RSAK7-10BD RSAK7-20B RSAK7-27B	Cobalt Nickel Strontium Titanium Vanadium Zinc	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)
K0806358	SA46-0.5B SA46-10B SA46-20B SA46-30B SA46-30BD SA48-0.5B SA48-10B SA48-20B SA48-30B SA48-35B RSAJ7-0.5B RSAJ7-10B RSAJ7-20B RSAK7-0.5B RSAK7-10B RSAK7-10BD RSAK7-20B RSAK7-27B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0806358	SA46-30B SA46-30BD	Calcium	J (all detects)	A	Field duplicates (RPD) (fd)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG K0806358

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0806358	SA46-0.5B	Boron Tin Tungsten	4.8U mg/Kg 11.9U mg/Kg 0.24U mg/Kg	A	bl
K0806358	SA46-10B	Tin	10.4U mg/Kg	A	bl
K0806358	SA46-20B	Tin	11.7U mg/Kg	A	bl
K0806358	SA46-30B	Tin	11.9U mg/Kg	A	bl
K0806358	SA46-30BD	Tin	11.5U mg/Kg	A	bl
K0806358	SA48-0.5B	Tin	11.2U mg/Kg	A	bl
K0806358	SA48-10B	Tin Tungsten	12.2U mg/Kg 0.24U mg/Kg	A	bl
K0806358	SA48-20B	Tin	11.4U mg/Kg	A	bl
K0806358	SA48-30B	Tin Tungsten	10.9U mg/Kg 0.21U mg/Kg	A	bl
K0806358	SA48-35B	Tin Tungsten	10.5U mg/Kg 0.22U mg/Kg	A	bl
K0806358	RSAJ7-0.5B	Tin	10.7U mg/Kg	A	bl
K0806358	RSAJ7-10B	Tin Tungsten	10.6U mg/Kg 0.21U mg/Kg	A	bl
K0806358	RSAJ7-20B	Tin	10.4U mg/Kg	A	bl
K0806358	RSAK7-0.5B	Tin	11.0U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0806358	RSAK7-10B	Tin	12.1U mg/Kg	A	bl
K0806358	RSAK7-10BD	Tin	10.8U mg/Kg	A	bl
K0806358	RSAK7-20B	Tin	10.7U mg/Kg	A	bl
K0806358	RSAK7-27B	Tin	11.2U mg/Kg	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG K0806358

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21258G4 Date: 9-2-09
SDG #: K0806358 Page: 1 of 1
Laboratory: Columbia Analytical Services Reviewer: CR
2nd Reviewer: LC

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/9/08 - 7/10/08
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	SW	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	A	Dup
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(4,5), (15,16)
XV	Field Blanks	N	

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

Validated Samples: All SDG

1	SA46-0.5B	11	RSAJ7-0.5B	21	PBS1	31	
2	SA46-10B	12	RSAJ7-10B	22		32	
3	SA46-20B	13	RSAJ7-20B	23		33	
4	SA46-30B	14	RSAK7-0.5B	24		34	
5	SA46-30BD	15	RSAK7-10B	25		35	
6	SA48-0.5B	16	RSAK7-10BD	26		36	
7	SA48-10B	17	RSAK7-20B	27		37	
8	SA48-20B	18	RSAK7-27B	28		38	
9	SA48-30B	19	SA48-0.5BMS	29		39	
10	SA48-35B	20	SA48-0.5BDUP	30		40	

Notes: _____

LDC #: 21258~~H4~~ 6
SDG #: K0806~~534~~ 358

Reviewer: CR
2nd reviewer: V

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

All circled elements are applicable to each sample.

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

Comments: ~~Mercury by CVAA if performed~~

Tronox_SR.wpd

LDC #: 21258G4
SDG #: K0806358

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason Code: 6)

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

METHOD: Trace metals (EPA SW 846 Method 6020/7000) Soil preparation factor applied: 100x

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

				Sample Identification																	
Analyte	Max. PB[a] (mg/Kg)	Max. ICB/CCB[a] (ug/l)	Action Limit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Al	0.8																				
B		8.0		3.9 / 4.8																	
Be	0.015																				
Ca	2.8																				
Mn	0.74																				
Ni	0.15																				
Sn	3.0			3.7 / 11.9	2.9 / 10.4	3.6 / 11.7	3.6 / 11.9	3.8 / 11.5	6.0 / 11.2	3.8 / 12.2	3.2 / 11.4	3.5 / 10.9	3.6 / 10.5	3.7 / 10.7	3.0 / 10.6	3.0 / 10.4	~~33.8~~ 3.8 CR 11.0	3.5 / 12.1	3.0 / 10.8	3.2 / 10.7	3.5 / 11.2
W	0.11			0.22 / 0.24						0.15 / 0.24		0.17 / 0.21	0.18 / 0.22		0.17 / 0.21						

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: Both analytes: 1-5, 7-11. 6=Ba only.

					Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Quals									
Ba			1.0											
Ca			8.0											

LDC #: 21258G4
SDG #: K0806358
METHOD: Trace metals (EPA SW 846 Method 6020/7000)

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

Reason Code: 61

Reviewer: CSZ
2nd Reviewer:

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: All analytes: 12-18. 6=W only.

					Sample Identification									
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum PB[a] (ug/l)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**	12									
Ba			2.0											
Ca			3.0											
Cu /			1.0											
Ni			0.18											
Tl			0.008											
W			0.10		See PB									

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

					Sample Identification									
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum PB[a] (ug/l)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**	No Quals									
Ca			3.0											
Be			0.017											
Ni			0.08											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: All analytes: 1, 2, 4, 7, 8, 11. 12-18 = Be only.

					Sample Identification									
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum PB[a] (ug/l)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**	1	7								
Be			0.018											
Ni			0.13											
W			0.09		See PB	See PB								

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

LDC #: 21758G4
SDG #: R0606358

VALIDATION FINDINGS WORKSHEET
ICP Interference Check Sample

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

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

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

Y N N/A Were ICP interference check samples performed as required?
Y N N/A Were the AB solution percent recoveries (%R) within the control limits of 80-120%?
LEVEL IV ONLY:
Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	ICS Identification	Analyte	Finding	Associated Samples	Qualifications
	8/4/08	ICSAB (14:35)	Mg	18	All	No Qual (Sample <90% ICSA)

Comments:

LDC #: 21258G4
SDG #: 1S0606358

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Reviewer: CR
2nd Reviewer: L

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

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

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

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

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

LEVEL IV ONLY:

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

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
	19	Soil	Sb	36.8	All	J-/UJ/A (m)
			W	58.2	↓	↓

Comments: _____

LDC #: 72758G4
SDG #: 1508063S5

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: CR
2nd Reviewer: [signature]

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

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

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

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	6	Soil	Co	18.0	All	J | UJ | A (SD)
			Ni	23		
			Sr	12.5		
			Ti	11.6		
			V	12.1		
			Zn	18.9		

Comments:

LDC#: 21258G4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer:

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

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

Compound	Concentration (mg/Kg) 4	Concentration (mg/Kg) 5	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Aluminum	21400	22900	7			
Antimony	0.23	0.20		0.03	(≤0.06)	
Arsenic	19.6	22.1	12			
Barium	206	201	2			
Beryllium	0.901	0.905	0			
Boron	48.2	47.3	2			
Cadmium	0.177	0.164		0.013	(≤0.047)	
Calcium	19900	34100	53			Jdet/A fd
Chromium	16.9	22.1	27			
Cobalt	7.04	7.02		0.02	(≤2.37)	
Copper	19.7	20.1	2			
Iron	19200	19200	0			
Lead	11.2	9.39	18			
Magnesium	46400	52000	11			
Manganese	556	596	7			
Mercury	0.009	0.007		0.002	(≤0.019)	
Molybdenum	0.80	0.96	18			
Nickel	14.0	15.7	11			
Potassium	4810	4610	4			

LDC#: 21258G4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer:

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

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

Compound	Concentration (mg/Kg) 4	Concentration (mg/Kg) 5	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Sodium	2720	2800	3			
Strontium	127	138	8			
Thallium	0.268	0.302	12			
Tin	3.6	3.8		0.2	(≤11.9)	
Titanium	911	862	6			
Tungsten	0.54	0.51		0.03	(≤0.23)	
Uranium	3.300	3.900	17			
Vanadium	46.7	44.2	6			
Zinc	48.0	49.7	3			

LDC#: 21258G4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: L

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

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

Compound	Concentration (mg/Kg) 15	Concentration (mg/Kg) 16	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Aluminum	10300	11100	7			
Antimony	0.16	0.16		0	(≤0.06)	
Arsenic	4.26	4.91		0.65	(≤1.22)	
Barium	153	182	17			
Beryllium	0.563	0.492	13			
Boron	8.8	8.8		0	(≤4.8)	
Cadmium	0.121	0.125		0.004	~~(≤0.049)~~ (≤0.049)	
Calcium	37900	42700	12			
Chromium	6.80	7.82	14			
Cobalt	6.87	6.72		0.15	(≤2.41)	
Copper	17.2	16.7	3			
Iron	16200	17600	8			
Lead	7.38	7.69	4			
Magnesium	14000	12900	8			
Manganese	328	310	6			
Mercury	0.008	0.007		0.001	(≤0.020)	
Molybdenum	0.15	0.20		0.05	(≤0.12)	
Nickel	11.1	11.9	7			
Potassium	2090	2260	8			

LDC#: 21258G4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer:

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

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

Compound	Concentration (mg/Kg) 15	Concentration (mg/Kg) 16	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Sodium	977	1010	3			
Strontium	328	391	18			
Thallium	0.063	0.085		0.022	(≤0.049)	
Tin	3.5	3.0		0.5	(≤12.1)	
Titanium	831	906	9			
Tungsten	0.37	0.28		0.09	(≤0.24)	
Uranium	2.100	2.300	9			
Vanadium	46.6	47.4	2			
Zinc	29.1	29.3	1			

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 30, 2008

LDC Report Date: August 17, 2009

Matrix: Soil

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K0806534

Sample Identification

RSAI7-10B(K0806534-001)
RSAI7-10B(K0806534-002)
RSAI7-10B(K0806534-001)MS
RSAI7-10B(K0806534-001)DUP
RSAI7-10B(K0806534-002)MS
RSAI7-10B(K0806534-002)DUP

Samples in this SDG underwent SPLP extraction

Introduction

This data review covers 6 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.

No field blanks were identified 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) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
RSAI7-10B(K0806534-001)MS (RSAI7-10B(K0806534-001))	Uranium	131 (75-125)	J+ (all detects)	A

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards

Raw data were not reviewed for this SDG.

X. Furnace Atomic Absorption QC

All graphite furnace atomic absorption QC were within validation criteria.

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
RSAI7-10B(K0806534-001)L	Magnesium	16 (≤10)	RSAI7-10B(K0806534-001)	J (all detects) UJ (all non-detects)	A
RSAI7-10B(K0806534-002)L	Magnesium	22 (≤10)	RSAI7-10B(K0806534-002)	J (all detects) UJ (all non-detects)	A

XII. Sample Result Verification and Project Quantitation Limit

All sample result verifications were acceptable.

The QAPP PQLs were met with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
All samples in SDG K0806534	Selenium	Laboratory reporting limit reported at 6.0 ug/L.	PQL should be reported at 5.0 ug/L per the QAPP.	None	P

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG K0806534	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, 2008 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG K0806534

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0806534	RSAI7-10B(K0806534-001)	Uranium	J+ (all detects)	A	Matrix spike analysis (%R) (m)
K0806534	RSAI7-10B(K0806534-001) RSAI7-10B(K0806534-002)	Magnesium	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)
K0806534	RSAI7-10B(K0806534-001) RSAI7-10B(K0806534-002)	Selenium	None	P	Sample result verification
K0806534	RSAI7-10B(K0806534-001) RSAI7-10B(K0806534-002)	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG K0806534

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG K0806534

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21258H4
SDG #: K0806534
Laboratory: Columbia Analytical Services

Date: 8-14-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer:

METHOD: SPLP 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: 6/30/08
II.	ICP/MS Tune	~~A~~ A	~~Not utilized~~ CR
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	A	Dup
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	~~A~~ A	~~Not utilized~~ CR
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

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

Validated Samples: Soil

1	RSAI7-10B(K0806534-001)	11	PBW1	21		31	
2	RSAI7-10B(K0806534-002)	12		22		32	
3	RSAI7-10B(K0806534-001)MS	13		23		33	
4	RSAI7-10B(K0806534-001)DUP	14		24		34	
5	RSAI7-10B(K0806534-002)MS	15		25		35	
6	RSAI7-10B(K0806534-002)DUP	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: Samples underwent SPLP extraction
(1 = extraction liquid #2)
(2 = extraction liquid #3)

LDC #: 21258H4
SDG #: K0806534

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: SR
2nd reviewer: [signature]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2	soil	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:3-6	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, 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
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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
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP	soil	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 21258H4
SDG #: 180806534

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

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

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

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

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

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

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

LEVEL IV ONLY:

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

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
	3	soil	U	131	1	J+ det / A (m)

Comments:

MS.4S2

LDC #: 21258H4
SDG #: R0808534

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

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

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

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

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

LEVEL IV ONLY:

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

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	1	Soil	Mg	16	1	J/UJ/A (sd)
	2	Soil	Mg	22	2	J/UJ/A (sd)

Comments:

SDIL4S2

LDC #: 21258D4 H4
SDG #: ~~K0806227~~ K0806534

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW-846 6010/7000)

#	Sample ID	Analyte	Lab Limit ~~Result (units)~~	QUAPP Limit ~~RL (units)~~	Finding	Qualifications
1	~~All~~ Aq	Se	6.0 ug/L	5.0 ~~mg/L~~ ug/L	Lab Limit > QUAPP Limit	None/P

Comments: