



**LABORATORY DATA CONSULTANTS, INC.**

7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Northgate Environmental Management, Inc.  
1100 Quail Street Ste. 102  
Newport Beach, CA 92660  
ATTN: Ms. Cindy Arnold

February 19, 2010

SUBJECT: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada,  
Data Validation

Dear Ms. Arnold,

Enclosed is the revised data validation report for the fraction listed below. Please replace the previously submitted report with the enclosed revised report. We apologize for any inconvenience these oversights may have caused.

**LDC Project # 22234:**

**SDG #**

**Fraction**

R0906095

Wet Chemistry

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto  
Operations Manager/Senior Chemist

## Laboratory Data Consultants, Inc. Data Validation Report

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

**Collection Date:** October 23 through October 30, 2009

**LDC Report Date:** February 19, 2010

**Matrix:** Water

**Parameters:** Wet Chemistry

**Validation Level:** Stage 4

**Laboratory:** Columbia Analytical Services, Inc.

**Sample Delivery Group (SDG):** R0906095

### Sample Identification

M-141B  
M-141009B  
PB102309-A3  
M-139B  
M-145B  
M-144B  
M-146B  
M-138B  
M-138009B  
M-148B  
M-137B  
EB103009-GWA4  
EB103009-GWA4RE  
PB102309-A3MS  
PB102309-A3MSD  
PB102309-A3DUP

## Introduction

This data review covers 16 water samples listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA Method 300.1 for Chlorate, EPA Method 120.1 for Conductivity, EPA SW 846 Method 9012A for Cyanide, EPA Method 218.6 for Dissolved Hexavalent Chromium, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Method 9040B for pH, Standard Method 5540C for Surfactants, EPA Method 365.1 for Total Phosphorus, EPA SW 846 Method 9060 for Total Organic Carbon, Standard Method 2540C for Total Dissolved Solids, and Standard Method 2540D for Total Suspended Solids.

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

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section X.

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.
- UU Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
EB103009-GWA4	Hexavalent chromium	25 & 25.25 hours	24 hours	J- (all detects) UJ (all non-detects)	P
EB103009-GWA4RE	Nitrite as N	105 hours	48 hours	J- (all detects) R (all non-detects)	A
M-141009B	Hexavalent chromium	29 hours	24 hours	J- (all detects) UJ (all non-detects)	P

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

## II. Calibration

### a. Initial Calibration

All criteria for the initial calibration of each method were met.

### b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

## \*III. Blanks

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

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Total dissolved solids	6 mg/L	M-141B M-141009B PB102309-A3 M-139B M-145B M-144B M-146B

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Sulfate	0.13 mg/L	M-141009B PB102309-A3 M-139B M-145B M-144B M-146B M-138B M-138009B M-148B
PB (prep blank)	Chloride	0.09 mg/L	PB102309-A3
ICB/CCB	Chloride Sulfate	0.090 mg/L 0.192 mg/L	PB102309-A3
ICB/CCB	Sulfate	0.127 mg/L	M-141B
ICB/CCB	Sulfate	0.128	M-141009B M-139B M-145B M-144B M-146B M-138B M-138009B M-148B
ICB/CCB	Sulfate	0.126 mg/L	M-137B

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
PB102309-A3	Total dissolved solids Chloride Sulfate	9 mg/L 0.9 mg/L 1.5 mg/L	10U mg/L 2.0U mg/L 2.0U mg/L

\*Samples EB103009-GWA4 and EB103009-GWA4RE were identified as equipment blanks. No contaminant concentrations were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB103009-GWA4	10/30/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Conductivity Nitrate as N pH Surfactants	1.5 mg/L 1.5 mg/L 0.348 mg/L 0.2 mg/L 0.8 mg/L 1.09 umhos/cm 0.67 mg/L 7.98 units 0.013 mg/L	M-137B

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

Sample	*Analyte	Reported Concentration	Modified Final Concentration
M-137B	Ammonia as N Nitrate as N	0.038 mg/L 3.45 mg/L	0.050U mg/L 3.45J+ mg/L

\*Removed Conductivity from above field blanks finding table.

Sample FB080409-GW (from SDG R0904290) was identified as a field blank. No contaminant concentrations were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB080409-GW	8/4/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride pH Total phosphorus Sulfate	1.9 mg/L 1.9 mg/L 0.035 mg/L 0.2 mg/L 1.3 mg/L 5.89 units 0.014 mg/L 0.9 mg/L	M-144B M-146B

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-144B	Ammonia as N Total organic carbon Total phosphorus	0.021 mg/L 0.8 mg/L 0.023 mg/L	0.050U mg/L 1.0U mg/L 0.050U mg/L
M-146B	Total organic carbon Total phosphorus	0.8 mg/L 0.039 mg/L	1.0U mg/L 0.050U mg/L

\*Indicates change as the result of report review.  
SDG R0906095

Samples PB100209-A2 (from SDG R0905636) and PB102309-A3 were identified as pump blanks. No contaminant concentrations were found in these blanks with the following exceptions:

Pump Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
PB102309-A3	10/23/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Conductivity Nitrate as N pH Total dissolved solids Sulfate Chlorate	1.1 mg/L 1.1 mg/L 2.60 mg/L 0.2 mg/L 0.9 mg/L 3.83 umhos/cm 0.69 mg/L 5.79 units 9 mg/L 1.5 mg/L 23 ug/L	M-141B M-141009B M-139B M-145B M-148B
PB100209-A2	10/2/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Chloride Conductivity pH Total phosphorus	1.1 mg/L 1.1 mg/L 0.025 mg/L 0.9 mg/L 1.84 umhos/cm 6.49 units 0.007 mg/L	M-144B M-146B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
M-141B	Ammonia as N	1.95 mg/L	1.95J+ mg/L
M-141009B	Ammonia as N	0.054 mg/L	0.054J+ mg/L
M-139B	Ammonia as N Total organic carbon Nitrate as N	1.10 mg/L 0.5 mg/L 3.66 mg/L	1.10J+ mg/L 1.0U mg/L 3.66J+ mg/L
M-145B	Ammonia as N Nitrate as N	0.191 mg/L 2.90 mg/L	0.191J+ mg/L 2.90J+ mg/L
M-148B	Ammonia as N Nitrate as N	0.011 mg/L 6.37 mg/L	0.050U mg/L 6.37J+ mg/L
M-144B	Ammonia as N Total phosphorus	0.021 mg/L 0.023 mg/L	0.050U mg/L 0.050U mg/L
M-146B	Total phosphorus	0.039 mg/L	0.050U mg/L



Sample FiltB092509-A2 (from SDG R0905462) was identified as a filter blank. No contaminant concentrations were found in this blank.

#### IV. Matrix Spike/Matrix Spike Duplicates

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

#### V. Duplicates

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

#### VI. Laboratory Control Samples

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

LCS ID (Associated Samples)	Analyte	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS (EB103009-GWA4)	Nitrite as N	87 (90-110)	-	-	J- (all detects) UJ (all non-detects)	P

#### VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits.

#### VIII. Sample Result Verification and Project Quantitation Limit

All sample result verifications were acceptable.

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0906095	All analytes reported below the PQL.	J (all detects)	A

## IX. Overall Assessment

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
EB103009-GWA4RE	Nitrite as N	X	A

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

## X. Field Duplicates

Samples M-141B and M-141009B and samples M-138B and M-138009B were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-141B	M-141009B				
Ammonia as N	1.95 mg/L	0.054 mg/L	-	1.896 ( $\leq 0.050$ )	J (all detects)	A
Alkalinity, total	260 mg/L	260 mg/L	0 ( $\leq 30$ )	-	-	-
Alkalinity, bicarbonate	260 mg/L	260 mg/L	0 ( $\leq 30$ )	-	-	-
Bromide	2.5 mg/L	2.6 mg/L	-	0.1 ( $\leq 1.0$ )	-	-
Chloride	999 mg/L	994 mg/L	1 ( $\leq 30$ )	-	-	-
Conductivity	9500 umhos/cm	9620 umhos/cm	1 ( $\leq 30$ )	-	-	-
Hexavalent chromium	11.0 mg/L	11.1 mg/L	1 ( $\leq 30$ )	-	-	-
Nitrate as N	31.1 mg/L	30.8 mg/L	1 ( $\leq 30$ )	-	-	-
Nitrite as N	0.155 mg/L	0.159 mg/L	3 ( $\leq 30$ )	-	-	-
pH	6.99 units	7.04 units	1 ( $\leq 30$ )	-	-	-
Sulfate	2210 mg/L	2600 mg/L	16 ( $\leq 30$ )	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-141B	M-141009B				
Surfactants	0.014 mg/L	0.016 mg/L	-	0.002 ( $\leq 0.020$ )	-	-
Total dissolved solids	9560 mg/L	9480 mg/L	1 ( $\leq 30$ )	-	-	-
Total organic carbon	3.2 mg/L	3.3 mg/L	-	0.1 ( $\leq 1.0$ )	-	-
Total phosphorus	0.027 mg/L	0.026 mg/L	-	0.001 ( $\leq 0.050$ )	-	-
Chlorate	2330000 ug/L	2270000 ug/L	3 ( $\leq 30$ )	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-138B	M-138009B				
Ammonia as N	0.007U mg/L	0.073 mg/L	-	0.066 ( $\leq 0.050$ )	J (all detects) UJ (all non-detects)	A
Alkalinity, total	347 mg/L	342 mg/L	1 ( $\leq 30$ )	-	-	-
Alkalinity, bicarbonate	347 mg/L	342 mg/L	1 ( $\leq 30$ )	-	-	-
Chloride	146 mg/L	148 mg/L	1 ( $\leq 30$ )	-	-	-
Conductivity	3500 mg/L	3490 mg/L	0 ( $\leq 30$ )	-	-	-
Hexavalent chromium	0.050 umhos/cm	0.050 umhos/cm	0 ( $\leq 30$ )	-	-	-
Nitrate as N	2.20 mg/L	2.16 mg/L	2 ( $\leq 30$ )	-	-	-
Nitrite as N	0.008 mg/L	0.007U mg/L	-	0.001 ( $\leq 0.010$ )	-	-
pH	7.48 mg/L	7.49 mg/L	0 ( $\leq 30$ )	-	-	-
Sulfate	1400 units	1380 units	1 ( $\leq 30$ )	-	-	-
Surfactants	0.005 mg/L	0.007 mg/L	-	0.002 ( $\leq 0.020$ )	-	-
Total dissolved solids	2810 mg/L	2850 mg/L	1 ( $\leq 30$ )	-	-	-
Total organic carbon	1.5 mg/L	1.6 mg/L	-	0.1 ( $\leq 1.0$ )	-	-

\*Indicates change as the result of report review.  
SDG R0906095

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-138B	M-138009B				
Total phosphorus	0.031 mg/L	0.030 mg/L	-	0.001 ( $\leq 0.050$ )	-	-
Total suspended solids	6.3 mg/L	7.1 mg/L	12 ( $\leq 30$ )	-	-	-
Chlorate	16800 ug/L	16800 ug/L	0 ( $\leq 30$ )	-	-	-

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Data Qualification Summary - SDG R0906095**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0906095	EB103009-GWA4 M-141009B	Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0906095	EB103009-GWA4RE	Nitrite as N	J- (all detects) R (all non-detects)	A	Technical holding times (h)
R0906095	EB103009-GWA4	Nitrite as N	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0906095	M-141B M-141009B PB102309-A3 M-139B M-145B M-144B M-146B M-138B M-138009B M-148B M-137B EB103009-GWA4 EB103009-GWA4RE	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0906095	EB103009-GWA4RE	Nitrite as N	X	A	Overall assessment of data (o)
R0906095	M-141B M-141009B	Ammonia as N	J (all detects)	A	Field duplicates (Difference) (fd)
R0906095	M-138B M-138009B	Ammonia as N	J (all detects) UJ (all non-detects)	A	Field duplicates (Difference) (fd)

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0906095**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906095	PB102309-A3	Total dissolved solids Chloride Sulfate	10U mg/L 2.0U mg/L 2.0U mg/L	A	bl

**\*Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Equipment Blank Data Qualification Summary - SDG R0906095**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
*R0906095	M-137B	Ammonia as N Nitrate as N	0.050U mg/L 3.45J+ mg/L	A	be

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0906095**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906095	M-144B	Ammonia as N Total organic carbon Total phosphorus	0.050U mg/L 1.0U mg/L 0.050U mg/L	A	bf
R0906095	M-146B	Total organic carbon Total phosphorus	1.0U mg/L 0.050U mg/L	A	bf

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Pump Blank Data Qualification Summary - SDG R0906095**

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906095	M-141B	Ammonia as N	1.95J+ mg/L	A	bp
R0906095	M-141009B	Ammonia as N	0.054J+ mg/L	A	bp
R0906095	M-139B	Ammonia as N Total organic carbon Nitrate as N	1.10J+ mg/L 1.0U mg/L 3.66J+ mg/L	A	bp
R0906095	M-145B	Ammonia as N Nitrate as N	0.191J+ mg/L 2.90J+ mg/L	A	bp
R0906095	M-148B	Ammonia as N Nitrate as N	0.050U mg/L 6.37J+ mg/L	A	bp
R0906095	M-144B	Ammonia as N Total phosphorus	0.050U mg/L 0.050U mg/L	A	bp
R0906095	M-146B	Total phosphorus	0.050U mg/L	A	bp

**Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada  
Wet Chemistry - Filter Blank Data Qualification Summary - SDG R0906095**

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

VALIDATION COMPLETENESS WORKSHEET

Stage 4

LDC #: 22234L6

SDG #: R0906095

Laboratory: Columbia Analytical Services

Date: 12-29-09

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [Signature]

**METHOD: (Analyte)** Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Nitrite-N, Sulfate (EPA SW846 Method 9056), Chlorate (EPA Method 300.1), Conductivity (EPA Method 120.1), Cyanide (EPA SW846 Method 9012A), Dissolved Hexavalent Chromium (EPA Method 218.6), Hexavalent Chromium (EPA SW846 Method 7199), pH (EPA SW846 Method 9040B/9045D), Surfactants (SM5540C), Perchlorate (EPA Method 314.0), Total Phosphorus (EPA Method 365.1), TDS (SM2540C), TSS (SM2540D), TOC (9060), Nitrate-N (353.2)

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 10/23-10/30/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	SW	
IV.	Surrogate Spikes	A	
V.	Matrix Spike/Matrix Spike Duplicates	A	MS/D
VI.	Duplicates	A	DLP
VII.	Laboratory control samples	SW	LCSD
VIII.	Sample result verification	A	
IX.	Overall assessment of data	SW	
X.	Field duplicates	SW	(1,2), (8,9)
XI.	Field blanks	SW	EB=12, B, Pump Blank=3, FB=FB080107GW (506 R090462) Filter Blank = me-38 filter, Fil# B092509-A2 (506 R090536)

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

(see below)

Validated Samples:

water

1	M-141B	11	M-137B	21	PBW	31
2	M-141009B	12	EB103009-GWA4	22		32
3	PB102309-A3	13	EB103009-GWA4RE	23		33
4	M-139B	14	PB102309-A3MS	24		34
5	M-145B	15	PB102309-A3MSD	25		35
6	M-144B	16	PB102309-A3DUP	26		36
7	M-146B	17		27		37
8	M-138B	18		28		38
9	M-138009B	19		29		39
10	M-148B	20		30		40

Notes: Pump Blank = PB100209-A2 (506 R090536)



LDC #:  
SDG #:

2223446  
see cover

VALIDATION FINDINGS CHECKLIST

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

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
<b>II. Technical Holding Times</b>				
All technical holding times were met.		✓		
Cooler temperature criteria was met.	✓			
<b>III. Calibration</b>				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)	✓			
Were balance checks performed as required? (Level IV only)	✓			
<b>IV. Blanks</b>				
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.	✓			
<b>V. Matrix Spike/Duplicate and MS/MSD Percent Recoveries</b>				
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 ≤ CRDL (≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
<b>VI. Laboratory Control Samples</b>				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?		✓		
<b>VII. Regional Quality Assurance and Quality Control</b>				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 2223416  
 SDG #: see cover

VALIDATION FINDINGS CHECKLIST

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

Validation Area	Yes	No	NA	Findings/Comments
<b>VII. Sample Result Verification</b>				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were detection limits < RL?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>VIII. Overall assessment of data</b>				
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>IX. Field duplicates</b>				
Field duplicate pairs were identified in this SDG.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Target analytes were detected in the field duplicates.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>X. Field blanks</b>				
Field blanks were identified in this SDG.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Target analytes were detected in the field blanks.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	





**VALIDATION FINDINGS WORKSHEET**  
**Blanks**

METHOD: Inorganics, Method See Cover

Reason Code: bl

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

Y / N / N/A Were all samples associated with a given method blank?

Y / N / N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

**Conc. units: mg/L**      **Associated Samples: 1-7**

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
	PB (mg/L)	6			3			
TDS					9 / 10			

**Conc. units: mg/L**      **Associated Samples: 2-10**

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
	PB (mg/L)	0.13			No Qualifiers			
SO4								

**Conc. units: mg/L**      **Associated Samples: 3**

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
	PB (mg/L)	0.09			3	0.9 / 2.0	1.5 / 2.0	
Cl			0.090					
SO4			0.192					

**Conc. units: mg/L**      **Associated Samples: 1**

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
	PB (mg/L)				No Qualifiers			
SO4			0.127					

LDC #: 22234L6  
 SDG #: See Cover

# VALIDATION FINDINGS WORKSHEET

## Blanks

Page: 2 of 2  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

**METHOD:** Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
 (Y) N N/A Were all samples associated with a given method blank?  
 (Y) N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/L Associated Samples: 2, 4-10

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
	PB (mg/L)				No Qualifiers			
SO4			0.128					

Conc. units: mg/L Associated Samples: 11

Analyte	Blank ID		Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification			
	PB (mg/L)				No Qualifiers			
SO4			0.126					

LDC #: 22234L6  
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET  
Field Blanks

Page: 1 of 1  
Reviewer: [Signature]  
2nd Reviewer: [Signature]

METHOD: Inorganics, Method See Cover  
 Y  N N/A Were field blanks identified in this SDG?  
 Y  N N/A Were target analytes detected in the field blanks?  
 Blank units: mg/L Associated sample units: mg/L  
 Sampling date: 10/30/09 Soil factor applied: NA  
 Field blank type: (circle one) Field Blank / Rinsate / Other **EB**

Reason Code: be

Associated Samples: 11

Analyte	Blank ID	Sample Identification			
		Action Level	11		
Total Alkalinity	1.5				
Bicarbonate Alkalinity	1.5				
Ammonia as N	0.348	3.48	0.038 / 0.050		
TOC (average)	0.2				
Chloride	0.8				
Conductivity (umhos/cm)	1.09	10.9	<del>166 J+</del>		
Nitrate as Nitrogen	0.67	6.7	3.45 J+		
pH (pH Units)	7.98				
Surfactants	0.013				

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

Page: 1 of 1  
Reviewer: CG  
2nd Reviewer: LN

LDC #: 22234L6  
SDG #: See Cover

**METHOD: Inorganics, Method** See Cover  
 **Y**  **N**  **N/A** Were field blanks identified in this SDG?  
 **Y**  **N**  **N/A** Were target analytes detected in the field blanks?  
**Blank units:** mg/L **Associated sample units:** mg/L  
**Sampling date:** 8/4/09 **Soil factor applied:** NA  
**Field blank type:** (circle one) Field Blank / Rinsate / Other: FB **Associated Samples:** 6, 7 **Reason Code:** bf

Analyte	Blank ID	Action Level	6	7	Sample Identification
	FB080409-GW (SDG#: R0904290)				
Total Alkalinity	1.9				
Bicarbonate Alkalinity	1.9				
Ammonia as N	0.035	0.021 / 0.050			
TOC (average)	0.2	0.8 / 1.0	0.8 / 1.0		
Chloride	1.3				
pH (pH Units)	5.89				
Total Phosphorus	0.014	0.023 / 0.050	0.039 / 0.050		
Sulfate	0.9				



# VALIDATION FINDINGS WORKSHEET

Field Blanks

**METHOD: Inorganics, Method** See Cover

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

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

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

Sampling date: 10/23/09 Soil factor applied NA

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

Reason Code: bp

Associated Samples: 1, 2, 4, 5, 10

Analyte	Blank ID	Sample Identification								
		1	2	4	5	10				
Total Alkalinity	3 1.1									
Bicarbonate Alkalinity	1.1									
Ammonia as N	2.60	1.95 J+	0.054 J+	1.10 J+	0.191 J+			0.011 / 0.050		
TOC (average)	0.2			0.5 / 1.0						
Chloride	0.9									
Conductivity (umhos/cm)	3.83									
Nitrate as Nitrogen	0.69									
pH (pH Units)	5.79								6.37 J+	
TDS	9									
SO4	1.5									
<u>ClO<sub>2</sub> (mg/L)</u>	<u>23</u>									<u>230</u>

LDC #: 22234L6  
 SDG #: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Blanks**

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

**METHOD: Inorganics, Method** See Cover  
 Y/N N/A Were field blanks identified in this SDG?  
 Y/N N/A Were target analytes detected in the field blanks?  
 Blank units: mg/L Associated sample units: mg/L  
 Sampling date: 10/2/09 Soil factor applied NA  
 Field blank type: (circle one) Field Blank / Rinsate / Other Pump Blank Associated Samples: 6, 7 Reason Code: bp

Analyte	Blank ID	Action Level	6	7	Sample Identification
	PB100209-A2 (SDG#R0905636)				
Total Alkalinity	1.1				
Bicarbonate Alkalinity	1.1				
Ammonia as N	0.025	0.021 / 0.050			
Chloride	0.9				
Conductivity (umhos/cm)	1.84	18.4			
pH (pH Units)	6.49				
Total Phosphorus	0.007	0.023 / 0.050	0.039 / 0.050		

**VALIDATION FINDINGS WORKSHEET**  
Laboratory Control Samples (LCS)

LDC #: 222346  
 SDG #: see cover

METHOD: Inorganics, Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
 (Y) (N) (N/A)  
 Was a laboratory control sample (LCS) analyzed for each matrix in this SDG?  
 (Y) (N) (N/A)  
 Were all LCS percent recoveries (%R) within the control limits of 80-120% (85-115% for Method 300.0)?  
**LEVEL IV ONLY:**  
 (Y) (N) (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	LCS ID	Matrix	Analyte	%R (limits)	Associated Samples	Qualifications
	LCS	water	NO2-N	87(90-110)	12	J-105/P (X)

Comments:

LDC #: 222346  
 SDG #: see cover

**VALIDATION FINDINGS WORKSHEET**  
Overall Assessment of Data

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

METHOD: Inorganics, Method 397.2

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  
 All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		13	NO2-N		X (6) / A

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

LDC#: 22234L6  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

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

Inorganics, Method See Cover

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

Analyte	Concentration (mg/L)		RPD ( $\leq 30$ )	Difference	Limits	Qualification (Parent only)
	1	2				
Ammonia as N	1.95	0.054		1.896	( $\leq 0.050$ )	Jdet/A (fd)
Total Alkalinity	260	260	0			
Bicarbonate Alkalinity	260	260	0			
Bromide	2.5	2.6		0.1	( $\leq 1.0$ )	
Chloride	999	994	1			
Conductivity (umhos/cm)	9500	9620	1			
Hexavalent Chromium	11.0	11.1	1			
Nitrate as N	31.1	30.8	1			
Nitrite as N	0.155	0.159	3			
pH (pH Units)	6.99	7.04	1			
Sulfate	2210	2600	16			
Surfactants	0.014	0.016		0.002	( $\leq 0.020$ )	
TDS	9560	9480	1			
TOC, Average	3.2	3.3		0.1	( $\leq 1.0$ )	
Total Phosphorus	0.027	0.026		0.001	( $\leq 0.050$ )	
Chlorate (ug/L)	2330000	2270000	3			

V:\FIELD DUPLICATES\FD\_inorganic22234L6.wpd

LDC#: 22234L6  
 SDG#: See Cover

**VALIDATION FINDINGS WORKSHEET**  
**Field Duplicates**

Page 1 of 2  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

Inorganics, Method See Cover

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

Analyte	Concentration (mg/L)		RPD ( $\leq 30$ )	Difference	Limits	Qualification (Parent only)
	8	9				
Ammonia as N	0.007U	0.073		0.066	( $\leq 0.050$ )	J/U/J/A (fd)
Total Alkalinity	347	342	1			
Bicarbonate Alkalinity	347	342	1			
Chloride	146	148	1			
Conductivity (umhos/cm)	3500	3490	0			
Hexavalent Chromium	0.050	0.050	0			
Nitrate as N	2.20	2.16	2			
Nitrite as N	0.008	0.007U		0.001	( $\leq 0.010$ )	
pH (pH Units)	7.48	7.49	0			
Sulfate	1400	1380	1			
Surfactants	0.005	0.007		0.002	( $\leq 0.020$ )	
TDS	2810	2850	1			
TOC, Average	1.5	1.6		0.1	( $\leq 1.0$ )	
Total Phosphorus	0.031	0.030		0.001	( $\leq 0.050$ )	
TSS	6.3	7.1	12			
Chlorate (ug/L)	16800	16800	0			

LDC #: 02346  
 SDG #: See cover

**Validatin Findings Worksheet  
 Initial and Continuing Calibration Calculation Verification**

Page: 1 of 1  
 Reviewer: SR  
 2nd Reviewer: SR

Method: Inorganics, Method see cover

The correlation coefficient (r) for the calibration of NH3-N was recalculated. Calibration date: 11/13/09

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

$\%R = \frac{\text{Found} \times 100}{\text{True}}$   
 Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution  
 True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (ug/l)	Area	Recalculated		Reported		Acceptable (Y/N)
					r or r <sup>2</sup>	r or r <sup>2</sup>			
Initial calibration	NH3-N	s1	0	11542	1.0000	0.9999			Y
		s2	0.01	103066					
		s3	0.02	218582					
		s4	0.05	478010					
		s5	0.1	938886					
		s6	0.2	1766170					
		s7	0.5	4174432					
		s8	1	8288506					
		s9	2	16582717					
Calibration verification	TOC	CCV	15	15.1291	101	-	-		
Calibration verification	CC6+	CCV	0.5	0.4988	100	-	-		
Calibration verification	T-P	CCV	0.45	0.4314	96	-	-	Y	

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

LDC #: 223425  
 SDG #: Secon

**VALIDATION FINDINGS WORKSHEET**  
**Level IV Recalculation Worksheet**

Page: 1 of 1  
 Reviewer: [Signature]  
 2nd Reviewer: [Signature]

METHOD: Inorganics, Method Secon

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

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

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

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

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

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

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated		Reported		Acceptable (Y/N)
					%R / RPD	%R / RPD			
LCS	Laboratory control sample	TP	0.807	0.800	101	101	101	101	Y
14	Matrix spike sample	C103	(SSR-SR) 194	200	97	97	97	97	Y
16	Duplicate sample	↓	23	21	9	9	9	9	Y

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 #: 222346  
 SDG #: seecaer

**VALIDATION FINDINGS WORKSHEET**  
**Sample Calculation Verification**

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

METHOD: Inorganics, Method seecaer

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

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

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

Concentration =  

$$Alk = \frac{V_{titrant} \times N_{titrant} \times 50,000}{V_{sample}}$$

Recalculation:  

$$Alk = \frac{2.25 \text{ mL} (0.002 \text{ N}) (50,000)}{20 \text{ mL}} = 113 \text{ mg/L}$$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	4	Alk, Total	113	113	Y
		Alk, BocaB	113	113	Y
		MH <sub>3</sub> -N	1.10	1.10	Y
		Bc	0.8	0.8	Y
		TOC	0.5	0.5	Y
		Cl	312	312	Y
		Cr6+	0.0010	0.0010	Y
		Cond (umhos/cm)	3680	3680	Y
		@NO <sub>3</sub> -N	3.66	3.66	Y
		pH (pH units)	7.44	7.44	Y
		T-P	0.024	0.024	Y
		TDS	288	288	Y
		TSS	125	125	Y
		SO <sub>4</sub>	1150	1150	Y
		ClO <sub>3</sub> (ug/L)	15700	15700	Y

Note: \_\_\_\_\_

LDC #: 222416  
 SDG #: see over

**VALIDATION FINDINGS WORKSHEET**  
**Sample Calculation Verification**

Page: 2 of 2  
 Reviewer: CF  
 2nd reviewer: [Signature]

METHOD: inorganics, Method see over

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

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

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

Concentration =  $Cl = 0.0262707(\text{Area}) + 0.080741$       Recalculation:  $40 (0.0262707(165.558) + 0.080741) = 177 \text{ mg/L}$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	5	Alk, Total	150	150	Y
		Alk, Bicarb	150	150	Y
		NH <sub>3</sub> -N	0.19	0.19	Y
		TOC	2.4	2.4	Y
		Cl	177	177	Y
		Cr6+	0.009	0.009	Y
		Cond (umhos/cm)	1820	1820	Y
		NO <sub>3</sub> -N	2.90	2.90	Y
		NO <sub>2</sub> -N	0.033	0.033	Y
		pH (pH units)	7.44	7.44	Y
		T-P	0.041	0.04	Y
		TDS	1350	1350	Y
		TSS	3.7	3.7	Y
		SO <sub>4</sub>	526	526	Y
		ClO <sub>4</sub> (ug/L)	715	715	N

Note: \_\_\_\_\_