Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC# 21257

Metals

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 16 through June 24, 2008

LDC Report Date: August 17, 2009

Matrix: Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K0805394

Sample Identification

PB061608B
PC-40B
H-48B
MC-66B
MC-66BD
MC-65B
PC-37B
M-44B
M-94BX
MC-62B
PC-72B
H-48BF
PB061608BMS
PB061608BDUP
PC-40BMS
PC-40BDUP
M-44BMS
M-44BDUP

Introduction

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

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Thallium	0.127 ug/L	All samples in SDG K0805394
ICB/CCB	Antimony Thallium	0.014 ug/L 0.014 ug/L	All samples in SDG K0805394
PB (prep blank)	Copper Silver Zinc	0.9 ug/L 0.8 ug/L 0.9 ug/L	PB061608B
ICB/CCB	Boron Barium Magnesium Molybdenum Silver	10.3 ug/L 1.0 ug/L 2.2 ug/L 0.9 ug/L 0.8 ug/L	PB061608B
PB (prep blank)	Magnesium Zinc	2.3 ug/L 0.6 ug/L	H-48B H-48BF

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Arsenic Barium Beryllium Boron Cadmium Cobalt Iron Magnesium Strontium Zinc	1.1 ug/L 2.7 ug/L 0.1 ug/L 8.1 ug/L 0.2 ug/L 0.5 ug/L 5.5 ug/L 5.2 ug/L 0.4 ug/L 0.8 ug/L	PC-40B MC-66B MC-66BD MC-65B PC-37B M-44B M-94BX MC-62B PC-72B
ICB/CCB	Arsenic Magnesium Strontium	1.1 ug/L 5.2 ug/L 0.4 ug/L	H-48B
ICB/CCB	Arsenic Magnesium	1.1 ug/L 5.2 ug/L	H-48BF
ICB/CCB	Manganese	0.2 ug/L	PC-37B M-44B M-94BX PC-72B
ICB/CCB	Aluminum Barium Boron Strontium	8.3 ug/L 3.7 ug/L 9.3 ug/L 0.2 ug/L	H-48BF

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
PB061608B	Boron Barium Copper Molybdenum Zinc	39.6 ug/L 1.8 ug/L 1.0 ug/L 1.2 ug/L 6.1 ug/L	50.0U ug/L 5.0U ug/L 10.0U ug/L 10.0U ug/L 10.0U ug/L
PC-40B	Antimony Cadmium Cobalt Iron Zinc	0.348 ug/L 0.2 ug/L 1.9 ug/L 19.4 ug/L 1.9 ug/L	0.500U ug/L 5.0U ug/L 10.0U ug/L 20.0U ug/L 10.0U ug/L
H-48B	Antimony	0.438 ug/L	0.500U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
MC-66B	Antimony Cadmium Cobalt Zinc	0.254 ug/L 0.3 ug/L 1.5 ug/L 2.0 ug/L	0.500U ug/L 5.0U ug/L 10.0U ug/L 10.0U ug/L
MC-66BD	Antimony Beryllium Cadmium Cobalt Zinc	0.291 ug/L 0.1 ug/L 0.3 ug/L 2.3 ug/L 4.7 ug/L	0.500U ug/L 0.3U ug/L 5.0U ug/L 10.0U ug/L 10.0U ug/L
MC-65B	Antimony Beryllium Cadmium Cobalt	0.199 ug/L 0.1 ug/L 0.2 ug/L 0.8 ug/L	0.500U ug/L 0.3U ug/L 5.0U ug/L 10.0U ug/L
PC-37B	Antimony Thallium Cadmium Cobalt Zinc Manganese	0.237 ug/L 0.168 ug/L 0.2 ug/L 0.9 ug/L 3.3 ug/L 4.7 ug/L	0.500U ug/L 0.200U ug/L 5.0U ug/L 10.0U ug/L 10.0U ug/L 5.0U ug/L
M-44B	Antimony Cobalt Zinc	0.238 ug/L 0.7 ug/L 5.8 ug/L	0.500U ug/L 10.0U ug/L 10.0U ug/L
M-94BX	Antimony Beryllium Cadmium Cobalt Zinc	0.220 ug/L 0.1 ug/L 0.3 ug/L 0.6 ug/L 6.2 ug/L	0.500U ug/L 0.3U ug/L 5.0U ug/L 10.0U ug/L 10.0U ug/L
MC-62B	Cobalt Iron Zinc	2.9 ug/L 9.6 ug/L 2.8 ug/L	10.0U ug/L 20.0U ug/L 10.0U ug/L
PC-72B	Antimony Thallium Beryllium Cobalt Zinc Manganese	0.272 ug/L 0.169 ug/L 0.1 ug/L 0.9 ug/L 2.1 ug/L 4.9 ug/L	0.500U ug/L 0.200U ug/L 0.3U ug/L 10.0U ug/L 10.0U ug/L 5.0U ug/L
H-48BF	Antimony Thallium	0.435 ug/L 0.163 ug/L	0.500U ug/L 0.200U 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	PC-40B H-48B MC-66B MC-66BD MC-65B PC-37B M-44B M-94BX MC-62B PC-72B H-48BF

Sample PB061608B 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 Barium Boron Calcium Cobalt Copper Iron Lead Magnesium Manganese Molybdenum Nickel Sodium Strontium Titanium Tungsten Zinc	37.6 ug/L 1.8 ug/L 39.6 ug/L 265 ug/L 0.4 ug/L 1.0 ug/L 57.4 ug/L 0.785 ug/L 63.1 ug/L 55.6 ug/L 1.2 ug/L 0.6 ug/L 83.5 ug/L 1.4 ug/L 2.8 ug/L 0.5 ug/L 6.1 ug/L	PC-40B H-48B MC-66B MC-66BD MC-65B PC-37B M-44B M-94BX MC-62B PC-72B H-48BF

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
PC-40B	Iron	19.4 ug/L	20.0U ug/L
PC-40B	Aluminum Cobalt Iron Lead Nickel Zinc	36.5 ug/L 1.9 ug/L 19.4 ug/L 1.610 ug/L 6.4 ug/L 1.9 ug/L	50.0U ug/L 10.0U ug/L 20.0U ug/L 1.610J+ ug/L 20.0U ug/L 10.0U ug/L
H-48B	Tungsten	0.6 ug/L	1.0U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
MC-66B	Cobalt	1.5 ug/L	10.0U ug/L
	Iron	189 ug/L	189J+ ug/L
	Lead	1.070 ug/L	1.070J+ ug/L
	Nickel	6.1 ug/L	20.0U ug/L
	Titanium	7.1 ug/L	10.0U ug/L
	Zinc	2.0 ug/L	10.0U ug/L
MC-66BD	Cobalt	2.3 ug/L	10.0U ug/L
	Lead	1.510 ug/L	1.510J+ ug/L
	Nickel	7.1 ug/L	20.0U ug/L
	Zinc	4.7 ug/L	10.0U ug/L
MC-65B	Cobalt	0.8 ug/L	10.0U ug/L
	Iron	32.1 ug/L	32.1J+ ug/L
	Lead	1.210 ug/L	1.210J+ ug/L
	Manganese	362 ug/L	362J+ ug/L
	Nickel	6.3 ug/L	20.0U ug/L
PC-37B	Aluminum	45.0 ug/L	50.0U ug/L
	Cobalt	0.9 ug/L	10.0U ug/L
	Iron	33.2 ug/L	33.2J+ ug/L
	Lead	0.919 ug/L	0.919J+ ug/L
	Manganese	4.7 ug/L	5.0U ug/L
	Nickel	7.4 ug/L	20.0U ug/L
	Zinc	3.3 ug/L	10.0U ug/L
M-44B	Aluminum	47.6 ug/L	50.0U ug/L
	Cobalt	0.7 ug/L	10.0U ug/L
	Iron	22.9 ug/L	22.9J+ ug/L
	Lead	0.903 ug/L	0.903J+ ug/L
	Manganese	10.6 ug/L	10.6J+ ug/L
	Nickel	6.6 ug/L	20.0U ug/L
	Zinc	5.8 ug/L	10.0U ug/L
M-94BX	Cobalt	0.6 ug/L	10.0U ug/L
	Iron	176 ug/L	176J+ ug/L
	Lead	1.160 ug/L	1.160J+ ug/L
	Manganese	40.5 ug/L	40.5J+ ug/L
	Nickel	7.8 ug/L	20.0U ug/L
	Titanium	6.3 ug/L	10.0U ug/L
	Zinc	6.2 ug/L	10.0U ug/L
MC-62B	Aluminum	11.2 ug/L	50.0U ug/L
	Cobalt	2.9 ug/L	10.0U ug/L
	Iron	9.6 ug/L	20.0U ug/L
	Lead	1.510 ug/L	1.510J+ ug/L
	Nickel	7.0 ug/L	20.0U ug/L
	Zinc	2.8 ug/L	10.0U ug/L
PC-72B	Cobalt	0.9 ug/L	10.0U ug/L
	Iron	24.3 ug/L	24.3J+ ug/L
	Lead	0.868 ug/L	0.868J+ ug/L
	Manganese	4.9 ug/L	5.0U ug/L
	Nickel	6.5 ug/L	20.0U ug/L
	Zinc	2.1 ug/L	10.0U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
H-48BF	Lead Tungsten	3.260 ug/L 0.5 ug/L	3.260J+ 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.

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 K0805394	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 K0805394	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 MC-66B and MC-66BD 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
	MC-66B	MC-66BD				
Aluminum	220	838	-	618 (≤50)	J (all detects)	A
Antimony	0.254	0.291	-	0.037 (≤0.5)	-	-
Arsenic	140	146	4 (≤30)	-	-	-
Barium	25.2	44.8	56 (≤30)	-	J (all detects)	A
Beryllium	0.1U	0.1	-	0 (≤0.3)	-	-
Boron	7740	7910	2 (≤30)	-	-	-
Cadmium	0.3	0.3	-	0 (≤5.0)	-	-
Calcium	696000	699000	0 (≤30)	-	-	-
Chromium	582	632	8 (≤30)	-	-	-
Cobalt	1.5	2.3	-	0.8 (≤10.0)	-	-

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	MC-66B	MC-66BD				
Iron	189	614	106 (≤30)	-	J (all detects)	A
Lead	1.070	1.510	34 (≤30)	-	J (all detects)	A
Magnesium	328000	330000	1 (≤30)	-	-	-
Manganese	588	563	4 (≤30)	-	-	-
Molybdenum	45.3	45.3	0 (≤30)	-	-	-
Nickel	6.1	7.1	-	1 (≤20.0)	-	-
Platinum	0.2	0.2	-	0 (≤1.0)	-	-
Potassium	22500	23000	2 (≤30)	-	-	-
Selenium	8.0	11.3	-	3.3 (≤50.0)	-	-
Sodium	1500000	1490000	1 (≤30)	-	-	-
Strontium	16300	16300	0 (≤30)	-	-	-
Thallium	0.248	0.309	-	0.061 (≤0.200)	-	-
Titanium	7.1	34.6	-	27.5 (≤10.0)	J (all detects)	A
Tungsten	3.8	3.7	-	0.1 (≤1.0)	-	-
Uranium	50.9	50.5	1 (≤30)	-	-	-
Vanadium	65.3	67.4	3 (≤30)	-	-	-
Zinc	2.0	4.7	-	2.7 (≤10.0)	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG K0805394

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0805394	PB061608B PC-40B H-48B MC-66B MC-66BD MC-65B PC-37B M-44B M-94BX MC-62B PC-72B H-48BF	Selenium	None	P	Sample result verification
K0805394	PB061608B PC-40B H-48B MC-66B MC-66BD MC-65B PC-37B M-44B M-94BX MC-62B PC-72B H-48BF	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
K0805394	MC-66B MC-66BD	Barium Iron Lead	J (all detects) J (all detects) J (all detects)	A	Field duplicates (RPD) (fd)
K0805394	MC-66B MC-66BD	Aluminum Titanium	J (all detects) J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG K0805394

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0805394	PB061608B	Boron Barium Copper Molybdenum Zinc	50.0U ug/L 5.0U ug/L 10.0U ug/L 10.0U ug/L 10.0U ug/L	A	bl
K0805394	PC-40B	Antimony Cadmium Cobalt Iron Zinc	0.500U ug/L 5.0U ug/L 10.0U ug/L 20.0U ug/L 10.0U ug/L	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0805394	H-48B	Antimony	0.500U ug/L	A	bl
K0805394	MC-66B	Antimony Cadmium Cobalt Zinc	0.500U ug/L 5.0U ug/L 10.0U ug/L 10.0U ug/L	A	bl
K0805394	MC-66BD	Antimony Beryllium Cadmium Cobalt Zinc	0.500U ug/L 0.3U ug/L 5.0U ug/L 10.0U ug/L 10.0U ug/L	A	bl
K0805394	MC-65B	Antimony Beryllium Cadmium Cobalt	0.500U ug/L 0.3U ug/L 5.0U ug/L 10.0U ug/L	A	bl
K0805394	PC-37B	Antimony Thallium Cadmium Cobalt Zinc Manganese	0.500U ug/L 0.200U ug/L 5.0U ug/L 10.0U ug/L 10.0U ug/L 5.0U ug/L	A	bl
K0805394	M-44B	Antimony Cobalt Zinc	0.500U ug/L 10.0U ug/L 10.0U ug/L	A	bl
K0805394	M-94BX	Antimony Beryllium Cadmium Cobalt Zinc	0.500U ug/L 0.3U ug/L 5.0U ug/L 10.0U ug/L 10.0U ug/L	A	bl
K0805394	MC-62B	Cobalt Iron Zinc	10.0U ug/L 20.0U ug/L 10.0U ug/L	A	bl
K0805394	PC-72B	Antimony Thallium Beryllium Cobalt Zinc Manganese	0.500U ug/L 0.200U ug/L 0.3U ug/L 10.0U ug/L 10.0U ug/L 5.0U ug/L	A	bl
K0805394	H-48BF	Antimony Thallium	0.500U ug/L 0.200U ug/L	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG K0805394

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0805394	PC-40B	Aluminum Cobalt Lead Nickel Zinc	50.0U ug/L 10.0U ug/L 1.610J+ ug/L 20.0U ug/L 10.0U ug/L	A	bp
K0805394	PC-40B	Iron	20.0U ug/L	A	bf,bp
K0805394	H-48B	Tungsten	1.0U ug/L	A	bf,bp
K0805394	MC-66B	Cobalt Iron Lead Nickel Titanium Zinc	10.0U ug/L 189J+ ug/L 1.070J+ ug/L 20.0U ug/L 10.0U ug/L 10.0U ug/L	A	bp
K0805394	MC-66BD	Cobalt Lead Nickel Zinc	10.0U ug/L 1.510J+ ug/L 20.0U ug/L 10.0U ug/L	A	bp
K0805394	MC-65B	Cobalt Iron Lead Manganese Nickel	10.0U ug/L 32.1J+ ug/L 1.210J+ ug/L 362J+ ug/L 20.0U ug/L	A	bp
K0805394	PC-37B	Aluminum Cobalt Iron Lead Manganese Nickel Zinc	50.0U ug/L 10.0U ug/L 33.2J+ ug/L 0.919J+ ug/L 5.0U ug/L 20.0U ug/L 10.0U ug/L	A	bp
K0805394	M-44B	Aluminum Cobalt Iron Lead Manganese Nickel Zinc	50.0U ug/L 10.0U ug/L 22.9J+ ug/L 0.903J+ ug/L 10.6J+ ug/L 20.0U ug/L 10.0U ug/L	A	bp

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0805394	M-94BX	Cobalt Iron Lead Manganese Nickel Titanium Zinc	10.0U ug/L 176J+ ug/L 1.160J+ ug/L 40.5J+ ug/L 20.0U ug/L 10.0U ug/L 10.0U ug/L	A	bp
K0805394	MC-62B	Aluminum Cobalt Lead Nickel Zinc	50.0U ug/L 10.0U ug/L 1.510J+ ug/L 20.0U ug/L 10.0U ug/L	A	bp
K0805394	MC-62B	Iron	20.0U ug/L	A	bf,bp
K0805394	PC-72B	Cobalt Iron Lead Manganese Nickel Zinc	10.0U ug/L 24.3J+ ug/L 0.868J+ ug/L 5.0U ug/L 20.0U ug/L 10.0U ug/L	A	bp
K0805394	H-48BF	Lead	3.260J+ ug/L	A	bp
K0805394	H-48BF	Tungsten	1.0U ug/L	A	bf,bp

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257W4
SDG #: K0805394
Laboratory: Columbia Analytical Services

Date: 8-12-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: V

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/16/08 - 6/24/08
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	SW	
VI.	Matrix Spike Analysis	~~AAS~~	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	(4,5)
XV	Field Blanks	SW	PB=1, FB=FB062408GWarea7(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	PB061608B	11	PC-72B	21	PBW1	31	
2	PC-40B	12	H-48BF	22	PBW2	32	
3	H-48B	13	PB061608BMS	23		33	
4	MC-66B	14	PB061608BDUP	24		34	
5	MC-66BD	15	PC-40BMS	25		35	
6	MC-65B	16	PC-40BDUP	26		36	
7	PC-37B	17	M-44BMS	27		37	
8	M-44B	18	M-44BDUP	28		38	
9	M-94BX	19		29		39	
10	MC-62B	20		30		40	

Notes: _____

LDC #: 21257W4
SDG #: K0805394

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)
1-12	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:13,14	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:15,16		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:17,18	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Analysis Method		
ICP	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 #: 21257W4
SDG #: K0805394

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason Code: bl
Raise to RL unless otherwise noted.

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

METHOD: Trace metals (EPA SW 846 Method 6020/7000) Preparation factor applied: Sb, Tl @ 10x. As @10xdil.
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	2	3	4	5	6	7	8	9	11	12
Sb		0.014		0.500	0.348	0.438	0.254	0.291	0.199	0.237	0.238	0.220	0.272	0.435
Tl	0.127	0.014		0.200						0.168			0.169	0.163

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

					Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1									
B			10.3		39.6 / 50.0									
Ba			1.0		1.8 / 5.0									
Cu		0.9			1.0 / 10.0									
Mg			2.2											
Mo			0.9		1.2 / 10.0									
Ag		0.8	0.8											
Zn		0.9			6.1 / 10.0									

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 2, 4-11 = All analytes, 3 =As, Mg (PB/CCB), Zn PB, and Sr only, 12=As, Mg (PB/CCB), Zn PB only

					Sample Identification									
Analyte	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	RL	2	4	5	6	7	8	9	10	11	
As		1.1												
Ba		2.7												
Be		0.1		0.3			0.1	0.1			0.1		0.1	
B		8.1												
Cd		0.2		5.0	0.2	0.3	0.3	0.2	0.2		0.3			
Co		0.5		10.0	1.9	1.5	2.3	0.8	0.9	0.7	0.6	2.9	0.9	
Fe		5.5		20.0	19.4							9.6		
Mg	2.3	5.2												
Sr		0.4												
Zn	0.6	0.8		10.0	1.9	2.0	4.7		3.3	5.8	6.2	2.8	2.1	

LDC #: 21257W4
SDG #: K0805394
METHOD: Trace metals (EPA SW 846 Method 6020/6010/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Preparation factor applied: Sb, Tl @ 10x. As @10xdil.

Reason Code: bl
Raise to RL unless otherwise noted.

Reviewer: CR
2nd Reviewer:

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 7-9, 11

					Sample Identification									
Analyte	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	RL	7	11								
Mn		0.2		5.0	4.7	4.9								

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

					Sample Identification									
Analyte	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	RL	No Qualifiers									
Al		8.3												
Ba		3.7												
B		9.3												
Sr		0.2												

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

LDC #: 21257W4
SDG #: K0805394

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: [illegible]

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

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

Raise to RL unless otherwise noted with J+

Reason Code: ~~be~~ CR bq

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 1

Analyte	Blank ID			Sample Identification										
	1	Action Level	RL	2	3	4	5	6	7	8	9	10	11	12
Al	37.6		50.0	36.5					45.0	47.6		11.2		
Ba	1.8													
B	39.6													
Ca	265	2650												
Co	0.4		10.0	1.9		1.5	2.3	0.8	0.9	0.7	0.6	2.9	0.9	
Cu	1.0													
Fe	57.4	574	20.0	19.4		189 J+		32.1 J+	33.2 J+	22.9 J+	176 J+	9.6	24.3 J+	
Pb	0.785	7.85		1.610 J+		1.070 J+	1.510 J+	1.210 J+	0.919 J+	0.903 J+	1.160 J+	1.510J+	0.868 J+	3.260 J+
Mg	63.1	631												
Mn	55.6	556	5.0					362 J+	4.7	10.6 J+	40.5 J+		4.9	
Mo	1.2													
Ni	0.6		20.0	6.4		6.1	7.1	6.3	7.4	6.6	7.8	7.0	6.5	
Na	83.5													
Sr	1.4													
Ti	2.8		10.0			7.1					6.3			
W	0.5		1.0		0.6									0.5
Zn	6.1		10.0	1.9		2.0	4.7		3.3	5.8	6.2	2.8	2.1	

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

LDC #:21257W4
SDG #: K0805394

VALIDATION FINDINGS WORKSHEET
Field Blanks

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?

Raise to RL unless otherwise noted with J+

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

Reason Code: bf

Sampling date: 6/24/08 Soil factor applied NA

Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: All except 1

Analyte	Blank ID	Sample Identification											
	FB062408GWarea1 (SDG#: K0805722)	Action Level	RL	2	3	10	12						
As	1.6												
B	49												
Ca	12.0												
Fe	2.9		20.0	19.4		9.6							
Mg	1.2												
W	0.4		1.0		0.6		0.5						

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 #: 21257W4
SDG #: I5080539Y

VALIDATION FINDINGS WORKSHEET
ICP Interference Check Sample

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 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
	7/7/08	ICSAB(13:38)	Mg	18	2-12	No Qual (samples <90% ICS A)

Comments: _____

LDC #: 21257W4
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: CR
2nd Reviewer: W

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

#	Sample ID	Analyte	Lab Limit ~~Result (units)~~	QUAPP Limit ~~RL (units)~~	Finding	Qualifications
1	A11	Se	< 6.0 ug/L	5.0 ~~mg~~ ug/L	Lab Limit > QUAPP Limit	None/P

Comments:

LDC#: 21257W4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CB
2nd Reviewer: W

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)		(≤30) RPD	(ug/L) Difference	(ug/L) Limits	Qualifications (Parent Only)
	4	5				
Aluminum	220	838		618	(≤50)	Jdet/A(fd)
Antimony	0.254	0.291		0.037	(≤0.5)	
Arsenic	140	146	4			
Barium	25.2	44.8	56			Jdet/A(fd)
Beryllium	0.1U	0.1		0	(≤0.3)	
Boron	7740	7910	2			
Cadmium	0.3	0.3		0	(≤5.0)	
Calcium	696000	699000	0			
Chromium	582	632	8			
Cobalt	1.5	2.3		0.8	(≤10.0)	
Iron	189	614	106			Jdet/A(fd)
Lead	1.070	1.510	34			Jdet/A(fd)
Magnesium	328000	330000	1			
Manganese	588	563	4			
Molybdenum	45.3	45.3	0			
Nickel	6.1	7.1		1	(≤20.0)	
Platinum	0.2	0.2		0	(≤1.0)	
Potassium	22500	23000	2			
Selenium	8.0	11.3		3.3	(≤50.0)	

LDC#: 21257W4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CB
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) 4	Concentration (ug/L) 5	(≤30) RPD	(ug/L) Difference	(ug/L) Limits	Qualifications (Parent Only)
Sodium	1500000	1490000	1			
Strontium	16300	16300	0			
Thallium	0.248	0.309		0.061	(≤0.200)	
Titanium	7.1	34.6		27.5	(≤10.0)	Jdet/Afd)
Tungsten	3.8	3.7		0.1	(≤1.0)	
Uranium	50.9	50.5	1			
Vanadium	65.3	67.4	3			
Zinc	2.0	4.7		2.7	(≤10.0)	

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 24 through June 27, 2008

LDC Report Date: September 15, 2009

Matrix: Water

Parameters: Metals

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K0805722

Sample Identification

H-49AB
FB062408GWarea1
M-23B
MC-53B
MC-97B
MC-45B
M-7BB
M-88BB
M-61B
MC-94B
MC-94BF
M-5AB
MW-16B
EB062608GW3
M-6AB
M-67B
M-68B
M-95B
M-57AB
M-7BBMS
M-7BBDUP

Introduction

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

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Arsenic Boron Thallium Tungsten	0.7 ug/L 21 ug/L 0.088 ug/L 0.5 ug/L	All samples in SDG K0805722
ICB/CCB	Antimony Barium Beryllium Boron Iron Lead Molybdenum Thallium Tungsten	0.014 ug/L 0.8 ug/L 0.1 ug/L 18.6 ug/L 4.3 ug/L 0.012 ug/L 5.9 ug/L 0.016 ug/L 0.1 ug/L	All samples in SDG K0805722
ICB/CCB	Arsenic	0.8 ug/L	H-49AB M-23B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Arsenic	1.1 ug/L	MC-94BF M-5AB M-6AB M-67B M-68B M-95B M-57AB
ICB/CCB	Arsenic	0.8 ug/L	FB062408GWarea1 MW-16B EB062608GW3

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
H-49AB	Antimony	0.250 ug/L	0.500U ug/L
FB062408GWarea1	Arsenic Boron Iron Tungsten	1.6 ug/L 49 ug/L 2.9 ug/L 0.4 ug/L	5.0U ug/L 50U ug/L 20.0U ug/L 1.0U ug/L
M-23B	Antimony Beryllium	0.227 ug/L 0.1 ug/L	0.500U ug/L 0.3U ug/L
MC-53B	Antimony	0.374 ug/L	0.500U ug/L
MC-97B	Antimony	0.280 ug/L	0.500U ug/L
MC-45B	Beryllium	0.1 ug/L	0.3U ug/L
M-7BB	Antimony Tungsten	0.169 ug/L 0.6 ug/L	0.500U ug/L 1.0U ug/L
M-88BB	Antimony	0.193 ug/L	0.500U ug/L
MC-94B	Antimony Beryllium	0.346 ug/L 0.1 ug/L	0.500U ug/L 0.3U ug/L
MC-94BF	Antimony	0.368 ug/L	0.500U ug/L
M-5AB	Antimony Thallium	0.161 ug/L 0.133 ug/L	0.500U ug/L 0.200U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
MW-16B	Antimony Arsenic Molybdenum	0.137 ug/L 4.5 ug/L 5.5 ug/L	0.500U ug/L 5.0U ug/L 10U ug/L
EB062608GW3	Arsenic Barium Boron Iron Thallium Tungsten	1.2 ug/L 0.7 ug/L 43 ug/L 3.9 ug/L 0.187 ug/L 0.4 ug/L	5.0U ug/L 5.0U ug/L 50U ug/L 20.0U ug/L 0.200U ug/L 1.0U ug/L
M-6AB	Antimony Tungsten	0.141 ug/L 1.0 ug/L	0.500U ug/L 1.0U ug/L
M-67B	Antimony	0.206 ug/L	0.500U ug/L
M-68B	Antimony Beryllium	0.281 ug/L 0.1 ug/L	0.500U ug/L 0.3U ug/L
M-95B	Antimony	0.196 ug/L	0.500U ug/L
M-57AB	Antimony	0.150 ug/L	0.500U ug/L

Sample EB062608GW3 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
EB062608GW3	6/26/08	Arsenic Barium Boron Calcium Iron Lead Magnesium Manganese Sodium Strontium Thallium Tungsten	1.2 ug/L 0.7 ug/L 43 ug/L 29.5 ug/L 3.9 ug/L 0.315 ug/L 7.5 ug/L 0.7 ug/L 47 ug/L 0.6 ug/L 0.187 ug/L 0.4 ug/L	M-5AB MW-16B

Sample FB062408GWarea1 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	H-49AB M-23B MC-53B MC-97B MC-45B M-7BB M-88BB M-61B MC-94B MC-94BF M-5AB MW-16B M-6AB M-67B M-68B M-95B M-57AB

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 Barium Boron Calcium Cobalt Copper Iron Lead Magnesium Manganese Molybdenum Nickel Sodium Strontium Titanium Tungsten Zinc	37.6 ug/L 1.8 ug/L 39.6 ug/L 265 ug/L 0.4 ug/L 1.0 ug/L 57.4 ug/L 0.785 ug/L 63.1 ug/L 55.6 ug/L 1.2 ug/L 0.6 ug/L 83.5 ug/L 1.4 ug/L 2.8 ug/L 0.5 ug/L 6.1 ug/L	H-49AB M-23B MC-53B MC-97B MC-45B M-7BB M-88BB M-61B MC-94B MC-94BF M-5AB MW-16B M-6AB M-67B M-68B M-95B M-57AB

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
H-49AB	Iron Lead Manganese Zinc	73.0 ug/L 1.200 ug/L 101 ug/L 2.9 ug/L	73.0J+ ug/L 1.200J+ ug/L 101J+ ug/L 10.0U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
M-23B	Cobalt	5.3 ug/L	10U ug/L
	Iron	23.2 ug/L	23.2J+ ug/L
	Lead	0.873 ug/L	0.873J+ ug/L
	Manganese	31 ug/L	31J+ ug/L
	Nickel	2.2 ug/L	20.0U ug/L
MC-53B	Aluminum	30 ug/L	50U ug/L
	Iron	41.9 ug/L	41.9J+ ug/L
	Lead	1.350 ug/L	1.350J+ ug/L
	Manganese	9.0 ug/L	9.0J+ ug/L
	Nickel	3.3 ug/L	20.0U ug/L
	Zinc	3.4 ug/L	10.0U ug/L
MC-97B	Aluminum	41 ug/L	50U ug/L
	Iron	44.4 ug/L	44.4J+ ug/L
	Lead	1.350 ug/L	1.350J+ ug/L
	Manganese	11 ug/L	11J+ ug/L
	Zinc	2.2 ug/L	10.0U ug/L
MC-45B	Cobalt	4.3 ug/L	10U ug/L
	Iron	43.4 ug/L	43.4J+ ug/L
	Lead	1.860 ug/L	1.860J+ ug/L
	Zinc	5.1 ug/L	10.0U ug/L
M-7BB	Iron	64.0 ug/L	64.0J+ ug/L
	Lead	1.280 ug/L	1.280J+ ug/L
	Manganese	1.9 ug/L	5.0U ug/L
	Titanium	4.1 ug/L	10.0U ug/L
	Tungsten	0.6 ug/L	1.0U ug/L
M-88BB	Iron	73.5 ug/L	73.5J+ ug/L
	Lead	0.841 ug/L	0.841J+ ug/L
	Manganese	19 ug/L	19J+ ug/L
	Nickel	8.9 ug/L	20.0U ug/L
	Zinc	2.4 ug/L	10.0U ug/L
M-61B	Aluminum	31 ug/L	50U ug/L
	Iron	50.7 ug/L	50.7J+ ug/L
	Lead	0.610 ug/L	0.610J+ ug/L
	Manganese	321 ug/L	321J+ ug/L
	Zinc	9.4 ug/L	10.0U ug/L
MC-94B	Iron	204 ug/L	204J+ ug/L
	Lead	3.320 ug/L	3.320J+ ug/L
	Manganese	31 ug/L	31J+ ug/L
	Zinc	3.2 ug/L	10.0U ug/L
MC-94BF	Iron	24.8 ug/L	24.8J+ ug/L
	Lead	1.650 ug/L	1.650J+ ug/L
	Manganese	1.2 ug/L	5.0U ug/L
	Zinc	2.1 ug/L	10.0U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
M-5AB	Lead	1.740 ug/L	1.740J+ ug/L
	Thallium	0.133 ug/L	0.200U ug/L
	Zinc	3.8 ug/L	10.0U ug/L
MW-16B	Arsenic	4.5 ug/L	5.0U ug/L
	Cobalt	3.2 ug/L	10U ug/L
	Iron	205 ug/L	205J+ ug/L
	Lead	1.320 ug/L	1.320J+ ug/L
	Molybdenum	5.5 ug/L	10U ug/L
	Nickel	2.6 ug/L	20.0U ug/L
	Titanium	9.0 ug/L	10.0U ug/L
	Zinc	6.0 ug/L	10.0U ug/L
M-6AB	Iron	125 ug/L	125J+ ug/L
	Lead	1.030 ug/L	1.030J+ ug/L
	Manganese	15 ug/L	15J+ ug/L
	Titanium	5.0 ug/L	10.0U ug/L
	Tungsten	1.0 ug/L	1.0U ug/L
M-67B	Iron	29.3 ug/L	29.3J+ ug/L
	Lead	0.668 ug/L	0.668J+ ug/L
	Manganese	21 ug/L	21J+ ug/L
	Nickel	2.8 ug/L	20.0U ug/L
	Zinc	4.4 ug/L	10.0U ug/L
M-68B	Iron	23.2 ug/L	23.2J+ ug/L
	Lead	0.591 ug/L	0.591J+ ug/L
	Manganese	58 ug/L	58J+ ug/L
	Zinc	3.2 ug/L	10.0U ug/L
M-95B	Iron	87.4 ug/L	87.4J+ ug/L
	Lead	0.701 ug/L	0.701J+ ug/L
	Manganese	34 ug/L	34J+ ug/L
	Titanium	4.2 ug/L	10.0U ug/L
M-57AB	Iron	176 ug/L	176J+ ug/L
	Lead	0.715 ug/L	0.715J+ ug/L
	Manganese	3.8 ug/L	5.0U ug/L
	Titanium	8.5 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 with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
M-7BBMS (All samples in SDG K0805722)	Boron	126.0 (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

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

X. Furnace Atomic Absorption QC

All graphite furnace atomic absorption QC were within validation criteria with the following exceptions:

Analytical Spike	Analyte	%R (Limits)	Associated Sample	Flag	A or P
M-5AB	Arsenic	84 (85-115)	M-5AB	J (all detects) UJ (all non-detects)	A
MC-53B	Arsenic	116 (85-115)	MC-53B	J (all detects) UJ (all non-detects)	A

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 K0805722	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 K0805722	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 K0805722

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0805722	H-49AB FB062408GWarea1 M-23B MC-53B MC-97B MC-45B M-7BB M-88BB M-61B MC-94B MC-94BF M-5AB MW-16B EB062608GW3 M-6AB M-67B M-68B M-95B M-57AB	Boron	J+ (all detects)	A	Matrix spike analysis (%R) (m)
K0805722	MC-53B M-5AB	Arsenic	J (all detects) UJ (all non-detects)	A	Furnace atomic absorption QC (%R) (q)
K0805722	H-49AB FB062408GWarea1 M-23B MC-53B MC-97B MC-45B M-7BB M-88BB M-61B MC-94B MC-94BF M-5AB MW-16B EB062608GW3 M-6AB M-67B M-68B M-95B M-57AB	Selenium	None	P	Sample result verification

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0805722	H-49AB FB062408GWarea1 M-23B MC-53B MC-97B MC-45B M-7BB M-88BB M-61B MC-94B MC-94BF M-5AB MW-16B EB062608GW3 M-6AB M-67B M-68B M-95B M-57AB	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 K0805722

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0805722	H-49AB	Antimony	0.500U ug/L	A	bl
K0805722	FB062408GWarea1	Arsenic Boron Iron Tungsten	5.0U ug/L 50U ug/L 20.0U ug/L 1.0U ug/L	A	bl
K0805722	M-23B	Antimony Beryllium	0.500U ug/L 0.3U ug/L	A	bl
K0805722	MC-53B	Antimony	0.500U ug/L	A	bl
K0805722	MC-97B	Antimony	0.500U ug/L	A	bl
K0805722	MC-45B	Beryllium	0.3U ug/L	A	bl
K0805722	M-7BB	Antimony Tungsten	0.500U ug/L 1.0U ug/L	A	bl
K0805722	M-88BB	Antimony	0.500U ug/L	A	bl
K0805722	MC-94B	Antimony Beryllium	0.500U ug/L 0.3U ug/L	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0805722	MC-94BF	Antimony	0.500U ug/L	A	bl
K0805722	M-5AB	Antimony Thallium	0.500U ug/L 0.200U ug/L	A	bl
K0805722	MW-16B	Antimony Arsenic Molybdenum	0.500U ug/L 5.0U ug/L 10U ug/L	A	bl
K0805722	EB062608GW3	Arsenic Barium Boron Iron Thallium Tungsten	5.0U ug/L 5.0U ug/L 50U ug/L 20.0U ug/L 0.200U ug/L 1.0U ug/L	A	bl
K0805722	M-6AB	Antimony Tungsten	0.500U ug/L 1.0U ug/L	A	bl
K0805722	M-67B	Antimony	0.500U ug/L	A	bl
K0805722	M-68B	Antimony Beryllium	0.500U ug/L 0.3U ug/L	A	bl
K0805722	M-95B	Antimony	0.500U ug/L	A	bl
K0805722	M-57AB	Antimony	0.500U ug/L	A	bl

*Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada Metals - Field Blank Data Qualification Summary - SDG K0805722

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0805722	H-49AB	Iron Lead Manganese Zinc	73.0J+ ug/L 1.200J+ ug/L 101J+ ug/L 10.0U ug/L	A	bp
K0805722	M-23B	Cobalt Iron Lead Manganese Nickel	10U ug/L 23.2J+ ug/L 0.873J+ ug/L 31J+ ug/L 20.0U ug/L	A	bp

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0805722	MC-53B	Aluminum Iron Lead Manganese Nickel Zinc	50U ug/L 41.9J+ ug/L 1.350J+ ug/L 9.0J+ ug/L 20.0U ug/L 10.0U ug/L	A	bp
K0805722	MC-97B	Aluminum Iron Lead Manganese Zinc	50U ug/L 44.4J+ ug/L 1.350J+ ug/L 11J+ ug/L 10.0U ug/L	A	bp
K0805722	MC-45B	Cobalt Iron Lead Zinc	10U ug/L 43.4J+ ug/L 1.860J+ ug/L 10.0U ug/L	A	bp
K0805722	M-7BB	Iron Lead Manganese Titanium	64.0J+ ug/L 1.280J+ ug/L 5.0U ug/L 10.0U ug/L	A	bp
K0805722	M-7BB	Tungsten	1.0U ug/L	A	bf,bp
K0805722	M-88BB	Iron Lead Manganese Nickel Zinc	73.5J+ ug/L 0.841J+ ug/L 19J+ ug/L 20.0U ug/L 10.0U ug/L	A	bp
K0805722	M-61B	Aluminum Iron Lead Manganese Zinc	50U ug/L 50.7J+ ug/L 0.610J+ ug/L 321J+ ug/L 10.0U ug/L	A	bp
K0805722	MC-94B	Iron Lead Manganese Zinc	204J+ ug/L 3.320J+ ug/L 31J+ ug/L 10.0U ug/L	A	bp
K0805722	MC-94BF	Iron Lead Manganese Zinc	24.8J+ ug/L 1.650J+ ug/L 5.0U ug/L 10.0U ug/L	A	bp
K0805722	M-5AB	Lead	1.740J+ ug/L	A	be,bp
*K0805722	M-5AB	Thallium	0.200U ug/L	A	be

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0805722	M-5AB	Zinc	10.0U ug/L	A	bp
K0805722	MW-16B	Cobalt Iron Molybdenum Nickel Titanium Zinc	10U ug/L 205J+ ug/L 10U ug/L 20.0U ug/L 10.0U ug/L 10.0U ug/L	A	bp
K0805722	MW-16B	Arsenic	5.0U ug/L	A	be,bf
K0805722	MW-16B	Lead	1.320J+ ug/L	A	be,bp
K0805722	M-6AB	Iron Lead Manganese Titanium	125J+ ug/L 1.030J+ ug/L 15J+ ug/L 10.0U ug/L	A	bp
K0805722	M-6AB	Tungsten	1.0U ug/L	A	bf,bp
K0805722	M-67B	Iron Lead Manganese Nickel Zinc	29.3J+ ug/L 0.668J+ ug/L 21J+ ug/L 20.0U ug/L 10.0U ug/L	A	bp
K0805722	M-68B	Iron Lead Manganese Zinc	23.2J+ ug/L 0.591J+ ug/L 58J+ ug/L 10.0U ug/L	A	bp
K0805722	M-95B	Iron Lead Manganese Titanium	87.4J+ ug/L 0.701J+ ug/L 34J+ ug/L 10.0U ug/L	A	bp
K0805722	M-57AB	Iron Lead Manganese Titanium	176J+ ug/L 0.715J+ ug/L 5.0U ug/L 10.0U ug/L	A	bp

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0805722	M-5AB	Zinc	10.0U ug/L	A	bp
K0805722	MW-16B	Cobalt Iron Molybdenum Nickel Titanium Zinc	10U ug/L 205J+ ug/L 10U ug/L 20.0U ug/L 10.0U ug/L 10.0U ug/L	A	bp
K0805722	MW-16B	Arsenic	5.0U ug/L	A	be,bf
K0805722	MW-16B	Lead	1.320J+ ug/L	A	be,bp
K0805722	M-6AB	Iron Lead Manganese Titanium	125J+ ug/L 1.030J+ ug/L 15J+ ug/L 10.0U ug/L	A	bp
K0805722	M-6AB	Tungsten	1.0U ug/L	A	bf,bp
K0805722	M-67B	Iron Lead Manganese Nickel Zinc	29.3J+ ug/L 0.668J+ ug/L 21J+ ug/L 20.0U ug/L 10.0U ug/L	A	bp
K0805722	M-68B	Iron Lead Manganese Zinc	23.2J+ ug/L 0.591J+ ug/L 58J+ ug/L 10.0U ug/L	A	bp
K0805722	M-95B	Iron Lead Manganese Titanium	87.4J+ ug/L 0.701J+ ug/L 34J+ ug/L 10.0U ug/L	A	bp
K0805722	M-57AB	Iron Lead Manganese Titanium	176J+ ug/L 0.715J+ ug/L 5.0U ug/L 10.0U ug/L	A	bp

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 21257X4
SDG #: K0805722
Laboratory: Columbia Analytical Services

Date: 8-11-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/24/08 - 6/27/08
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	A	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	SW	
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	SW	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	SW	FB=2, EB=14, PB=PB061608B (SDG#: K0805594)

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	H-49AB	11	MC-94BF	21	M-7BBDUP	31	PBW1
2	FB062408GWarea1	12	M-5AB	22		32	
3	M-23B	13	MW-16B	23		33	
4	MC-53B	14	EB062608GW3	24		34	
5	MC-97B	15	M-6AB	25		35	
6	MC-45B	16	M-67B	26		36	
7	M-7BB	17	M-68B	27		37	
8	M-88BB	18	M-95B	28		38	
9	M-61B	19	M-57AB	29		39	
10	MC-94B	20	M-7BBMS	30		40	

Notes: _____

DC #: 212578X4
DG #: 1508057T2

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: LA

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?	✓			

DC #: 212578X4
DG #: K0605722

VALIDATION FINDINGS CHECKLIST

Reviewer: ER
2nd Reviewer: LA

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 #: 2V257X4
SDG #: K0805722

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)
1-19	Water	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:20,21		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, 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 #: 21257X4
SDG #: K0805722
METHOD: Trace metals (EPA SW 846 Method 6020/6010/7000)
Sample Concentration units, unless otherwise noted: ug/L

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Preparation factor applied: Sb, Pb, Tl, W @ 10x. As @10xdil.
Associated Samples: All

Reason Code: bl

Reviewer: CR
2nd Reviewer:

				Sample Identification									
Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	1	2	3	4	5	6	7	8	10	11
Sb		0.014		0.250 / 0.500U		0.227 / 0.500U	0.374 / 0.500U	0.280 / 0.500U		0.169 / 0.500U	0.193 / 0.500U	0.346 / 0.500U	0.368 / 0.500U
As	0.7				1.6 / 5.0U								
Ba		0.8											
Be		0.1				0.1 / 0.3U			0.1 / 0.3U			0.1 / 0.3U	
B	21	18.6			49 / 50U								
Fe		4.3			2.9 / 20.0U								
Pb		0.012											
Mo		5.9											
Tl	0.088	0.016											
W	0.5	0.1			0.4 / 1.0U					0.6 / 1.0U			

				Sample Identification							
Analyte	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	12	13	14	15	16	17	18	19
Sb		0.014		0.161 / 0.500U	0.137 / 0.500U		0.141 / 0.500U	0.206 / 0.500U	0.281 / 0.500U	0.196 / 0.500U	0.150 / 0.500U
As	0.7				4.5 / 5.0U	1.2 / 5.0U					
Ba		0.8				0.7 / 5.0U					
Be		0.1							0.1 / 0.3U		
B	21	18.6				43 / 50U					
Fe		4.3				3.9 / 20.0U					
Pb		0.012									
Mo		5.9			5.5 / 10U						
Tl	0.088	0.016		0.133 / 0.200U		0.187 / 0.200U					
W	0.5	0.1				0.4 / 1.0U	1.0 / 1.0U				

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

LDC #: 21257X4
SDG #: K0805722
METHOD: Trace metals (EPA SW 846 Method 6020/6010/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Preparation factor applied: Sb, Pb, Tl, W @ 10x

Reason Code: bl

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

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

					Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
As			0.8											

Sample Concentration units, unless otherwise noted: ug/L @10x Associated Samples: 11, 12, 15, 16-19

					Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
As			1.1											

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 2, 13, 14

					Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	2	13	14							
As			0.8		See PB	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 #: 21257X4
SDG #: K0805722

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?

Blank units: ug/L **Associated sample units:** ug/L Reason Code: be

Sampling date: 6/26/05 06 Soil factor applied NA

Field blank type: (circle one) Field Blank / Rinsate / Other: EB' Associated Samples: 12, 13

Analyte	Blank ID	Sample Identification										
	14	Action Level	12	13								
As	1.2			4.5 / 5.0U								
Ba	0.7											
B	43											
Ca	29.5											
Fe	3.9											
Pb	0.315	3.15	1.740 J+	1.320 J+								
Mg	7.5											
Mn	0.7											
Na	47											
Sr	0.6											
Tl	0.187		0.133 / 0.200U									
W	0.4											

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

LDC #: 21257X4
SDG #: K0805722

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?

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

Reason Code: bf

Sampling date: 6/24/08 Soil factor applied NA

Field blank type: (circle one) (Field Blank) / Rinsate / Other: Associated Samples: All except 2 & 14

Analyte	Blank ID	Sample Identification										
	2	Action Level	7	13	15							
As	1.6			4.5 / 5.0U								
B	49											
Ca	12.0											
Fe	2.9											
Mg	1.2											
W	0.4		0.6 / 1.0U		1.0 / 1.0U							

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 #: 21257X4
SDG #: K0805722

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?

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)

Reason Code: b~~e~~ P

Associated Samples: All except 2 & 14

Analyte	Blank ID		Sample Identification										
	PB061608B (SDG#: K0805394)	Action Level	1	3	4	5	6	7	8	9	10	11	12
Al	37.6				30 / 50U	41 / 50U				31 / 50U			
Ba	1.8												
B	39.6												
Ca	265	2650											
Co	0.4			5.3 / 10U			4.3 / 10U						
Cu	1.0												
Fe	57.4	574	73.0 J+	23.2 J+	41.9 J+	44.4 J+	43.4 J+	64.0 J+	73.5 J+	50.7 J+	204 J+	24.8 J+	
Pb	0.785	7.85	1.200 J+	0.873 J+	1.350 J+	1.350 J+	1.860 J+	1.280 J+	0.841 J+	0.610 J+	3.320 J+	1.650 J+	1.740 J+
Mg	63.1	631											
Mn	55.6	556	101 J+	31 J+	9.0 J+	11 J+		1.9 / 5.0U	19 J+	321 J+	31 J+	1.2 / 5.0U	
Mo	1.2												
Ni	0.6			2.2 / 20.0U	3.3 / 20.0U				8.9 / 20.0U				
Na	83.5												
Sr	1.4												
Ti	2.8							4.1 / 10.0U					
W	0.5							0.6 / 1.0U					
Zn	6.1		2.9 / 10.0U		3.4 / 10.0U	2.2 / 10.0U	5.1 / 10.0U		2.4 / 10.0U	9.4 / 10.0U	3.2 / 10.0U	2.1 / 10.0U	3.8 / 10.0U

LDC #: 21257X4
SDG #: K0805722

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)
(Y) N N/A Were field blanks identified in this SDG?
(Y) N N/A Were target analytes detected in the field blanks?
Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 6/16/08 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: (PB)

Reason Code: ~~be~~ CR bp

Associated Samples: All except 2 & 14

...Continued from page 1

Analyte	Blank ID		Sample Identification										
	PB061608B (SDG#: K0805394)	Action Level	13	15	16	17	18	19					
Al	37.6												
Ba	1.8												
B	39.6												
Ca	265	2650											
Co	0.4		3.2 / 10U										
Cu	1.0												
Fe	57.4	574	205 J+	125 J+	29.3 J+	23.2 J+	87.4 J+	176 J+					
Pb	0.785	7.85	1.320 J+	1.030 J+	0.668 J+	0.591 J+	0.701 J+	0.715 J+					
Mg	63.1	631											
Mn	55.6	556		15 J+	21J+ ~~213 J+~~ QR	58 J+	34 J+	3.8 / 5.0U					
Mo	1.2		5.5 / 10U										
Ni	0.6		2.6 / 20.0U		2.8 / 20.0U								
Na	83.5												
Sr	1.4												
Ti	2.8		9.0 / 10.0U	5.0 / 10.0U			4.2 / 10.0U	8.5 / 10.0U					
W	0.5			1.0 / 1.0U									
Zn	6.1		6.0 / 10.0U		4.4 / 10.0U	3.2 / 10.0U							

LDC #: 42578X4
SDG #: 150805722

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Page: 1 of
Reviewer: CR
2nd Reviewer:

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

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

(Y) N N/A Was a 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	water	B	126.0	All	J+ det/A (m)

Comments:

LDC #: B2125TX4
SDG #: 1508057Z2

VALIDATION FINDINGS WORKSHEET
Furnace Atomic Absorption QC

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 MSA was performed was the correlation coefficients ≥0.995 ?

LEVEL IV ONLY:

(Y) N N/A Do all applicable analyses have duplicate injections?

(Y) N N/A For sample concentrations > CRDL, are applicable duplicate injection RSD values <20% ?

Y (N) N/A Are analytical spike recoveries with in the control limits of 85-115% ?

Sample ID	Findings				Criteria	Qualifications
	As	Pb	Se	Tl		
12	84				85-115	J / UJ / A (Q)
4	116				↓	↓ ↓

Comments:

LDC #: 41257X4
SDG #: see cover

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	AM	Se	6.0 ug/L	5.0 ~~ug~~/L ug	Lab Limit > QUAPP Limit	None/P

Comments:

LDC #: 21257X4
SDG #: 1808577Z

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: GR
2nd Reviewer: V

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~~ CRICV	ICP (Initial calibration)	Cr	512	500	102	102	Y
ICV	GFAA (Initial calibration)	As	25.9	25.0	104	104	
ICV	CVAA (Initial calibration)	Hg	5.11	5.00	102	102	
CCV2 (11:33)	ICP (Continuing calibration)	Mg	25690	25000	103	103	
CCV4 (13:32)	GFAA (Continuing calibration)	As	29.2	30.0	97	97	
CCV2 (09:59)	CVAA (Continuing calibration)	Hg	4.97	5.00	99	99	
ICV	ICP/MS (Initial calibration)	Pb	25.0	25.0	100	100	
CCV4 (16:05)	ICP/MS (Continuing calibation)	Sb	26.3	25.0	105	105	

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 #: 21257A4
SDG #: K0805722

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/L	True / D / SDR (units) ug/L	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICS-AB	ICP interference check	Ni	950.6	1000	95.1	95.1	Y
LCS	Laboratory control sample	Mo	1020	1000	102.0	102.0	
20	Matrix spike	Cu	(SSR-SR) 231	250	92.4	92.4	
21	Duplicate	Ca	609000	617000	~~2.0~~ 1.3 QR	~~2.0~~ 1.3 QR	
7	ICP serial dilution	Si	1872.14	1891.25	1.0	1.0	

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 #: 21257K4
SDG #: I50805122

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 2
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 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 Zn were recalculated and verified using the following equation:

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

Recalculation:

Raw Data: 0.0029 mg/L (1000) = 2.9 mg/L

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 (ug/L)	Calculated Concentration (ug/L)	Acceptable (Y/N)
1	Al	90	90	Y
	Sb	6.250	6.250	
	As	190	190	
	Ba	23.2	23.2	
	B	6630	6630	
	Ca	717000	717000	
	Fe	73.0	73.0	
	Pb	1.200	1.200	
	Mg	414000	414000	
	Mn	101	101	
	Mo	73	73	
	K	36200	36200	
	Se	24.9	24.9	
	Na	2110000	2110000	
	Sr	15400	15400	
	Tl	0.312	0.312	
	W	4.8	4.8	
	U	29.8	29.8	
	V	163	163	
	Zn	2.9	2.9	↓

LDC #: 21257X4
SDG #: I80805727

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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 Ba were recalculated and verified using the following equation:

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

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

Recalculation:

Raw Data: 0.0323 mg/L (1000) = 32.3 ug/L

Sample ID	Analyte	Reported Concentration (ug/L)	Calculated Concentration (ug/L)	Acceptable (Y/N)
7	Al	71	71	Y
	Sb	0.169	0.169	|
	As	77.4	77.4	|
	Ba	32.3	32.3	|
	B	3980	3980	|
	Ca	609000	609000	|
	Fe	64.0	64.0	|
	Pb	1.280	1.280	|
	Mg	439000	439000	|
	Mn	1.9	1.9	|
	Mo	21	21	|
	Ni	23900	23900	|
	Se	6.9	6.9	|
	Na	1410000	141000	|
	Sr	18700	18700	|
	Tl	0.254	0.254	|
	Ti	4.1	4.1	|
	W	0.6	0.6	|
	U	47.3	47.3	|
	V	15.3	15.3	|

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 25 through June 26, 2008

LDC Report Date: August 24, 2009

Matrix: Soil

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K0805780

Sample Identification

SA87-0.5B
SA87-10B
SA87-20B
SA87-30B
SA87-25B
SA180-0.5B
SA180-10B
SA180-20B
SA180-30B
SA57-0.5B
SA57-10B
SA57-20B
SA57-30B
SA87-10BMS
SA87-10BDUP
SA180-10BMS
SA180-10BDUP

Introduction

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

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blanks are summarized in Section IV.

Field duplicates are summarized in Section XIV.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. ICPMS Tune

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

III. Calibration

An initial calibration was performed.

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

IV. Blanks

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

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Aluminum Copper Magnesium Manganese Nickel Tin	1.0 mg/Kg 0.2 mg/Kg 0.7 mg/Kg 0.04 mg/Kg 0.04 mg/Kg 3.4 mg/Kg	All samples in SDG K0805780
ICB/CCB	Boron	6.0 ug/L	All samples in SDG K0805780
ICB/CCB	Barium Calcium Manganese	3.0 ug/L 10.0 ug/L 0.20 ug/L	SA180-20B SA180-30B SA57-0.5B SA57-10B SA57-20B SA57-30B
ICB/CCB	Barium Calcium	5.0 ug/L 5.0 ug/L	SA87-0.5B SA87-20B SA87-30B SA87-25B SA180-0.5B SA180-10B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Magnesium	4.0 ug/L	SA87-0.5B SA87-10B SA87-20B SA87-30B SA87-25B SA180-0.5B SA180-10B
ICB/CCB	Calcium Barium	6.0 ug/L 6.0 ug/L	SA87-10B
ICB/CCB	Beryllium	0.012 ug/L	SA87-0.5B SA87-10B SA87-20B SA87-30B SA87-25B SA180-0.5B SA180-10B SA180-20B SA180-30B SA57-0.5B SA57-10B
ICB/CCB	Beryllium	0.015 ug/L	SA57-20B SA57-30B
ICB/CCB	Tungsten	0.138 ug/L	SA87-0.5B SA87-10B SA87-20B SA87-30B SA87-25B SA180-0.5B
ICB/CCB	Tungsten	0.102 ug/L	SA180-10B SA180-20B SA180-30B SA57-0.5B SA57-10B SA57-20B SA57-30B

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
SA87-0.5B	Tin	2.7 mg/Kg	9.4U mg/Kg
SA87-10B	Tin	2.6 mg/Kg	9.5U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA87-20B	Tin	3.4 mg/Kg	10.7U mg/Kg
SA87-30B	Tin	4.1 mg/Kg	13.0U mg/Kg
SA87-25B	Tin	4.1 mg/Kg	12.3U mg/Kg
SA180-0.5B	Tin	3.3 mg/Kg	9.6U mg/Kg
SA180-10B	Tin	2.8 mg/Kg	9.7U mg/Kg
SA180-20B	Tin	4.8 mg/Kg	13.1U mg/Kg
SA180-30B	Tin	4.3 mg/Kg	12.9U mg/Kg
SA57-0.5B	Tin	3.8 mg/Kg	10.6U mg/Kg
SA57-10B	Tin	3.9 mg/Kg	11.8U mg/Kg
SA57-20B	Tin	4.4 mg/Kg	13.3U mg/Kg
SA57-30B	Tin Tungsten	3.5 mg/Kg 0.20 mg/Kg	11.4U mg/Kg 0.23U 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
SA87-10BMS (All samples in SDG K0805780)	Antimony Tungsten	34.4 (75-125) 63.6 (75-125)	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
SA87-10BMS (SA87-10B)	Titanium	58.9 (75-125)	J- (all detects) UJ (all non-detects)	A
SA180-10BMS (All samples in SDG K0805780)	Antimony Tungsten	38.6 (75-125) 59.9 (75-125)	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
SA180-10BMS (SA180-10B)	Manganese	189.2 (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
SA87-10BDUP (SA87-10B)	Sodium Strontium	22.6 (≤20) 21.4 (≤20)	- -	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A
SA180-10BDUP (SA180-10B)	Barium Manganese	23.5 (≤20) 21.0 (≤20)	- -	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
SA87-10BL	Cobalt Zinc	16.9 (≤10) 17.1 (≤10)	All samples in SDG K0805780	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

XII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG K0805780	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 K0805780

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0805780	SA87-0.5B SA87-10B SA87-20B SA87-30B SA87-25B SA180-0.5B SA180-10B SA180-20B SA180-30B SA57-0.5B SA57-10B SA57-20B SA57-30B	Antimony Tungsten	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
K0805780	SA87-10B	Titanium	J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
K0805780	SA180-10B	Manganese	J+ (all detects)	A	Matrix spike analysis (%R) (m)
K0805780	SA87-10B	Sodium Strontium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)
K0805780	SA180-10B	Barium Manganese	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)
K0805780	SA87-0.5B SA87-10B SA87-20B SA87-30B SA87-25B SA180-0.5B SA180-10B SA180-20B SA180-30B SA57-0.5B SA57-10B SA57-20B SA57-30B	Cobalt Zinc	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0805780	SA87-0.5B SA87-10B SA87-20B SA87-30B SA87-25B SA180-0.5B SA180-10B SA180-20B SA180-30B SA57-0.5B SA57-10B SA57-20B SA57-30B	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 K0805780

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0805780	SA87-0.5B	Tin	9.4U mg/Kg	A	bl
K0805780	SA87-10B	Tin	9.5U mg/Kg	A	bl
K0805780	SA87-20B	Tin	10.7U mg/Kg	A	bl
K0805780	SA87-30B	Tin	13.0U mg/Kg	A	bl
K0805780	SA87-25B	Tin	12.3U mg/Kg	A	bl
K0805780	SA180-0.5B	Tin	9.6U mg/Kg	A	bl
K0805780	SA180-10B	Tin	9.7U mg/Kg	A	bl
K0805780	SA180-20B	Tin	13.1U mg/Kg	A	bl
K0805780	SA180-30B	Tin	12.9U mg/Kg	A	bl
K0805780	SA57-0.5B	Tin	10.6U mg/Kg	A	bl
K0805780	SA57-10B	Tin	11.8U mg/Kg	A	bl
K0805780	SA57-20B	Tin	13.3U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0805780	SA57-30B	Tin Tungsten	11.4U mg/Kg 0.23U mg/Kg	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG K0805780

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257Y4
SDG #: K0805780
Laboratory: Columbia Analytical Services

Date: 8-12-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/26/08, 6/25/08
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)	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	SA87-0.5B	11	SA57-10B	21	PBS1	31	
2	SA87-10B	12	SA57-20B	22		32	
3	SA87-20B	13	SA57-30B	23		33	
4	SA87-30B	14	SA87-10BMS	24		34	
5	SA87-25B	15	SA87-10BDUP	25		35	
6	SA180-0.5B	16	SA180-10BMS	26		36	
7	SA180-10B	17	SA180-10BDUP	27		37	
8	SA180-20B	18		28		38	
9	SA180-30B	19		29		39	
10	SA57-0.5B	20		30		40	

Notes: _____

LDC #: 2125744
SDG #: K0805780

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)
1-13	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:1417	↓	(Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn)
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, 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 #: 21257Y4
SDG #: K0805780
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 x 2xdil.
Associated Samples: All
Reason Code: bl

				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
Al	1.0															
B		6.0														
Cu	0.2															
Mg	0.7															
Mn	0.04															
Ni	0.04 0.07															
Sn	3.4			2.7 / 9.4	2.6 / 9.5	3.4 / 10.7	4.1 / 13.0	4.1 / 12.3	3.3 / 9.6	2.8 / 9.7	4.8 / 13.1	4.3 / 12.9	3.8 / 10.6	3.9 / 11.8	4.4 / 13.3	3.5 / 11.4

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

				Sample Identification												
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers												
Ba		3.0														
Ca		10.0														
Mn		0.20														

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 1,3-7

				Sample Identification												
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers												
Ba		5.0														
Ca		5.0														

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

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

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x x 2xdil.

Reason Code: bl

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

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

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

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

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

				Sample Identification												
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers												
Be		0.015														

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

				Sample Identification												
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers												
W		0.138														

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

				Sample Identification												
Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/L)	Action Limit	13												
W		0.102		0.20 / 0.23												

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

LDC #: 21257Y4
SDG #: K0805780

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
	14	Soil	Sb	34.4	All	J-/UJ/A (m)
			Ti	58.9	14 2	
			W	63.6	All	
	X 16	Soil	Sb	38.6	All	J-/UJ/A (m)
			Mn	189.2	7	J+det/A
			W	59.5	All	J-/UJ/A

Comments:

LDC #: 212544
SDG #: K0805780

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Reviewer: CR
2nd Reviewer: W

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
	15	Soil	Na	22.6		15 2	J/UJ/A 1d
			Sr	21.4		↓	
	17	Soil	Ba	23.5		17 7	J/UJ/A 1d
			Mn	21.0		↓	↓ ↓

Comments:

DUP.4S2

LDC #: 72574Y
SDG #: I5080578

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

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
	2	Soil	Co	16.9	All	J/UJ/A (y) CR (sd)
			~~Pb~~	~~14~~ CR		
			Zn	17.1		

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 29 through June 30, 2008

LDC Report Date: August 24, 2009

Matrix: Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K0805919

Sample Identification

M-79B
M-84B
M-126B
M-14ABF
M-14ADBF

Introduction

This data review covers 5 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 K0805919
ICB/CCB	Aluminum Antimony Boron Barium Cobalt Copper Magnesium Strontium Sodium Thallium Tungsten	4.0 ug/L 0.014 ug/L 10.7 ug/L 2.0 ug/L 0.4 ug/L 2.1 ug/L 4.3 ug/L 0.4 ug/L 200 ug/L 0.009 ug/L 0.1 ug/L	All samples in SDG K0805919

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-79B	Aluminum Cobalt Zinc	27.8 ug/L 0.7 ug/L 1.4 ug/L	50.0U ug/L 10.0U ug/L 10.0U ug/L
M-84B	Aluminum Cobalt Lead Molybdenum Thallium Zinc	14.9 ug/L 0.3 ug/L 0.139 ug/L 8.6 ug/L 0.194 ug/L 2.5 ug/L	50.0U ug/L 10.0U ug/L 0.200U ug/L 10.0U ug/L 0.200U ug/L 10.0U ug/L
M-126B	Cobalt Copper Molybdenum Zinc	1.0 ug/L 3.0 ug/L 7.2 ug/L 2.1 ug/L	10.0U ug/L 10.0U ug/L 10.0U ug/L 10.0U ug/L
M-14ABF	Cobalt Zinc	0.5 ug/L 1.3 ug/L	10.0U ug/L 10.0U ug/L
M-14ADBF	Copper Zinc	1.1 ug/L 0.8 ug/L	10.0U ug/L 10.0U 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 K0805919

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 Barium Boron Calcium Cobalt Copper Iron Lead Magnesium Manganese Molybdenum Nickel Sodium Strontium Titanium Tungsten Zinc	37.6 ug/L 1.8 ug/L 39.6 ug/L 265 ug/L 0.4 ug/L 1.0 ug/L 57.4 ug/L 0.785 ug/L 63.1 ug/L 55.6 ug/L 1.2 ug/L 0.6 ug/L 83.5 ug/L 1.4 ug/L 2.8 ug/L 0.5 ug/L 6.1 ug/L	All samples in SDG K0805919

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-79B	Aluminum Cobalt Iron Lead Manganese Titanium Zinc	27.8 ug/L 0.7 ug/L 18.0 ug/L 0.498 ug/L 2.3 ug/L 1.9 ug/L 1.4 ug/L	50.0U ug/L 10.0U ug/L 20.0U ug/L 0.498J+ ug/L 5.0U ug/L 10.0U ug/L 10.0U ug/L
M-84B	Aluminum Cobalt Iron Lead Manganese Molybdenum Titanium Zinc	14.9 ug/L 0.3 ug/L 14.5 ug/L 0.139 ug/L 5.3 ug/L 8.6 ug/L 0.4 ug/L 2.5 ug/L	50.0U ug/L 10.0U ug/L 20.0U ug/L 0.200U ug/L 5.3J+ ug/L 10.0U ug/L 10.0U ug/L 10.0U ug/L
M-126B	Cobalt Copper Iron Lead Molybdenum Titanium Zinc	1.0 ug/L 3.0 ug/L 67.9 ug/L 1.530 ug/L 7.2 ug/L 3.8 ug/L 2.1 ug/L	10.0U ug/L 10.0U ug/L 67.9J+ ug/L 1.530J+ ug/L 10.0U ug/L 10.0U ug/L 10.0U ug/L
M-14ABF	Cobalt Iron Lead Manganese Zinc	0.5 ug/L 7.1 ug/L 0.561 ug/L 2.5 ug/L 1.3 ug/L	10.0U ug/L 20.0U ug/L 0.561J+ ug/L 5.0U ug/L 10.0U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
M-14ADBF	Copper	1.1 ug/L	10.0U ug/L
	Iron	11.2 ug/L	20.0U ug/L
	Lead	0.480 ug/L	0.480J+ ug/L
	Manganese	3.5 ug/L	5.0U ug/L
	Zinc	0.8 ug/L	10.0U ug/L

V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

VI. Matrix Spike Analysis

Matrix spike (MS) 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 K0805919	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 K0805919	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-14ABF and M-14ADBF 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-14ABF	M-14ADBF				
Antimony	0.136	0.126	-	0.01 (≤0.5)	-	-
Arsenic	121	112	8 (≤30)	-	-	-
Barium	14.9	14.5	-	0.4 (≤5.0)	-	-
Boron	2540	2570	1 (≤30)	-	-	-
Calcium	255000	258000	1 (≤30)	-	-	-
Chromium	39.7	38.0	4 (≤30)	-	-	-
Cobalt	0.5	0.3U	-	0.2 (≤10.0)	-	-
Copper	0.8U	1.1	-	0.3 (≤10.0)	-	-
Iron	7.1	11.2	-	4.1 (≤20.0)	-	-
Lead	0.561	0.480	-	0.081 (≤0.200)	-	-

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-14ABF	M-14ADBF				
Magnesium	123000	123000	0 (≤30)	-	-	-
Manganese	2.5	3.5	-	1 (≤5.0)	-	-
Molybdenum	21.6	22.1	-	0.5 (≤10.0)	-	-
Potassium	8920	8630	3 (≤30)	-	-	-
Selenium	6.0U	6.5	-	0.5 (≤50.0)	-	-
Silver	0.7U	0.7	-	0 (≤10.0)	-	-
Sodium	566000	564000	0 (≤30)	-	-	-
Strontium	6690	6650	1 (≤30)	-	-	-
Thallium	0.208	0.219	-	0.011 (≤0.200)	-	-
Tungsten	1.5	1.4	-	0.1 (≤1.0)	-	-
Uranium	32.0	32.0	0 (≤30)	-	-	-
Vanadium	35.8	34.9	3 (≤30)	-	-	-
Zinc	1.3	0.8	-	0.5 (≤10.0)	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG K0805919

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
K0805919	M-79B M-84B M-126B M-14ABF M-14ADBF	Selenium	None	P	Sample result verification
K0805919	M-79B M-84B M-126B M-14ABF M-14ADBF	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 K0805919

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0805919	M-79B	Aluminum Cobalt Zinc	50.0U ug/L 10.0U ug/L 10.0U ug/L	A	bl
K0805919	M-84B	Aluminum Cobalt Lead Molybdenum Thallium Zinc	50.0U ug/L 10.0U ug/L 0.200U ug/L 10.0U ug/L 0.200U ug/L 10.0U ug/L	A	bl
K0805919	M-126B	Cobalt Copper Molybdenum Zinc	10.0U ug/L 10.0U ug/L 10.0U ug/L 10.0U ug/L	A	bl
K0805919	M-14ABF	Cobalt Zinc	10.0U ug/L 10.0U ug/L	A	bl
K0805919	M-14ADBF	Copper Zinc	10.0U ug/L 10.0U ug/L	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG K0805919

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
K0805919	M-79B	Aluminum Cobalt Lead Manganese Titanium Zinc	50.0U ug/L 10.0U ug/L 0.498J+ ug/L 5.0U ug/L 10.0U ug/L 10.0U ug/L	A	bp
K0805919	M-79B	Iron	20.0U ug/L	A	bf,bp
K0805919	M-84B	Aluminum Cobalt Lead Manganese Molybdenum Titanium Zinc	50.0U ug/L 10.0U ug/L 0.200U ug/L 5.3J+ ug/L 10.0U ug/L 10.0U ug/L 10.0U ug/L	A	bp
K0805919	M-84B	Iron	20.0U ug/L	A	bf,bp
K0805919	M-126B	Cobalt Copper Iron Lead Molybdenum Titanium Zinc	10.0U ug/L 10.0U ug/L 67.9J+ ug/L 1.530J+ ug/L 10.0U ug/L 10.0U ug/L 10.0U ug/L	A	bp
K0805919	M-14ABF	Cobalt Lead Manganese Zinc	10.0U ug/L 0.561J+ ug/L 5.0U ug/L 10.0U ug/L	A	bp
K0805919	M-14ABF	Iron	20.0U ug/L	A	bf,bp
K0805919	M-14ADBF	Copper Lead Manganese Zinc	10.0U ug/L 0.480J+ ug/L 5.0U ug/L 10.0U ug/L	A	bp
K0805919	M-14ADBF	Iron	20.0U ug/L	A	bf,bp

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257Z4
SDG #: K0805919
Laboratory: Columbia Analytical Services

Date: 8-12-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/29/08 - 6/30/08
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 (SDG#: K0805394, K0806119)
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	(SDG# K0806119)
XII.	Sample Result Verification	SW	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(4,5)
XV	Field Blanks	SW	FB=FB062408GWarea1 (SDG#: K0805722), PB=PBD61608B (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-79B	11	PBW1	21		31	
2	M-84B	12		22		32	
3	M-126B	13		23		33	
4	M-14ABF	14		24		34	
5	M-14ADBF	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 2125724
SDG #: K0805919

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)
1-5	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
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, 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	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
GFAA	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

Comments: Mercury by CVAA if performed

LDC #: 21257Z4
SDG #: K0805919
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: ug/L

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Preparation factor applied: Sb, Tl, W @10x
Raise to RL.
Reason Code: bl
Associated Samples: All

					Sample Identification									
Analyte	**Maximum PB[a] (ug/l)**	**Maximum ICB/CCB[a] (ug/l)**	**Action Limit**	**RL**	**1**	2	3	4	5					
Al		4.0		50.0	27.8	14.9								
Sb		0.014												
B	4.4	10.7												
Ba		2.0												
Co		0.4		10.0	0.7	0.3	1.0	0.5						
Cu	1.8	2.1		10.0			3.0		1.1					
Pb	0.089			0.200		0.139								
Mg	6.9	4.3												
Mo	1.3			10.0		8.6	7.2							
Sr		0.4												
Na	128	200												
Tl	0.186	0.009		0.200		0.194								
W		0.1												
Zn	0.7			10.0	1.4	2.5	2.1	1.3	0.8					

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

LDC #: 21257Z4
SDG #: K0805919

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	RL	1	2	4	5						
As	1.6												
B	49												
Ca	12.0												
Fe	2.9		20.0	18.0	14.5	7.1	11.2						
Mg	1.2												
W	0.4												

LDC #: 21257Z4
SDG #: K0805919

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?

Raise to RL unless otherwise noted with J+.

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

Reason Code: ~~be~~ cr DP

Sampling date: 6/16/08 Soil factor applied NA

Field blank type: (circle one) Field Blank / Rinsate / Other: PB Associated Samples: All

Analyte	Blank ID			Sample Identification										
	PB061608B (SDG#: K0805394)	Action Level	RL	1	2	3	4	5						
Al	37.6		50.0	27.8	14.9									
Ba	1.8													
B	39.6													
Ca	265	2650												
Co	0.4		10.0	0.7	0.3	1.0	0.5							
Cu	1.0		10.0			3.0		1.1						
Fe	57.4	574	20.0	18.0	14.5	67.9 J+	7.1	11.2						
Pb	0.785	7.85	0.200	0.498 J+	0.139	1.530 J+	0.561 J+	0.480 J+						
Mg	63.1	631												
Mn	55.6	556	5.0	2.3	5.3 J+		2.5	3.5						
Mo	1.2		10.0		8.6	7.2								
Ni	0.6													
Na	83.5													
Sr	1.4													
Ti	2.8		10.0	1.9	0.4	3.8								
W	0.5													
Zn	6.1		10.0	1.4	2.5	2.1	1.3	0.8						

LDC #: 2125724
SDG #: K0805919

VALIDATION FINDINGS WORKSHEET
ICP Interference Check Sample

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 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
	7/15/09	ICSAB(13:57)	Mg	18	All	No Quals (Samples <90% ICSA)

Comments:

LDC #: 2125724
SDG #: see cover

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	A11	Se	@ 6.0 ug/L	5.0 ~~ug/L~~ ug	Lab Limit > QUAPP Limit	None/P

Comments:

LDC#: 21257Z4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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)		(≤30) RPD	(ug/L) Difference	(ug/L) Limits	Qualifications (Parent Only)
	4	5				
Antimony	0.136	0.126		0.01	(≤0.5)	
Arsenic	121	112	8			
Barium	14.9	14.5		0.4	(≤5.0)	
Boron	2540	2570	1			
Calcium	255000	258000	1			
Chromium	39.7	38.0	4			
Cobalt	0.5	0.3U		0.2	(≤10.0)	
Copper	0.8U	1.1		0.3	(≤10.0)	
Iron	7.1	11.2		4.1	(≤20.0)	
Lead	0.561	0.480		0.081	(≤0.200)	
Magnesium	123000	123000	0			
Manganese	2.5	3.5		1	(≤5.0)	
Molybdenum	21.6	22.1		0.5	(≤10.0)	
Potassium	8920	8630	3			
Selenium	6.0U	6.5		0.5	(≤50.0)	
Silver	0.7U	0.7		0	(≤10.0)	
Sodium	566000	564000	0			
Strontium	6690	6650	1			
Thallium	0.208	0.219		0.011	(≤0.200)	

LDC#: 21257Z4
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) 4	Concentration (ug/L) 5	(≤30) RPD	(ug/L) Difference	(ug/L) Limits	Qualifications (Parent Only)
Tungsten	1.5	1.4		0.1	(≤1.0)	
Uranium	32.0	32.0	0			
Vanadium	35.8	34.9	3			
Zinc	1.3	0.8		0.5	(≤10.0)	