CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
09/25/2012	
3. Project No.	Page 1 of 2

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR12-027		Scot Fitzgerald	Analytical Support Group	2753/373-7495

17. Comment Submittal Approval

09/25/2012 (Date) — Scot Fitzgerald (Organization Manager (optional) (print and sign))

10. Agreement With Indicated Comment Disposition(s)

Reviewer/Point of Contact (print and sign)

Date

Author/Originator (print and sign)

11. CLOSED

Scot Fitzgerald
Reviewer/Point of Contact (print and sign)

9/27/2012 (Date)

Author/Originator (print and sign)

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if NOT accepted)	16. Status
1	Page 39 MS/MSD discussion includes MS failure for samples B2LXD8, B2LXD9 and B2LXF7. All 200.8 metals for these samples were rerun and re-reported per client request in SDG WSCF121091 with no MS failure. The MS failure does not apply to these samples because the rerun data replaced the original data.		Remove flags from qualification summary and discussion for these three samples.	Y		closed

CHPRC - REVIEW COMMENT RECORD (RCR)

1. Date	2. Review No.
9/26/2012	RCR-VSR12-027
3. Project No.	Page 1 of 1
100 K	

5. Document Number(s)/Title(s)	6. Program/Project/Building Number	7. Reviewer	8. Organization/Group	9. Location/Phone
VSR12-027, 182-K and 100-K Verification samples	SGRP	SL Huggins	SGRP QA	MO-2216E/A101 373-3630

17. Comment Submittal Approval	10. Agreement With Indicated Comment Disposition(s)	11. CLOSED
9/26/12 (Date)	(Date)	9/26/12 (Date)
SL Huggins (Organization Manager (optional) (print and sign))	(Reviewer/Point of Contact (print and sign))	SL Huggins (Reviewer/Point of Contact (print and sign))
	(Author/Originator (print and sign))	(Author/Originator (print and sign))

12. Item	13a. Comments	13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if **NOT** accepted)	16. Status
1	No comments					Closed

ANALYTICAL QUALITY ASSOCIATES, INC.

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Data Validation Report for CH2M Hill Plateau Remediation Company

VSR12-027
Project 100-K
182-K and 100-K-106 Verification Samples

Chemical & Radiochemical Validation - Level C

Validation Performed By: Eyda Hergenreder Eyda Hergenreder **Date: 9-20-2012**

Technical Review By: _____ **Date: 9-24-2012**
Marcia Hilchey

QA Review Performed By: _____ **Date: 9-27-2012**
Lonnie Morris

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Date: 20 September 2012
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 100 K
Subject: Semivolatile Organics - Sample Data Groups (SDGs) WSCF121032 and WSCF121038

INTRODUCTION

This memorandum presents the results of data validation for SDGs WSCF121032 and WSCF121038 prepared by WSCF Analytical Laboratories. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B2LXF0	08/13/12	Soil	C	WTPH-D & 8015
B2LXF1	08/13/12	Soil	C	WTPH-D & 8015
B2LXF2	08/13/12	Soil	C	WTPH-D & 8015
B2LXF6	08/13/12	Soil	C	WTPH-D & 8015
B2LXF7	08/13/12	Soil	C	WTPH-D & 8015
B2LXD8	08/13/12	Soil	C	WTPH-D & 8015
B2LXD9	08/13/12	Soil	C	WTPH-D & 8015
B2M011	08/14/12	Soil	C	WTPH-D & 8015
B2M012	08/14/12	Soil	C	WTPH-D & 8015
B2M013	08/14/12	Soil	C	WTPH-D & 8015
B2LXF3	08/14/12	Soil	C	WTPH-D & 8015
B2LXF4	08/14/12	Soil	C	WTPH-D & 8015
B2LXF5	08/14/12	Soil	C	WTPH-D & 8015
B2LXF8	08/14/12	Soil	C	WTPH-D & 8015
B2LXF9	08/14/12	Soil	C	WTPH-D & 8015
B2LXH0	08/14/12	Soil	C	WTPH-D & 8015
B2LXH1	08/14/12	Soil	C	WTPH-D & 8015
B2LXH2	08/14/12	Soil	C	WTPH-D & 8015
B2LXH3	08/14/12	Soil	C	WTPH-D & 8015

Data validation was conducted in accordance with the CHPRC validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev. 5, (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements for method WTPH-D is extraction within 14 days of sample collection and analysis within 40 days of sample extraction. The holding time requirements for method 8015 Alcohols/Glycols is analysis within 14 days from sample collection. Sample preservation requires chilling to 4 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

All equipment blank results were acceptable with the following exception. Extended motor oil was detected in equipment blank sample B2M013.

- **Accuracy**

Accuracy is evaluated by reviewing surrogate results, matrix spike sample results, and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 50% to 150%. The limits for reported analytes not listed in the SAP are specified by the DV procedure.

Surrogates

All surrogate recoveries were acceptable.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ±30%. When duplicate RPDs exceed the limits and have associated results <5X the SAP required detection limits with differences <2X the required detection limits no precision infraction occurred.

MS/MSD Samples

All MS/MSD relative percent difference values were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Internal Standards**

Internal standard performance criteria ensure that GC/MS sensitivity and response are stable during each analysis. Internal standards are added to all samples, including QC samples, prior to analysis.

Internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDLs were below the CRDL with the following exception. The MDLs for extended motor oil were > the CRDL for TPH.

- **Completeness**

SDGs WSCF121032 and WSCF121036 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

It should also be noted that page two of COC F12-037-017 did not list collector name.

REFERENCES

GRP-GD-003, Rev. 0, Change 0, *Data Validation for Chemical Analyses*, August 2010.

DOE/RL-96-22, Rev. 5, *100 Area Remedial Action Sampling and Analysis Plan*, September 2009.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Semivolatile Organics Data Qualification Summary			
SDG: WSCF121032 and WSCF121038	Reviewer: AQA	Project: 100-K	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
WTPH-D & 8015	None	NA	NA

Comments: None

Appendix 3

Data Validation Supporting Documentation

Data Validation for Chemical Analyses

Published Date: 08/16/10 Effective Date: 08/16/10

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 100 K			DATA PACKAGE: VSR12-027		
VALIDATOR: Eyda Hergenreder		LAB: WSCF		DATE: 09-20-2012	
			SDG: WSCF121032, WSCF121038		
ANALYSES PERFORMED					
8015 X	8021	8141	8151	8315	
		WTPH-HCID	WTPH-G	WTPH-D X	

SAMPLES/MATRIX: Soil samples

SDG WSCF121032: B2LXF0, B2LXF1, B2LXF2, B2LXF6, B2LXF7, B2LXD8, B2LXD9

SDG WSCF121038: B2M011, B2M012, B2M013, B2LXF3, B2LXF4, B2LXF5, B2LXF8, B2LXF9, B2LXH0, B2LXH1, B2LXH2, B2LXH3

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present?.....(Yes) No N/A

Comments: None

2. INSTRUMENT TUNING AND CALIBRATION (Levels D and E)

Initial calibrations acceptable? ..... Yes No N/A

Continuing calibrations acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments:

3. BLANKS (Levels B, C, D, and E)

Calibration blanks analyzed? (Levels D, E) ..... Yes No N/A

Calibration blank results acceptable? (Levels D, E) ..... Yes No N/A

Laboratory blanks analyzed? ..... Yes No N/A

Laboratory blank results acceptable? ..... Yes No N/A

Field/trip blanks analyzed? (Levels C, D, E) ..... Yes No N/A

Field/trip blank results acceptable? (Levels C, D, E) ..... Yes No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No N/A

Comments:

SDG WSCF121038: Equipment blank B2M013: Extended motor oil 31 mg/kg

4. ACCURACY (Levels C, D, and E)

Surrogates/system monitoring compounds analyzed?	(Yes)	No	N/A
Surrogate/system monitoring compound recoveries acceptable?	(Yes)	No	N/A
Surrogates traceable? (Levels D, E)	Yes	No	(N/A)
Surrogates expired? (Levels D, E)	Yes	No	(N/A)
MS/MSD samples analyzed?	(Yes)	No	N/A
MS/MSD results acceptable?	(Yes)	No	N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes	No	(N/A)
MS/MSD standards expired? (Levels D, E)	Yes	No	(N/A)
LCS/BSS samples analyzed?	(Yes)	No	N/A
LCS/BSS results acceptable?	(Yes)	No	N/A
Standards traceable? (Levels D, E)	Yes	No	(N/A)
Standards expired? (Levels D, E)	Yes	No	(N/A)
Transcription/calculation errors? (Levels D, E)	Yes	No	(N/A)
Performance audit sample(s) analyzed?	Yes	No	(N/A)
Performance audit sample results acceptable?	Yes	No	(N/A)

Comments: None

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... (Yes) No N/A

Duplicate results acceptable? ..... (Yes) No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)

MS/MSD standards expired? (Levels D, E) ..... Yes No (N/A)

Field duplicate RPD values acceptable? ..... (Yes) No N/A

Field split RPD values acceptable? ..... Yes No (N/A)

Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)

Comments: None

6. HOLDING TIMES (all levels)

Samples properly preserved? ..... (Yes) No N/A

Sample holding times acceptable? ..... (Yes) No N/A

Comments: None

7. COMPOUND IDENTIFICATION, QUANTITATION, AND DETECTION LIMITS (all levels)

Results reported for all requested analyses? ..... (Yes) No N/A

Results supported in the raw data? (Levels D, E) ..... Yes No (N/A)

Samples properly prepared? (Levels D, E) ..... Yes No (N/A)

Detection limits meet RDL? ..... Yes (No) N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)

Comments:

Extended motor oil MDL for all samples were > CRDL for TPH

8. SAMPLE CLEANUP (Levels D and E)

Fluorisil ® (or other absorbent) cleanup performed? ..... Yes No (N/A)

Lot check performed? ..... Yes No (N/A)

Check recoveries acceptable? ..... Yes No (N/A)

Check materials traceable? ..... Yes No (N/A)

Check materials Expired? ..... Yes No (N/A)

Analytical batch QC given similar cleanup? ..... Yes No (N/A)

Transcription/Calculation Errors? ..... Yes No (N/A)

Comments:

Comments:

More

Appendix 4

Additional Documentation Requested By Client

Batch QC List

Attention Scot Fitzgerald
Department Organic, Volatiles

Group # WSCF121032

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
206332	206355	1	BLANK	80018	BLANK		SW-846 Method 8015 for GPP
206332	206355	2	LCS	80019	LCS		SW-846 Method 8015 for GPP
206332	206355	3	MS	80020	B2LXF0(121032001MS)	121032001	SW-846 Method 8015 for GPP
206332	206355	4	MSD	80021	B2LXF0(121032001MSD)	121032001	SW-846 Method 8015 for GPP
206332	206355	5	SAMPLE	121032001	B2LXF0		SW-846 Method 8015 for GPP
206332	206355	6	SAMPLE	121032002	B2LXF1		SW-846 Method 8015 for GPP
206332	206355	7	SAMPLE	121032003	B2LXF2		SW-846 Method 8015 for GPP
206332	206355	8	SAMPLE	121032004	B2LXF6		SW-846 Method 8015 for GPP
206332	206355	9	SAMPLE	121032005	B2LXF7		SW-846 Method 8015 for GPP
206332	206355	10	SAMPLE	121032006	B2LXD8		SW-846 Method 8015 for GPP
206332	206355	11	SAMPLE	121032007	B2LXD9		SW-846 Method 8015 for GPP

Quality Control Report

Attention Scot Fitzgerald
Department Organic, Volatiles

Group # WSCF121032

Analytical Batch 206355 (QC Batch: 206332) **Test** SW-846 Method 8015 for GPP
Associated Samples 121032001, 121032002, 121032003, 121032004, 121032005, 121032006, 121032007

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #80018**							
Ethylene glycol	107-21-1		<4500	ug/kg					U	08/21/12
LCS			**QC Sample #80019**							
Ethylene glycol	107-21-1		145000	ug/kg	104.6	70 - 130				08/21/12
MS			**QC Sample #80020**							
			Original 121032001							
Ethylene glycol	107-21-1	<3800	146000	ug/kg	98.5	70 - 130				08/21/12
MSD			**QC Sample #80021**							
			Original 121032001					**Paired 80020**		
Ethylene glycol	107-21-1	<3800	155000	ug/kg	103.7	70 - 130				08/21/12

* - QC result out of range n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Organic, Volatiles

Group # WSCF121032

Analytical Batch 206355 (QC Batch: 206332) **Test** SW-846 Method 8015 for GPP
Associated Samples 121032001, 121032002, 121032003, 121032004, 121032005, 121032006, 121032007

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
SAMPLE			**Sample #121032001**							
2-Methylcyclohexanol	583-59-5				106.7	70 - 130				08/21/12
SAMPLE			**Sample #121032002**							
2-Methylcyclohexanol	583-59-5				104.5	70 - 130				08/21/12
SAMPLE			**Sample #121032003**							
2-Methylcyclohexanol	583-59-5				104.9	70 - 130				08/21/12
SAMPLE			**Sample #121032004**							
2-Methylcyclohexanol	583-59-5				106.7	70 - 130				08/21/12
SAMPLE			**Sample #121032005**							
2-Methylcyclohexanol	583-59-5				110.4	70 - 130				08/21/12
SAMPLE			**Sample #121032006**							
2-Methylcyclohexanol	583-59-5				107.8	70 - 130				08/21/12
SAMPLE			**Sample #121032007**							
2-Methylcyclohexanol	583-59-5				103.3	70 - 130				08/21/12

* - QC result out of range n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Organic, Volatiles

Group # WSCF121032

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #80018**							
2-Methylcyclohexanol	583-59-5			ug/kg	103.6	70 - 130				08/21/12
LCS			**QC Sample #80019**							
2-Methylcyclohexanol	583-59-5			ug/kg	103.4	70 - 130				08/21/12
MS			**QC Sample #80020**							
			Original 121032001							
2-Methylcyclohexanol	583-59-5			ug/kg	102.5	70 - 130				08/21/12
MSD			**QC Sample #80021**							
			Original 121032001					**Paired**	**80020**	
2-Methylcyclohexanol	583-59-5			ug/kg	102.1	70 - 130	n/a			08/21/12

* - QC result out of range

n/a - Not Applicable

Batch QC List

Attention Scot Fitzgerald
Department Organic, Volatiles

Group # WSCF121038

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
206332	206355	1	BLANK	80018	BLANK		SW-846 Method 8015 for GPP
206332	206355	2	LCS	80019	LCS		SW-846 Method 8015 for GPP
206332	206355	3	MS	80020	B2LXF0(121032001MS)	121032001	SW-846 Method 8015 for GPP
206332	206355	4	MSD	80021	B2LXF0(121032001MSD)	121032001	SW-846 Method 8015 for GPP
206332	206355	12	SAMPLE	121038001	B2M011		SW-846 Method 8015 for GPP
206332	206355	13	SAMPLE	121038002	B2M012		SW-846 Method 8015 for GPP
206332	206355	14	SAMPLE	121038003	B2M013		SW-846 Method 8015 for GPP
206332	206355	15	SAMPLE	121038004	B2LXF3		SW-846 Method 8015 for GPP
206332	206355	16	SAMPLE	121038005	B2LXF4		SW-846 Method 8015 for GPP
206332	206355	17	SAMPLE	121038006	B2LXF5		SW-846 Method 8015 for GPP
206332	206355	18	SAMPLE	121038007	B2LXF8		SW-846 Method 8015 for GPP
206332	206355	19	SAMPLE	121038008	B2LXF9		SW-846 Method 8015 for GPP
206332	206355	20	SAMPLE	121038009	B2LXH0		SW-846 Method 8015 for GPP
206332	206355	21	SAMPLE	121038010	B2LXH1		SW-846 Method 8015 for GPP
206332	206355	22	SAMPLE	121038011	B2LXH2		SW-846 Method 8015 for GPP
206332	206355	23	SAMPLE	121038012	B2LXH3		SW-846 Method 8015 for GPP

Quality Control Report

Attention Scot Fitzgerald
Department Organic, Volatiles

Group # WSCF121038

Analytical Batch 206355 (QC Batch: 206332) **Test** SW-846 Method 8015 for GPP
Associated Samples 121038001, 121038002, 121038003, 121038004, 121038005, 121038006, 121038007, 121038008, 121038009, 121038010, 121038011, 121038012

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #80018**							
Ethylene glycol	107-21-1		<4500	ug/kg					U	08/21/12
LCS			**QC Sample #80019**							
Ethylene glycol	107-21-1		145000	ug/kg	104.6	70 - 130				08/21/12
MS			**QC Sample #80020**							
			Original 121032001							
Ethylene glycol	107-21-1		146000	ug/kg	98.5	70 - 130				08/21/12
MSD			**QC Sample #80021**							
			Original 121032001					**Paired 80020**		
Ethylene glycol	107-21-1		155000	ug/kg	103.7	70 - 130				08/21/12

* - QC result out of range n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Organic, Volatiles

Group # WSCF121038

Analytical Batch 206355 (QC Batch: 206332) **Test** SW-846 Method 8015 for GPP
Associated Samples 121038001, 121038002, 121038003, 121038004, 121038005, 121038006, 121038007, 121038008, 121038009, 121038010, 121038011, 121038012

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
SAMPLE			**Sample #121038001**							
2-Methylcyclohexanol	583-59-5				109.1	70 - 130				08/21/12
SAMPLE			**Sample #121038002**							
2-Methylcyclohexanol	583-59-5				108.6	70 - 130				08/21/12
SAMPLE			**Sample #121038003**							
2-Methylcyclohexanol	583-59-5				110	70 - 130				08/21/12
SAMPLE			**Sample #121038004**							
2-Methylcyclohexanol	583-59-5				107.7	70 - 130				08/21/12
SAMPLE			**Sample #121038005**							
2-Methylcyclohexanol	583-59-5				109	70 - 130				08/21/12
SAMPLE			**Sample #121038006**							
2-Methylcyclohexanol	583-59-5				109.3	70 - 130				08/21/12
SAMPLE			**Sample #121038007**							

* - QC result out of range n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Organic, Volatiles

Group # WSCF121038

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
2-Methylcyclohexanol	583-59-5				105.1	70 - 130				08/21/12
SAMPLE			**Sample #121038008**							
2-Methylcyclohexanol	583-59-5				107.6	70 - 130				08/21/12
SAMPLE			**Sample #121038009**							
2-Methylcyclohexanol	583-59-5				105	70 - 130				08/21/12
SAMPLE			**Sample #121038010**							
2-Methylcyclohexanol	583-59-5				108.8	70 - 130				08/21/12
SAMPLE			**Sample #121038011**							
2-Methylcyclohexanol	583-59-5				108.4	70 - 130				08/21/12
SAMPLE			**Sample #121038012**							
2-Methylcyclohexanol	583-59-5				107.9	70 - 130				08/21/12
BLANK			**QC Sample #80018**							
2-Methylcyclohexanol	583-59-5			ug/kg	103.6	70 - 130				08/21/12
LCS			**QC Sample #80019**							
2-Methylcyclohexanol	583-59-5			ug/kg	103.4	70 - 130				08/21/12
MS			**QC Sample #80020**							
			Original 121032001							
2-Methylcyclohexanol	583-59-5			ug/kg	102.5	70 - 130				08/21/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Organic, Volatiles

Group # WSCF121038

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
MSD			**QC Sample #80021**							
			Original 121032001					**Paired**	**80020**	
2-Methylcyclohexanol	583-59-5			ug/kg	102.1	70 - 130	n/a			08/21/12

* - QC result out of range n/a - Not Applicable

Batch QC List

Attention Scot Fitzgerald
Department Organic, Semivolatiles

Group # WSCF121032

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
206271	206314	1	BLANK	79854	BLANK		Extractable Diesel and Petroleum
206271	206314	2	LCS	79855	LCS		Extractable Diesel and Petroleum
206271	206314	3	MS	79856	B2LXF0(121032001MS)	121032001	Extractable Diesel and Petroleum
206271	206314	4	MSD	79857	B2LXF0(121032001MSD)	121032001	Extractable Diesel and Petroleum
206271	206314	5	SAMPLE	121032001	B2LXF0		Extractable Diesel and Petroleum
206271	206314	6	SAMPLE	121032002	B2LXF1		Extractable Diesel and Petroleum
206271	206314	7	SAMPLE	121032003	B2LXF2		Extractable Diesel and Petroleum
206271	206314	8	SAMPLE	121032004	B2LXF6		Extractable Diesel and Petroleum
206271	206314	9	SAMPLE	121032005	B2LXF7		Extractable Diesel and Petroleum
206271	206314	10	SAMPLE	121032006	B2LXD8		Extractable Diesel and Petroleum
206271	206314	11	SAMPLE	121032007	B2LXD9		Extractable Diesel and Petroleum

Quality Control Report

Attention Scot Fitzgerald
Department Organic, Semivolatiles

Group # WSCF121032

Analytical Batch 206314 (QC Batch: 206271) **Test** Extractable Diesel and Petroleum
Associated Samples 121032001, 121032002, 121032003, 121032004, 121032005, 121032006, 121032007

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #79854**							
Diesel	TPHDIESEL		<4	mg/kg					U	08/15/12
Kerosene	TPHKEROSE		<4	mg/kg					U	08/15/12
Extended Motor Oil	TPH/OILH		<10	mg/kg					U	08/15/12
LCS			**QC Sample #79855**							
Diesel	TPHDIESEL		99	mg/kg	99.3	70 - 130				08/15/12
MS			**QC Sample #79856**							
			Original 121032001							
Diesel	TPHDIESEL	<4	100	mg/kg	100.3	70 - 130				08/15/12
MSD			**QC Sample #79857**							
			Original 121032001					**Paired 79856**		
Diesel	TPHDIESEL	<4	110	mg/kg	111.5	70 - 130	10.40	30		08/15/12

* - QC result out of range n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Organic, Semivolatiles

Group # WSCF121032

Analytical Batch 206314 (QC Batch: 206271) **Test** Extractable Diesel and Petroleum
Associated Samples 121032001, 121032002, 121032003, 121032004, 121032005, 121032006, 121032007

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
SAMPLE			**Sample #121032001**							
o-Terphenyl	84-15-1				95.7	70 - 130				08/15/12
SAMPLE			**Sample #121032002**							
o-Terphenyl	84-15-1				89	70 - 130				08/15/12
SAMPLE			**Sample #121032003**							
o-Terphenyl	84-15-1				97.5	70 - 130				08/15/12
SAMPLE			**Sample #121032004**							
o-Terphenyl	84-15-1				94.5	70 - 130				08/15/12
SAMPLE			**Sample #121032005**							
o-Terphenyl	84-15-1				98.9	70 - 130				08/15/12
SAMPLE			**Sample #121032006**							
o-Terphenyl	84-15-1				90.7	70 - 130				08/15/12
SAMPLE			**Sample #121032007**							
o-Terphenyl	84-15-1				94.3	70 - 130				08/15/12

* - QC result out of range n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Organic, Semivolatiles

Group # WSCF121032

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #79854**							
o-Terphenyl	84-15-1				96.1	70 - 130				08/15/12
LCS			**QC Sample #79855**							
o-Terphenyl	84-15-1				96.1	50 - 150				08/15/12
MS			**QC Sample #79856**							
			Original 121032001							
o-Terphenyl	84-15-1				98.4	50 - 150				08/15/12
MSD			**QC Sample #79857**							
			Original 121032001					**Paired 79856**		
o-Terphenyl	84-15-1				108.3	50 - 150	n/a			08/15/12

* - QC result out of range

n/a - Not Applicable

Batch QC List

Attention Scot Fitzgerald
Department Organic, Semivolatiles

Group # WSCF121038

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
206330	206331	1	BLANK	80014	BLANK		Extractable Diesel and Petroleum
206330	206331	2	LCS	80015	LCS		Extractable Diesel and Petroleum
206330	206331	3	MS	80016	B2M011(121038001MS)	121038001	Extractable Diesel and Petroleum
206330	206331	4	MSD	80017	B2M011(121038001MSD)	121038001	Extractable Diesel and Petroleum
206330	206331	5	SAMPLE	121038001	B2M011		Extractable Diesel and Petroleum
206330	206331	6	SAMPLE	121038002	B2M012		Extractable Diesel and Petroleum
206330	206331	7	SAMPLE	121038003	B2M013		Extractable Diesel and Petroleum
206330	206331	8	SAMPLE	121038004	B2LXF3		Extractable Diesel and Petroleum
206330	206331	9	SAMPLE	121038005	B2LXF4		Extractable Diesel and Petroleum
206330	206331	10	SAMPLE	121038006	B2LXF5		Extractable Diesel and Petroleum
206330	206331	11	SAMPLE	121038007	B2LXF8		Extractable Diesel and Petroleum
206330	206331	12	SAMPLE	121038008	B2LXF9		Extractable Diesel and Petroleum
206330	206331	13	SAMPLE	121038009	B2LXH0		Extractable Diesel and Petroleum
206330	206331	14	SAMPLE	121038010	B2LXH1		Extractable Diesel and Petroleum
206330	206331	15	SAMPLE	121038011	B2LXH2		Extractable Diesel and Petroleum
206330	206331	16	SAMPLE	121038012	B2LXH3		Extractable Diesel and Petroleum

Quality Control Report

Attention Scot Fitzgerald
Department Organic, Semivolatiles

Group # WSCF121038

Analytical Batch 206331 (QC Batch: 206330) **Test** Extractable Diesel and Petroleum
Associated Samples 121038001, 121038002, 121038003, 121038004, 121038005, 121038006, 121038007, 121038008, 121038009, 121038010, 121038011, 121038012

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #80014**							
Diesel	TPHDIESEL		<4	mg/kg					U	08/15/12
Kerosene	TPHKEROSE		<4	mg/kg					U	08/15/12
Extended Motor Oil	TPH/OILH		<10	mg/kg					U	08/15/12
LCS			**QC Sample #80015**							
Diesel	TPHDIESEL		96	mg/kg	96.3	70 - 130				08/15/12
MS			**QC Sample #80016**							
			Original 121038001							
Diesel	TPHDIESEL	<4	94	mg/kg	96.8	70 - 130				08/15/12
MSD			**QC Sample #80017**							
			Original 121038001					**Paired 80016**		
Diesel	TPHDIESEL	<4	98	mg/kg	99.2	70 - 130	3.80	30		08/16/12

* - QC result out of range n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Organic, Semivolatiles

Group # WSCF121038

Analytical Batch 206331 (QC Batch: 206330) **Test** Extractable Diesel and Petroleum
Associated Samples 121038001, 121038002, 121038003, 121038004, 121038005, 121038006, 121038007, 121038008, 121038009, 121038010, 121038011, 121038012

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
SAMPLE			**Sample #121038001**							
o-Terphenyl	84-15-1				102.9	70 - 130				08/15/12
SAMPLE			**Sample #121038002**							
o-Terphenyl	84-15-1				105.1	70 - 130				08/16/12
SAMPLE			**Sample #121038003**							
o-Terphenyl	84-15-1				106.7	70 - 130				08/16/12
SAMPLE			**Sample #121038004**							
o-Terphenyl	84-15-1				105.3	70 - 130				08/16/12
SAMPLE			**Sample #121038005**							
o-Terphenyl	84-15-1				100.2	70 - 130				08/16/12
SAMPLE			**Sample #121038006**							
o-Terphenyl	84-15-1				97.3	70 - 130				08/16/12
SAMPLE			**Sample #121038007**							

* - QC result out of range n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Organic, Semivolatiles

Group # WSCF121038

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
o-Terphenyl	84-15-1				103.4	70 - 130				08/16/12
SAMPLE			**Sample #121038008**							
o-Terphenyl	84-15-1				102.6	70 - 130				08/16/12
SAMPLE			**Sample #121038009**							
o-Terphenyl	84-15-1				102.6	70 - 130				08/16/12
SAMPLE			**Sample #121038010**							
o-Terphenyl	84-15-1				101.4	70 - 130				08/16/12
SAMPLE			**Sample #121038011**							
o-Terphenyl	84-15-1				91.4	70 - 130				08/16/12
SAMPLE			**Sample #121038012**							
o-Terphenyl	84-15-1				99.1	70 - 130				08/16/12
BLANK			**QC Sample #80014**							
o-Terphenyl	84-15-1				98.2	70 - 130				08/15/12
LCS			**QC Sample #80015**							
o-Terphenyl	84-15-1				104.1	50 - 150				08/15/12
MS			**QC Sample #80016**							
			Original 121038001							
o-Terphenyl	84-15-1				100.5	50 - 150				08/15/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Organic, Semivolatiles

Group # WSCF121038

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
MSD			**QC Sample #80017**							
			Original 121038001					**Paired**	**80016**	
o-Terphenyl	84-15-1				101.5	50 - 150	n/a			08/16/12

* - QC result out of range

n/a - Not Applicable

Date: 27 September 2012
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 100 K
Subject: Inorganics - Sample Data Groups (SDGs) WSCF121032, WSCF121038 and WSCF121091

INTRODUCTION

This memorandum presents the results of data validation for SDGs WSCF121032, WSCF121038 and WSCF121091 prepared by WSCF Analytical Laboratories. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B2LXF0	08/13/12	Soil	C	200.8
B2LXF1	08/13/12	Soil	C	200.8
B2LXF2	08/13/12	Soil	C	200.8
B2LXF6	08/13/12	Soil	C	200.8
B2LXF7	08/13/12	Soil	C	200.8
B2LXD8	08/13/12	Soil	C	200.8
B2LXD9	08/13/12	Soil	C	200.8
B2M011	08/14/12	Soil	C	200.8
B2M012	08/14/12	Soil	C	200.8
B2M013	08/14/12	Soil	C	200.8
B2LXF3	08/14/12	Soil	C	200.8
B2LXF4	08/14/12	Soil	C	200.8
B2LXF5	08/14/12	Soil	C	200.8
B2LXF8	08/14/12	Soil	C	200.8
B2LXF9	08/14/12	Soil	C	200.8
B2LXH0	08/14/12	Soil	C	200.8
B2LXH1	08/14/12	Soil	C	200.8
B2LXH2	08/14/12	Soil	C	200.8
B2LXH3	08/14/12	Soil	C	200.8

Data validation was conducted in accordance with the CHPRC validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev. 5, (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested By Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirement for ICP metals are analysis within 180 days of sample collection, and the holding time requirement for mercury is analysis within 28 days of sample collection. Sample preservation requires chilling to 4 degrees Celsius.

The samples were analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

All equipment blank results were acceptable with the following exceptions. Mn, Ba, Cr, Cu, Pb and Sr were detected in equipment blank sample B2LXF7. Mn, Ni, Ba, Cr, Co, Cu, V, Zn, Pb, Mo, Sr, Sn and U were detected in equipment blank sample B2M013.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results, laboratory control sample results, and ICP-AES interference check sample results. According to the SAP, the matrix spike sample and the laboratory control sample accuracy limits are 70% to 130%. The limits for reported analytes not listed in the SAP are specified by the DV procedure. The interference check sample limits are ones specified by the DV procedure.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable with the following exceptions.

For SDG WSCF121032, the MS recovery for Mn was < the lower acceptance limit. The Mn result for sample B2LXD8 and B2LXD9 were non-detects; however these two samples and sample B2LXF7 were reanalyzed in SDG WSCF121091 with acceptable MS recovery, therefore the Mn results for these three samples should not be qualified. All other sample results were detects and should be qualified as estimates and flagged "J-." See the table in Appendix 2 for a listing of all affected sample results.

For SDG WSCF121038, for batch 206267, MS recovery for Mn was < the lower acceptance limit. The Mn results for all associated samples were detects and should be qualified as estimates and flagged "J-." For batch 206268 the MS and MSD recoveries for Mn was above the upper acceptance limit. The Mn results for all associated samples were detects and should be qualified as estimates and flagged "J+." See the table in Appendix 2 for a listing of all affected sample results.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

ICP-AES Interference Check Samples (ICSs)

ICS data was not included in the data package. Sample results should not be qualified based on this.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, field duplicate sample results, field split sample results, and ICP serial dilution results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ±30%. The limits for reported analytes not listed in the SAP are specified by the DV procedure. The serial dilution limits are ones specified by the DV procedure.

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable with the following exceptions. Samples B2LXF2 and B2LXF6 had a Cr RPD = 33% and Pb = 32%. Samples B2LXF9 and B2M012 had a Mn RPD = 59%, Ni = 48%, Ba = 49%, Co = 47%, V = 56%, Zn = 40%, Pb = 48% and Sr =32%.

Field Split Samples

No field splits were submitted for validation.

ICP Serial Dilution Samples

ICS serial dilution data was not included in the data package. Sample results should not be qualified based on this.

- **ICP-MS Internal Standards**

The analysis of ICP-MS internal standards is used to determine the existences and magnitude of instrument drift and physical interferences. The criteria for evaluation of internal standard results apply to all samples (including QC) analyzed during the analytical run, beginning with the calibration.

ICP-MS internal standards data was not included in the data package. Sample results should not be qualified based on this.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDLs were below the CRDLs.

- **Completeness**

SDGs WSCF121032, WSCF121038 and WSCF121091 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Minor deficiencies leading to qualification of sample results as estimates were due to a matrix spike infractions. See the table in Appendix 2 for a listing of all affected sample results.

It should also be noted that page two of COC F12-037-017 did not list collector name.

REFERENCES

GRP-GD-003, Rev. 0, Change 0, *Data Validation for Chemical Analyses*, August 2010.

DOE/RL-96-22, Rev. 5, *100 Area Remedial Action Sampling and Analysis Plan*, September 2009.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

Inorganic Data Qualification Summary			
SDG: WSCF121032, WSCF121038, WSCF121091	Reviewer: AQA	Project: 100 K	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Mn	J-	B2LXF0, B2LXF1, B2LXF2, B2LXF6, B2M011, B2M012, B2M013, B2LXF3, B2LXF4, B2LXF5, B2LXF8	Low matrix spike recovery
Mn	J+	B2LXF9, B2LXH0, B2LXH1, B2LXH2, B2LXH3	High matrix spike recoveries

Comments: None

Appendix 3

Data Validation Supporting Documentation

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 100 K			DATA PACKAGE: VSR12-027		
VALIDATOR: Eyda Hergenreder		LAB: WSCF		DATE: 09-20-2012	
			SDG: WSCF121032, WSCF121038, WSCF121091		
ANALYSES PERFORMED					
SW-846/ICP	SW-846/GFAA	SW-846/Hg		EPA 200.8 X	
SAMPLES/MATRIX Soil samples					
SDG WSCF121032: B2LXF0, B2LXF1, B2LXF2, B2LXF6, B2LXF7, B2LXD8, B2LXD9					
SDG WSCF121038: B2M011, B2M012, B2M013, B2LXF3, B2LXF4, B2LXF5, B2LXF8, B2LXF9, B2LXH0, B2LXH1, B2LXH2, B2LXH3					
SDG WSCF121091: B2LXF7, B2LXD8, B2LXD9					

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present?..... (Yes) No N/A

Comments: None

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments?	Yes	No	N/A
Initial calibrations acceptable?	Yes	No	N/A
ICP interference checks acceptable?	Yes	No	N/A
ICV and CCV checks performed on all instruments?	Yes	No	N/A
ICV and CCV checks acceptable?	Yes	No	N/A
Standards traceable?	Yes	No	N/A
Standards expired?	Yes	No	N/A
Calculation check acceptable?	Yes	No	N/A

Comments:

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E)	Yes	No	N/A
ICB and CCB results acceptable? (Levels D, E)	Yes	No	N/A
Laboratory blanks analyzed?	Yes	No	N/A
Laboratory blank results acceptable?	Yes	No	N/A
Field blanks analyzed? (Levels C, D, E)	Yes	No	N/A
Field blank results acceptable? (Levels C, D, E)	Yes	No	N/A
Transcription/calculation errors? (Levels D, E)	Yes	No	N/A

Comments:

Equipment blanks
sample B2LXF7: Mn 0.433 mg/kg; Ba 0.176 mg/kg; Cr 0.116 mg/kg; Cu 0.141 mg/kg; Pb 0.0477 mg/kg; Sr 0.0715 mg/kg
sample B2M013: Mn 5.46 mg/kg; Ni 0.0705 mg/kg; Ba 2.33 mg/kg; Cr 0.0694 mg/kg; Co 0.0933 mg/kg; Cu 0.116 mg/kg; V 0.276 mg/kg; Zn 0.897 mg/kg; Pb 0.290 mg/kg; Mo 0.0492 mg/kg; Sr 0.385 mg/kg; Sn 0.0340 mg/kg; U 0.0547 mg/kg

4. ACCURACY (Levels C, D, and E)

MS/MSD samples analyzed?	(Yes)	No	N/A
MS/MSD results acceptable?	Yes	(No)	N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes	No	(N/A)
MS/MSD standards expired? (Levels D, E)	Yes	No	(N/A)
LCS/BSS samples analyzed?	(Yes)	No	N/A
LCS/BSS results acceptable?	(Yes)	No	N/A
Standards traceable? (Levels D, E)	Yes	No	(N/A)
Standards expired? (Levels D, E)	Yes	No	(N/A)
Transcription/calculation errors? (Levels D, E)	Yes	No	(N/A)
Performance audit sample(s) analyzed?	Yes	No	(N/A)
Performance audit sample results acceptable?	Yes	No	(N/A)

Comments:

SDG WSCF121032: Mn MS%R 60%;
SDG WSCF121038: Mn (batch 206267) MS%R 60%; Mn (batch 206268) MS/MSD%Rs 164%/214%

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable?	(Yes)	No	N/A
Duplicate results acceptable?	(Yes)	No	N/A
MS/MSD standards NIST traceable? (Levels D, E)	Yes	No	(N/A)
MS/MSD standards expired? (Levels D, E)	Yes	No	(N/A)
Field duplicate RPD values acceptable?	Yes	(No)	N/A
Field split RPD values acceptable?	Yes	No	(N/A)
Transcription/calculation errors? (Levels D, E)	Yes	No	(N/A)

Comments:

Field duplicate samples RPDs:
samples B2LXF2/B2LXF6: Cr 33%, Pb 32%;
samples B2LXF9/B2M012: Mn 59%; Ni 48%; Ba 49%; Co 47%; V 56%; Zn 40%; Pb 48%; Sr 32%

6. ICP QUALITY CONTROL (Levels D and E)

ICP serial dilution samples analyzed?	Yes	No	N/A
ICP serial dilution %D values acceptable?	Yes	No	N/A
ICP post digestion spike required?	Yes	No	N/A
ICP post digestion spike values acceptable?	Yes	No	N/A
Standards traceable?	Yes	No	N/A
Standards expired?	Yes	No	N/A
Transcription/calculation errors?	Yes	No	N/A

Comments:

7. HOLDING TIMES (all levels)

Samples properly preserved?	(Yes)	No	N/A
Sample holding times acceptable?	(Yes)	No	N/A

Comments: None

8. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses?..... (Yes) No N/A

Results supported in the raw data? (Levels D, E) ..... Yes No (N/A)

Samples properly prepared? (Levels D, E)..... Yes No (N/A)

Detection limits meet RDL?..... (Yes) No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)

Comments: None

Comments (attach additional sheets as necessary):

More

Appendix 4

Additional Documentation Requested By Client

Batch QC List

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121032

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
206267	206301	4	BLANK	79846	BLANK		ICP-2008 MS All possible metal
206267	206301	5	LCS	79847	LCS		ICP-2008 MS All possible metal
206267	206301	6	SAMPLE	121032001	B2LXF0		ICP-2008 MS All possible metal
206267	206301	7	MS	79848	B2LXF0(121032001MS)	121032001	ICP-2008 MS All possible metal
206267	206301	8	MSD	79849	B2LXF0(121032001MSD)	121032001	ICP-2008 MS All possible metal
206267	206301	9	SAMPLE	121032002	B2LXF1		ICP-2008 MS All possible metal
206267	206301	10	SAMPLE	121032003	B2LXF2		ICP-2008 MS All possible metal
206267	206301	11	SAMPLE	121032004	B2LXF6		ICP-2008 MS All possible metal
206267	206301	12	SAMPLE	121032005	B2LXF7		ICP-2008 MS All possible metal
206267	206301	13	SAMPLE	121032006	B2LXD8		ICP-2008 MS All possible metal
206267	206301	14	SAMPLE	121032007	B2LXD9		ICP-2008 MS All possible metal
206267	206361	1	LCS	79847	LCS		ICP-2008 MS All possible metal
206267	206361	2	BLANK	79846	BLANK		ICP-2008 MS All possible metal
206267	206361	13	MSD	79849	B2LXF0(121032001MSD)	121032001	ICP-2008 MS All possible metal
206267	206361	14	MS	79848	B2LXF0(121032001MS)	121032001	ICP-2008 MS All possible metal
206267	206361	15	SAMPLE	121032007	B2LXD9		ICP-2008 MS All possible metal
206267	206361	16	SAMPLE	121032006	B2LXD8		ICP-2008 MS All possible metal
206267	206361	17	SAMPLE	121032005	B2LXF7		ICP-2008 MS All possible metal
206267	206361	18	SAMPLE	121032004	B2LXF6		ICP-2008 MS All possible metal
206267	206361	19	SAMPLE	121032003	B2LXF2		ICP-2008 MS All possible metal
206267	206361	20	SAMPLE	121032002	B2LXF1		ICP-2008 MS All possible metal
206267	206361	21	SAMPLE	121032001	B2LXF0		ICP-2008 MS All possible metal
206297	206299	1	BLANK	79902	BLANK		Anions by Ion Chromatography (Solid)

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121032

Analytical Batch 206301 (QC Batch: 206267) **Test** ICP-2008 MS All possible metal
Associated Samples 121032001, 121032002, 121032003, 121032004, 121032005, 121032006, 121032007

Analyte	CAS #	Original Found	QC Found	Units	% Recov Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #79846**						
Manganese	7439-96-5		<0.10	ug/L				U	08/16/12
Nickel	7440-02-0		<0.10	ug/L				U	08/16/12
Silver	7440-22-4		<0.050	ug/L				U	08/16/12
Antimony	7440-36-0		<0.30	ug/L				U	08/16/12
Barium	7440-39-3		<0.20	ug/L				U	08/16/12
Beryllium	7440-41-7		<0.10	ug/L				U	08/16/12
Cadmium	7440-43-9		<0.050	ug/L				U	08/16/12
Chromium	7440-47-3		<0.10	ug/L				U	08/16/12
Cobalt	7440-48-4		<0.050	ug/L				U	08/16/12
Copper	7440-50-8		<0.10	ug/L				U	08/16/12
Vanadium	7440-62-2		<0.20	ug/L				U	08/16/12
Zinc	7440-66-6		<1.0	ug/L				U	08/16/12
Lead	7439-92-1		<0.050	ug/L				U	08/16/12
Mercury	7439-97-6		<0.050	ug/L				U	08/16/12
Molybdenum	7439-98-7		<0.050	ug/L				U	08/16/12
Strontium	7440-24-6		<0.10	ug/L				UX	08/16/12
Tin	7440-31-5		<0.050	ug/L				U	08/16/12

* - QC result out of range n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121032

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Uranium	7440-61-1		<0.050	ug/L					U	08/16/12
Arsenic	7440-38-2		<0.20	ug/L					U	08/16/12
LCS			**QC Sample #79847**							
Manganese	7439-96-5		221	mg/kg	77.2	75 - 121				08/16/12
Nickel	7440-02-0		48.2	mg/kg	81.6	74 - 122				08/16/12
Silver	7440-22-4		29.6	mg/kg	86.1	83 - 127				08/16/12
Antimony	7440-36-0		104	mg/kg	84.9	62 - 205				08/16/12
Barium	7440-39-3		134	mg/kg	79	78 - 118				08/16/12
Beryllium	7440-41-7		53.5	mg/kg	85.7	77 - 120				08/16/12
Cadmium	7440-43-9		53.2	mg/kg	86.1	76 - 129				08/16/12
Chromium	7440-47-3		55.3	mg/kg	77.6	68 - 119				08/16/12
Cobalt	7440-48-4		87.8	mg/kg	85.2	77 - 122				08/16/12
Copper	7440-50-8		64.5	mg/kg	79.4	67 - 120				08/16/12
Vanadium	7440-62-2		45.6	mg/kg	77	67 - 122				08/16/12
Zinc	7440-66-6		120	mg/kg	84.8	73 - 131				08/16/12
Lead	7439-92-1		76.9	mg/kg	83.2	79 - 124				08/16/12
Mercury	7439-97-6		3.23	mg/kg	85.7	69 - 124				08/16/12
Molybdenum	7439-98-7		37.8	mg/kg	88.8	80 - 125				08/16/12
Strontium	7440-24-6		55.9	mg/kg	77.2	78 - 119			X	08/16/12
Tin	7440-31-5		91.3	mg/kg	85.3	84 - 130				08/16/12
Uranium	7440-61-1		357	mg/kg	87.5	86 - 113				08/16/12
Arsenic	7440-38-2		81.3	mg/kg	87.8	79 - 125				08/16/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121032

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
MS			**QC Sample #79848**							
			Original 121032001							
Manganese	7439-96-5	273	61.0	mg/kg	60.3	70 - 130			N	08/16/12
Nickel	7440-02-0	13.2	75.4	mg/kg	74.6	70 - 130				08/16/12
Silver	7440-22-4	<0.026	89.3	mg/kg	88.3	70 - 130				08/16/12
Antimony	7440-36-0	<0.16	81.6	mg/kg	80.7	70 - 130				08/16/12
Barium	7440-39-3	53.8	82.9	mg/kg	82	70 - 130				08/16/12
Beryllium	7440-41-7	0.208	89.5	mg/kg	88.5	70 - 130				08/16/12
Cadmium	7440-43-9	0.0705	87.1	mg/kg	86.1	70 - 130				08/16/12
Chromium	7440-47-3	17.3	71.8	mg/kg	71	70 - 130				08/16/12
Cobalt	7440-48-4	8.58	82.4	mg/kg	81.4	70 - 130				08/16/12
Copper	7440-50-8	15.8	77.4	mg/kg	76.5	70 - 130				08/16/12
Vanadium	7440-62-2	52.1	75.9	mg/kg	75	70 - 130				08/16/12
Zinc	7440-66-6	47.9	83.8	mg/kg	82.9	70 - 130				08/16/12
Lead	7439-92-1	4.02	85.5	mg/kg	84.5	70 - 130				08/16/12
Mercury	7439-97-6	<0.026	8.82	mg/kg	87.2	70 - 130				08/16/12
Molybdenum	7439-98-7	0.497	96.1	mg/kg	95	70 - 130				08/16/12
Strontium	7440-24-6	27.1	90.1	mg/kg	89.1	70 - 130			X	08/16/12
Tin	7440-31-5	0.479	89.3	mg/kg	88.3	70 - 130				08/16/12
Uranium	7440-61-1	0.420	87.9	mg/kg	86.9	70 - 130				08/16/12
Arsenic	7440-38-2	1.79	89.4	mg/kg	88.4	70 - 130				08/16/12
MSD			**QC Sample #79849**							
			Original 121032001					**Paired 79848**		
Manganese	7439-96-5	273	124	mg/kg	115.2	70 - 130	17.50	30		08/16/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121032

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Nickel	7440-02-0	13.2	83.6	mg/kg	77.8	70 - 130	8.80	30		08/16/12
Silver	7440-22-4	<0.026	91.3	mg/kg	84.9	70 - 130	2.20	30		08/16/12
Antimony	7440-36-0	<0.16	82.3	mg/kg	76.6	70 - 130	0.90	30		08/16/12
Barium	7440-39-3	53.8	94.2	mg/kg	87.6	70 - 130	8.00	30		08/16/12
Beryllium	7440-41-7	0.208	91.7	mg/kg	85.3	70 - 130	2.50	30		08/16/12
Cadmium	7440-43-9	0.0705	88.9	mg/kg	82.7	70 - 130	2.00	30		08/16/12
Chromium	7440-47-3	17.3	75.4	mg/kg	70.1	70 - 130	4.00	30		08/16/12
Cobalt	7440-48-4	8.58	86.4	mg/kg	80.3	70 - 130	4.30	30		08/16/12
Copper	7440-50-8	15.8	80.1	mg/kg	74.5	70 - 130	2.90	30		08/16/12
Vanadium	7440-62-2	52.1	86.3	mg/kg	80.3	70 - 130	7.90	30		08/16/12
Zinc	7440-66-6	47.9	89.7	mg/kg	83.5	70 - 130	4.40	30		08/16/12
Lead	7439-92-1	4.02	87.1	mg/kg	81	70 - 130	1.80	30		08/16/12
Mercury	7439-97-6	<0.026	9.03	mg/kg	84	70 - 130	2.40	30		08/16/12
Molybdenum	7439-98-7	0.497	98.8	mg/kg	91.9	70 - 130	2.80	30		08/16/12
Strontium	7440-24-6	27.1	89.7	mg/kg	83.5	70 - 130	0.30	30	X	08/16/12
Tin	7440-31-5	0.479	90.9	mg/kg	84.6	70 - 130	1.70	30		08/16/12
Uranium	7440-61-1	0.420	90.7	mg/kg	84.3	70 - 130	3.00	30		08/16/12
Arsenic	7440-38-2	1.79	90.7	mg/kg	84.4	70 - 130	1.40	30		08/16/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121032

Analytical Batch 206361 (QC Batch: 206267) **Test** ICP-2008 MS All possible metal
Associated Samples 121032001, 121032002, 121032003, 121032004, 121032005, 121032006, 121032007

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #79846**							
Selenium	7782-49-2		<0.50	ug/L					U	08/16/12
LCS			**QC Sample #79847**							
Selenium	7782-49-2		81.9	mg/kg	91.5	82 - 133				08/16/12
MS			**QC Sample #79848**							
			Original 121032001							
Selenium	7782-49-2	<0.26	95.1	mg/kg	94	70 - 130				08/16/12
MSD			**QC Sample #79849**							
			Original 121032001					**Paired 79848**		
Selenium	7782-49-2	<0.26	100	mg/kg	93.3	70 - 130	5.40	30		08/16/12

* - QC result out of range n/a - Not Applicable

Batch QC List

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121038

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
206267	206301	4	BLANK	79846	BLANK		ICP-2008 MS All possible metal
206267	206301	5	LCS	79847	LCS		ICP-2008 MS All possible metal
206267	206301	7	MS	79848	B2LXF0(121032001MS)	121032001	ICP-2008 MS All possible metal
206267	206301	8	MSD	79849	B2LXF0(121032001MSD)	121032001	ICP-2008 MS All possible metal
206267	206301	20	SAMPLE	121038001	B2M011		ICP-2008 MS All possible metal
206267	206301	21	SAMPLE	121038002	B2M012		ICP-2008 MS All possible metal
206267	206301	22	SAMPLE	121038003	B2M013		ICP-2008 MS All possible metal
206267	206301	23	SAMPLE	121038004	B2LXF3		ICP-2008 MS All possible metal
206267	206301	24	SAMPLE	121038005	B2LXF4		ICP-2008 MS All possible metal
206267	206301	25	SAMPLE	121038006	B2LXF5		ICP-2008 MS All possible metal
206267	206301	26	SAMPLE	121038007	B2LXF8		ICP-2008 MS All possible metal
206267	206361	1	LCS	79847	LCS		ICP-2008 MS All possible metal
206267	206361	2	BLANK	79846	BLANK		ICP-2008 MS All possible metal
206267	206361	13	MSD	79849	B2LXF0(121032001MSD)	121032001	ICP-2008 MS All possible metal
206267	206361	14	MS	79848	B2LXF0(121032001MS)	121032001	ICP-2008 MS All possible metal
206267	206361	22	SAMPLE	121038007	B2LXF8		ICP-2008 MS All possible metal
206267	206361	23	SAMPLE	121038006	B2LXF5		ICP-2008 MS All possible metal
206267	206361	24	SAMPLE	121038005	B2LXF4		ICP-2008 MS All possible metal
206267	206361	25	SAMPLE	121038004	B2LXF3		ICP-2008 MS All possible metal
206267	206361	26	SAMPLE	121038003	B2M013		ICP-2008 MS All possible metal
206267	206361	27	SAMPLE	121038002	B2M012		ICP-2008 MS All possible metal
206267	206361	28	SAMPLE	121038001	B2M011		ICP-2008 MS All possible metal
206268	206302	4	BLANK	79850	BLANK		ICP-2008 MS All possible metal

Batch QC List

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121038

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
206268	206302	5	LCS	79851	LCS		ICP-2008 MS All possible metal
206268	206302	6	SAMPLE	121038008	B2LXF9		ICP-2008 MS All possible metal
206268	206302	7	MS	79852	B2LXF9(121038008MS)	121038008	ICP-2008 MS All possible metal
206268	206302	8	MSD	79853	B2LXF9(121038008MSD)	121038008	ICP-2008 MS All possible metal
206268	206302	9	SAMPLE	121038009	B2LXH0		ICP-2008 MS All possible metal
206268	206302	10	SAMPLE	121038010	B2LXH1		ICP-2008 MS All possible metal
206268	206302	11	SAMPLE	121038011	B2LXH2		ICP-2008 MS All possible metal
206268	206302	12	SAMPLE	121038012	B2LXH3		ICP-2008 MS All possible metal
206268	206356	1	LCS	79851	LCS		ICP-2008 MS All possible metal
206268	206356	2	BLANK	79850	BLANK		ICP-2008 MS All possible metal
206268	206356	8	SAMPLE	121038012	B2LXH3		ICP-2008 MS All possible metal
206268	206356	9	SAMPLE	121038011	B2LXH2		ICP-2008 MS All possible metal
206268	206356	10	SAMPLE	121038010	B2LXH1		ICP-2008 MS All possible metal
206268	206356	11	SAMPLE	121038009	B2LXH0		ICP-2008 MS All possible metal
206268	206356	12	MSD	79853	B2LXF9(121038008MSD)	121038008	ICP-2008 MS All possible metal
206268	206356	13	MS	79852	B2LXF9(121038008MS)	121038008	ICP-2008 MS All possible metal
206268	206356	14	SAMPLE	121038008	B2LXF9		ICP-2008 MS All possible metal
206297	206299	1	BLANK	79902	BLANK		Anions by Ion Chromatography (Solid)
206297	206299	2	LCS	79903	LCS		Anions by Ion Chromatography (Solid)
206297	206299	4	MS	79904	B2LXF7(121032005MS)	121032005	Anions by Ion Chromatography (Solid)
206297	206299	5	MSD	79905	B2LXF7(121032005MSD)	121032005	Anions by Ion Chromatography (Solid)
206297	206299	6	DUP	79906	B2LXF7(121032005DUP)	121032005	Anions by Ion Chromatography (Solid)
206297	206299	14	SAMPLE	121038001	B2M011		Anions by Ion Chromatography (Solid)

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121038

Analytical Batch 206301 (QC Batch: 206267) **Test** ICP-2008 MS All possible metal
Associated Samples 121038001, 121038002, 121038003, 121038004, 121038005, 121038006, 121038007

Analyte	CAS #	Original Found	QC Found	Units	% Recov Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #79846**						
Manganese	7439-96-5		<0.10	ug/L				U	08/16/12
Nickel	7440-02-0		<0.10	ug/L				U	08/16/12
Silver	7440-22-4		<0.050	ug/L				U	08/16/12
Antimony	7440-36-0		<0.30	ug/L				U	08/16/12
Barium	7440-39-3		<0.20	ug/L				U	08/16/12
Beryllium	7440-41-7		<0.10	ug/L				U	08/16/12
Cadmium	7440-43-9		<0.050	ug/L				U	08/16/12
Chromium	7440-47-3		<0.10	ug/L				U	08/16/12
Cobalt	7440-48-4		<0.050	ug/L				U	08/16/12
Copper	7440-50-8		<0.10	ug/L				U	08/16/12
Vanadium	7440-62-2		<0.20	ug/L				U	08/16/12
Zinc	7440-66-6		<1.0	ug/L				U	08/16/12
Lead	7439-92-1		<0.050	ug/L				U	08/16/12
Mercury	7439-97-6		<0.050	ug/L				U	08/16/12
Molybdenum	7439-98-7		<0.050	ug/L				U	08/16/12
Strontium	7440-24-6		<0.10	ug/L				UX	08/16/12
Tin	7440-31-5		<0.050	ug/L				U	08/16/12

* - QC result out of range n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121038

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Uranium	7440-61-1		<0.050	ug/L					U	08/16/12
Arsenic	7440-38-2		<0.20	ug/L					U	08/16/12
LCS			**QC Sample #79847**							
Manganese	7439-96-5		221	mg/kg	77.2	75 - 121				08/16/12
Nickel	7440-02-0		48.2	mg/kg	81.6	74 - 122				08/16/12
Silver	7440-22-4		29.6	mg/kg	86.1	83 - 127				08/16/12
Antimony	7440-36-0		104	mg/kg	84.9	62 - 205				08/16/12
Barium	7440-39-3		134	mg/kg	79	78 - 118				08/16/12
Beryllium	7440-41-7		53.5	mg/kg	85.7	77 - 120				08/16/12
Cadmium	7440-43-9		53.2	mg/kg	86.1	76 - 129				08/16/12
Chromium	7440-47-3		55.3	mg/kg	77.6	68 - 119				08/16/12
Cobalt	7440-48-4		87.8	mg/kg	85.2	77 - 122				08/16/12
Copper	7440-50-8		64.5	mg/kg	79.4	67 - 120				08/16/12
Vanadium	7440-62-2		45.6	mg/kg	77	67 - 122				08/16/12
Zinc	7440-66-6		120	mg/kg	84.8	73 - 131				08/16/12
Lead	7439-92-1		76.9	mg/kg	83.2	79 - 124				08/16/12
Mercury	7439-97-6		3.23	mg/kg	85.7	69 - 124				08/16/12
Molybdenum	7439-98-7		37.8	mg/kg	88.8	80 - 125				08/16/12
Strontium	7440-24-6		55.9	mg/kg	77.2	78 - 119			X	08/16/12
Tin	7440-31-5		91.3	mg/kg	85.3	84 - 130				08/16/12
Uranium	7440-61-1		357	mg/kg	87.5	86 - 113				08/16/12
Arsenic	7440-38-2		81.3	mg/kg	87.8	79 - 125				08/16/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121038

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
MS			**QC Sample #79848**							
			Original 121032001							
Manganese	7439-96-5		61.0	mg/kg	60.3	70 - 130			N	08/16/12
Nickel	7440-02-0		75.4	mg/kg	74.6	70 - 130				08/16/12
Silver	7440-22-4		89.3	mg/kg	88.3	70 - 130				08/16/12
Antimony	7440-36-0		81.6	mg/kg	80.7	70 - 130				08/16/12
Barium	7440-39-3		82.9	mg/kg	82	70 - 130				08/16/12
Beryllium	7440-41-7		89.5	mg/kg	88.5	70 - 130				08/16/12
Cadmium	7440-43-9		87.1	mg/kg	86.1	70 - 130				08/16/12
Chromium	7440-47-3		71.8	mg/kg	71	70 - 130				08/16/12
Cobalt	7440-48-4		82.4	mg/kg	81.4	70 - 130				08/16/12
Copper	7440-50-8		77.4	mg/kg	76.5	70 - 130				08/16/12
Vanadium	7440-62-2		75.9	mg/kg	75	70 - 130				08/16/12
Zinc	7440-66-6		83.8	mg/kg	82.9	70 - 130				08/16/12
Lead	7439-92-1		85.5	mg/kg	84.5	70 - 130				08/16/12
Mercury	7439-97-6		8.82	mg/kg	87.2	70 - 130				08/16/12
Molybdenum	7439-98-7		96.1	mg/kg	95	70 - 130				08/16/12
Strontium	7440-24-6		90.1	mg/kg	89.1	70 - 130			X	08/16/12
Tin	7440-31-5		89.3	mg/kg	88.3	70 - 130				08/16/12
Uranium	7440-61-1		87.9	mg/kg	86.9	70 - 130				08/16/12
Arsenic	7440-38-2		89.4	mg/kg	88.4	70 - 130				08/16/12
MSD			**QC Sample #79849**							
			Original 121032001					**Paired 79848**		
Manganese	7439-96-5		124	mg/kg	115.2	70 - 130	17.50	30		08/16/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121038

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Nickel	7440-02-0		83.6	mg/kg	77.8	70 - 130	8.80	30		08/16/12
Silver	7440-22-4		91.3	mg/kg	84.9	70 - 130	2.20	30		08/16/12
Antimony	7440-36-0		82.3	mg/kg	76.6	70 - 130	0.90	30		08/16/12
Barium	7440-39-3		94.2	mg/kg	87.6	70 - 130	8.00	30		08/16/12
Beryllium	7440-41-7		91.7	mg/kg	85.3	70 - 130	2.50	30		08/16/12
Cadmium	7440-43-9		88.9	mg/kg	82.7	70 - 130	2.00	30		08/16/12
Chromium	7440-47-3		75.4	mg/kg	70.1	70 - 130	4.00	30		08/16/12
Cobalt	7440-48-4		86.4	mg/kg	80.3	70 - 130	4.30	30		08/16/12
Copper	7440-50-8		80.1	mg/kg	74.5	70 - 130	2.90	30		08/16/12
Vanadium	7440-62-2		86.3	mg/kg	80.3	70 - 130	7.90	30		08/16/12
Zinc	7440-66-6		89.7	mg/kg	83.5	70 - 130	4.40	30		08/16/12
Lead	7439-92-1		87.1	mg/kg	81	70 - 130	1.80	30		08/16/12
Mercury	7439-97-6		9.03	mg/kg	84	70 - 130	2.40	30		08/16/12
Molybdenum	7439-98-7		98.8	mg/kg	91.9	70 - 130	2.80	30		08/16/12
Strontium	7440-24-6		89.7	mg/kg	83.5	70 - 130	0.30	30	X	08/16/12
Tin	7440-31-5		90.9	mg/kg	84.6	70 - 130	1.70	30		08/16/12
Uranium	7440-61-1		90.7	mg/kg	84.3	70 - 130	3.00	30		08/16/12
Arsenic	7440-38-2		90.7	mg/kg	84.4	70 - 130	1.40	30		08/16/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121038

Analytical Batch 206302 (QC Batch: 206268) **Test** ICP-2008 MS All possible metal
Associated Samples 121038008, 121038009, 121038010, 121038011, 121038012

Analyte	CAS #	Original Found	QC Found	Units	% Recov Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #79850**						
Manganese	7439-96-5		<0.050	ug/L				U	08/15/12
Nickel	7440-02-0		<0.050	ug/L				U	08/15/12
Silver	7440-22-4		<0.025	ug/L				U	08/15/12
Antimony	7440-36-0		<0.15	ug/L				U	08/15/12
Barium	7440-39-3		<0.10	ug/L				U	08/15/12
Beryllium	7440-41-7		<0.050	ug/L				U	08/15/12
Cadmium	7440-43-9		<0.025	ug/L				U	08/15/12
Chromium	7440-47-3		<0.050	ug/L				U	08/15/12
Cobalt	7440-48-4		<0.025	ug/L				U	08/15/12
Copper	7440-50-8		<0.050	ug/L				U	08/15/12
Vanadium	7440-62-2		<0.10	ug/L				U	08/15/12
Zinc	7440-66-6		<0.50	ug/L				U	08/15/12
Lead	7439-92-1		<0.025	ug/L				U	08/15/12
Mercury	7439-97-6		<0.025	ug/L				U	08/15/12
Molybdenum	7439-98-7		<0.025	ug/L				U	08/15/12
Strontium	7440-24-6		<0.050	ug/L				U	08/15/12
Tin	7440-31-5		<0.025	ug/L				U	08/15/12

* - QC result out of range n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121038

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Uranium	7440-61-1		<0.025	ug/L					U	08/15/12
Arsenic	7440-38-2		<0.10	ug/L					U	08/15/12
LCS			**QC Sample #79851**							
Manganese	7439-96-5		235	mg/kg	82.3	75 - 121				08/15/12
Nickel	7440-02-0		51.8	mg/kg	87.7	74 - 122				08/15/12
Silver	7440-22-4		31.6	mg/kg	91.9	83 - 127				08/15/12
Antimony	7440-36-0		112	mg/kg	91.9	62 - 205				08/15/12
Barium	7440-39-3		146	mg/kg	86.4	78 - 118				08/15/12
Beryllium	7440-41-7		59.2	mg/kg	94.8	77 - 120				08/15/12
Cadmium	7440-43-9		56.8	mg/kg	91.9	76 - 129				08/15/12
Chromium	7440-47-3		59.9	mg/kg	84	68 - 119				08/15/12
Cobalt	7440-48-4		92.7	mg/kg	90	77 - 122				08/15/12
Copper	7440-50-8		68.2	mg/kg	84	67 - 120				08/15/12
Vanadium	7440-62-2		49.3	mg/kg	83.2	67 - 122				08/15/12
Zinc	7440-66-6		128	mg/kg	90.6	73 - 131				08/15/12
Lead	7439-92-1		82.4	mg/kg	89.2	79 - 124				08/15/12
Mercury	7439-97-6		3.52	mg/kg	93.3	69 - 124				08/15/12
Molybdenum	7439-98-7		40.4	mg/kg	94.8	80 - 125				08/15/12
Strontium	7440-24-6		59.9	mg/kg	82.7	78 - 119				08/15/12
Tin	7440-31-5		100	mg/kg	93.4	84 - 130				08/15/12
Uranium	7440-61-1		379	mg/kg	91.6	86 - 113				08/15/12
Arsenic	7440-38-2		87.0	mg/kg	93.9	79 - 125				08/15/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121038

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
MS			**QC Sample #79852**							
			Original 121038008							
Manganese	7439-96-5	399	169	mg/kg	163.6	70 - 130			N	08/15/12
Nickel	7440-02-0	7.31	97.0	mg/kg	94.1	70 - 130				08/15/12
Silver	7440-22-4	<0.024	100	mg/kg	97.3	70 - 130				08/15/12
Antimony	7440-36-0	<0.14	97.9	mg/kg	94.9	70 - 130				08/15/12
Barium	7440-39-3	58.8	108	mg/kg	104.3	70 - 130				08/15/12
Beryllium	7440-41-7	0.220	110	mg/kg	106.9	70 - 130				08/15/12
Cadmium	7440-43-9	0.0518	102	mg/kg	99.4	70 - 130				08/15/12
Chromium	7440-47-3	5.37	98.5	mg/kg	95.5	70 - 130				08/15/12
Cobalt	7440-48-4	10.2	98.9	mg/kg	95.9	70 - 130				08/15/12
Copper	7440-50-8	14.0	96.2	mg/kg	93.3	70 - 130				08/15/12
Vanadium	7440-62-2	57.3	101	mg/kg	98	70 - 130				08/15/12
Zinc	7440-66-6	40.5	105	mg/kg	102.3	70 - 130				08/15/12
Lead	7439-92-1	2.45	103	mg/kg	99.6	70 - 130				08/15/12
Mercury	7439-97-6	<0.024	11.0	mg/kg	106.4	70 - 130				08/15/12
Molybdenum	7439-98-7	0.490	111	mg/kg	107.9	70 - 130				08/15/12
Strontium	7440-24-6	20.1	107	mg/kg	103.8	70 - 130				08/15/12
Tin	7440-31-5	0.478	106	mg/kg	103.1	70 - 130				08/15/12
Uranium	7440-61-1	0.386	106	mg/kg	102.3	70 - 130				08/15/12
Arsenic	7440-38-2	1.48	103	mg/kg	99.7	70 - 130				08/15/12
MSD			**QC Sample #79853**							
			Original 121038008					**Paired**	**79852**	
Manganese	7439-96-5	399	222	mg/kg	214.2	70 - 130	9.10	30	N	08/15/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121038

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Nickel	7440-02-0	7.31	104	mg/kg	100	70 - 130	6.30	30		08/15/12
Silver	7440-22-4	<0.024	111	mg/kg	106.8	70 - 130	10.00	30		08/15/12
Antimony	7440-36-0	<0.14	105	mg/kg	100.8	70 - 130	6.70	30		08/15/12
Barium	7440-39-3	58.8	121	mg/kg	116.5	70 - 130	7.80	30		08/15/12
Beryllium	7440-41-7	0.220	119	mg/kg	115	70 - 130	7.90	30		08/15/12
Cadmium	7440-43-9	0.0518	111	mg/kg	107.1	70 - 130	8.10	30		08/15/12
Chromium	7440-47-3	5.37	106	mg/kg	102.1	70 - 130	6.90	30		08/15/12
Cobalt	7440-48-4	10.2	107	mg/kg	103.2	70 - 130	7.20	30		08/15/12
Copper	7440-50-8	14.0	104	mg/kg	100.1	70 - 130	6.70	30		08/15/12
Vanadium	7440-62-2	57.3	110	mg/kg	106.2	70 - 130	5.60	30		08/15/12
Zinc	7440-66-6	40.5	115	mg/kg	111.1	70 - 130	6.60	30		08/15/12
Lead	7439-92-1	2.45	111	mg/kg	107.4	70 - 130	7.90	30		08/15/12
Mercury	7439-97-6	<0.024	11.8	mg/kg	113.4	70 - 130	7.00	30		08/15/12
Molybdenum	7439-98-7	0.490	119	mg/kg	114.9	70 - 130	6.90	30		08/15/12
Strontium	7440-24-6	20.1	119	mg/kg	114.5	70 - 130	8.80	30		08/15/12
Tin	7440-31-5	0.478	114	mg/kg	109.7	70 - 130	6.80	30		08/15/12
Uranium	7440-61-1	0.386	115	mg/kg	110.6	70 - 130	8.40	30		08/15/12
Arsenic	7440-38-2	1.48	112	mg/kg	107.6	70 - 130	8.20	30		08/15/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121038

Analytical Batch 206356 (QC Batch: 206268) **Test** ICP-2008 MS All possible metal
Associated Samples 121038008, 121038009, 121038010, 121038011, 121038012

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #79850**							
Selenium	7782-49-2		<0.50	ug/L					U	08/16/12
LCS			**QC Sample #79851**							
Selenium	7782-49-2		86.8	mg/kg	97	82 - 133				08/16/12
MS			**QC Sample #79852**							
			Original 121038008							
Selenium	7782-49-2	<0.24	99.3	mg/kg	96.3	70 - 130				08/16/12
MSD			**QC Sample #79853**							
			Original 121038008					**Paired 79852**		
Selenium	7782-49-2	<0.24	99.9	mg/kg	96.3	70 - 130	0.70	30		08/16/12

* - QC result out of range n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121038

Analytical Batch 206361 (QC Batch: 206267) **Test** ICP-2008 MS All possible metal
Associated Samples 121038001, 121038002, 121038003, 121038004, 121038005, 121038006, 121038007

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #79846**							
Selenium	7782-49-2		<0.50	ug/L					U	08/16/12
LCS			**QC Sample #79847**							
Selenium	7782-49-2		81.9	mg/kg	91.5	82 - 133				08/16/12
MS			**QC Sample #79848**							
			Original 121032001							
Selenium	7782-49-2		95.1	mg/kg	94	70 - 130				08/16/12
MSD			**QC Sample #79849**							
			Original 121032001					**Paired 79848**		
Selenium	7782-49-2		100	mg/kg	93.3	70 - 130	5.40	30		08/16/12

* - QC result out of range n/a - Not Applicable

Batch QC List

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121091

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
206924	207038	4	BLANK	80733	BLANK		ICP-2008 MS All possible metal
206924	207038	5	LCS	80734	LCS		ICP-2008 MS All possible metal
206924	207038	6	SAMPLE	121091001	B2LXF7		ICP-2008 MS All possible metal
206924	207038	7	MS	80735	B2LXF7(121091001MS)	121091001	ICP-2008 MS All possible metal
206924	207038	8	MSD	80736	B2LXF7(121091001MSD)	121091001	ICP-2008 MS All possible metal
206924	207038	9	SAMPLE	121091002	B2LXD8		ICP-2008 MS All possible metal
206924	207038	10	SAMPLE	121091003	B2LXD9		ICP-2008 MS All possible metal
206924	207043	1	LCS	80734	LCS		ICP-2008 MS All possible metal
206924	207043	2	BLANK	80733	BLANK		ICP-2008 MS All possible metal
206924	207043	8	SAMPLE	121091003	B2LXD9		ICP-2008 MS All possible metal
206924	207043	9	SAMPLE	121091002	B2LXD8		ICP-2008 MS All possible metal
206924	207043	10	MSD	80736	B2LXF7(121091001MSD)	121091001	ICP-2008 MS All possible metal
206924	207043	11	MS	80735	B2LXF7(121091001MS)	121091001	ICP-2008 MS All possible metal
206924	207043	12	SAMPLE	121091001	B2LXF7		ICP-2008 MS All possible metal

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121091

Analytical Batch 207038 (QC Batch: 206924)
Associated Samples 121091001, 121091002, 121091003

Test ICP-2008 MS All possible metal

Analyte	CAS #	Original Found	QC Found	Units	% Recov Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #80733**						
Manganese	7439-96-5		<0.10	ug/L				U	09/05/12
Nickel	7440-02-0		<0.10	ug/L				U	09/05/12
Silver	7440-22-4		<0.050	ug/L				U	09/05/12
Antimony	7440-36-0		<0.30	ug/L				U	09/05/12
Barium	7440-39-3		<0.20	ug/L				U	09/05/12
Beryllium	7440-41-7		<0.10	ug/L				U	09/05/12
Cadmium	7440-43-9		<0.050	ug/L				U	09/05/12
Chromium	7440-47-3		<0.10	ug/L				U	09/05/12
Cobalt	7440-48-4		<0.050	ug/L				U	09/05/12
Copper	7440-50-8		<0.10	ug/L				U	09/05/12
Vanadium	7440-62-2		<0.20	ug/L				U	09/05/12
Zinc	7440-66-6		<1.0	ug/L				U	09/05/12
Lead	7439-92-1		<0.050	ug/L				U	09/05/12
Mercury	7439-97-6		<0.050	ug/L				U	09/05/12
Molybdenum	7439-98-7		<0.050	ug/L				U	09/05/12
Strontium	7440-24-6		<0.10	ug/L				U	09/05/12
Thallium	7440-28-0		<0.050	ug/L				U	09/05/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121091

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Tin	7440-31-5		<0.050	ug/L					U	09/05/12
Uranium	7440-61-1		<0.050	ug/L					U	09/05/12
Arsenic	7440-38-2		<0.20	ug/L					U	09/05/12
LCS			**QC Sample #80734**							
Manganese	7439-96-5		243	mg/kg	84.8	75 - 121				09/05/12
Nickel	7440-02-0		52.0	mg/kg	88.1	74 - 122				09/05/12
Silver	7440-22-4		35.3	mg/kg	102.7	83 - 127				09/05/12
Antimony	7440-36-0		152	mg/kg	124.3	62 - 205				09/05/12
Barium	7440-39-3		158	mg/kg	93.5	78 - 118				09/05/12
Beryllium	7440-41-7		48.7	mg/kg	78.1	77 - 120				09/05/12
Cadmium	7440-43-9		58.0	mg/kg	93.8	76 - 129				09/05/12
Chromium	7440-47-3		64.5	mg/kg	90.4	68 - 119				09/05/12
Cobalt	7440-48-4		91.8	mg/kg	89.1	77 - 122				09/05/12
Copper	7440-50-8		67.6	mg/kg	83.2	67 - 120				09/05/12
Vanadium	7440-62-2		51.1	mg/kg	86.3	67 - 122				09/05/12
Zinc	7440-66-6		124	mg/kg	87.7	73 - 131				09/05/12
Lead	7439-92-1		87.7	mg/kg	94.9	79 - 124				09/05/12
Mercury	7439-97-6		4.11	mg/kg	109	69 - 124				09/05/12
Molybdenum	7439-98-7		43.8	mg/kg	102.9	80 - 125				09/05/12
Strontium	7440-24-6		62.4	mg/kg	86.3	78 - 119				09/05/12
Thallium	7440-28-0		119	mg/kg	96.5	52 - 137				09/05/12
Tin	7440-31-5		109	mg/kg	102.3	84 - 130				09/05/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121091

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Uranium	7440-61-1		411	mg/kg	97.1	86 - 113				09/05/12
Arsenic	7440-38-2		89.9	mg/kg	97.1	79 - 125				09/05/12
MS			**QC Sample #80735**							
			Original 121091001							
Manganese	7439-96-5	0.342	50.2	mg/kg	95.6	70 - 130				09/05/12
Nickel	7440-02-0	0.0686	50.1	mg/kg	95.4	70 - 130				09/05/12
Silver	7440-22-4	<0.023	52.6	mg/kg	100.1	70 - 130				09/05/12
Antimony	7440-36-0	<0.14	51.9	mg/kg	98.8	70 - 130				09/05/12
Barium	7440-39-3	0.381	50.9	mg/kg	96.9	70 - 130				09/05/12
Beryllium	7440-41-7	<0.046	51.8	mg/kg	98.7	70 - 130				09/05/12
Cadmium	7440-43-9	<0.023	50.6	mg/kg	96.4	70 - 130				09/05/12
Chromium	7440-47-3	0.117	50.7	mg/kg	96.6	70 - 130				09/05/12
Cobalt	7440-48-4	<0.023	51.1	mg/kg	97.2	70 - 130				09/05/12
Copper	7440-50-8	0.459	49.8	mg/kg	94.8	70 - 130				09/05/12
Vanadium	7440-62-2	0.204	50.8	mg/kg	96.8	70 - 130				09/05/12
Zinc	7440-66-6	<0.46	50.8	mg/kg	96.7	70 - 130				09/05/12
Lead	7439-92-1	0.0792	50.0	mg/kg	95.2	70 - 130				09/05/12
Mercury	7439-97-6	<0.023	1.03	mg/kg	98.5	70 - 130				09/05/12
Molybdenum	7439-98-7	0.0490	54.5	mg/kg	103.8	70 - 130				09/05/12
Strontium	7440-24-6	0.468	50.8	mg/kg	96.6	70 - 130				09/05/12
Thallium	7440-28-0	0.0554	50.8	mg/kg	96.7	70 - 130				09/05/12
Tin	7440-31-5	<0.023	52.2	mg/kg	99.3	70 - 130				09/05/12
Uranium	7440-61-1	0.0385	50.9	mg/kg	97	70 - 130				09/05/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121091

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Arsenic	7440-38-2	0.134	49.5	mg/kg	94.2	70 - 130				09/05/12
MSD			**QC Sample #80736**							
			Original 121091001						**Paired 80735**	
Manganese	7439-96-5	0.342	52.7	mg/kg	102.4	70 - 130	4.70	30		09/05/12
Nickel	7440-02-0	0.0686	52.2	mg/kg	101.6	70 - 130	4.10	30		09/05/12
Silver	7440-22-4	<0.023	54.4	mg/kg	105.7	70 - 130	3.30	30		09/05/12
Antimony	7440-36-0	<0.14	54.6	mg/kg	106.2	70 - 130	5.10	30		09/05/12
Barium	7440-39-3	0.381	52.5	mg/kg	102.2	70 - 130	3.20	30		09/05/12
Beryllium	7440-41-7	<0.046	52.5	mg/kg	102.1	70 - 130	1.30	30		09/05/12
Cadmium	7440-43-9	<0.023	52.2	mg/kg	101.5	70 - 130	3.10	30		09/05/12
Chromium	7440-47-3	0.117	52.7	mg/kg	102.5	70 - 130	3.80	30		09/05/12
Cobalt	7440-48-4	<0.023	52.6	mg/kg	102.4	70 - 130	3.00	30		09/05/12
Copper	7440-50-8	0.459	51.5	mg/kg	100.2	70 - 130	3.40	30		09/05/12
Vanadium	7440-62-2	0.204	52.6	mg/kg	102.3	70 - 130	3.40	30		09/05/12
Zinc	7440-66-6	<0.46	52.1	mg/kg	101.4	70 - 130	2.60	30		09/05/12
Lead	7439-92-1	0.0792	51.5	mg/kg	100	70 - 130	2.90	30		09/05/12
Mercury	7439-97-6	<0.023	0.921	mg/kg	89.5	70 - 130	11.70	30		09/05/12
Molybdenum	7439-98-7	0.0490	57.1	mg/kg	111.1	70 - 130	4.70	30		09/05/12
Strontium	7440-24-6	0.468	52.4	mg/kg	101.8	70 - 130	3.10	30		09/05/12
Thallium	7440-28-0	0.0554	52.7	mg/kg	102.4	70 - 130	3.60	30		09/05/12
Tin	7440-31-5	<0.023	54.9	mg/kg	106.7	70 - 130	5.00	30		09/05/12
Uranium	7440-61-1	0.0385	53.0	mg/kg	103.1	70 - 130	4.00	30		09/05/12
Arsenic	7440-38-2	0.134	51.1	mg/kg	99.4	70 - 130	3.20	30		09/05/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121091

Analytical Batch 207043 (QC Batch: 206924)
Associated Samples 121091001, 121091002, 121091003

Test ICP-2008 MS All possible metal

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #80733**							
Selenium	7782-49-2		<1.0	ug/L					U	09/05/12
LCS			**QC Sample #80734**							
Selenium	7782-49-2		83.8	mg/kg	93.6	82 - 133				09/05/12
MS			**QC Sample #80735**							
			Original 121091001							
Selenium	7782-49-2	<0.23	47.9	mg/kg	91.3	70 - 130				09/05/12
MSD			**QC Sample #80736**							
			Original 121091001					**Paired**	**80735**	
Selenium	7782-49-2	<0.23	49.9	mg/kg	97.1	70 - 130	4.10	30		09/05/12

* - QC result out of range

n/a - Not Applicable

Date: 20 September 2012
To: CH2M Hill (technical representative)
From: Analytical Quality Associates, Inc.
Project: 100 K
Subject: General Chemistry - Sample Data Groups (SDGs) WSCF121032 and WSCF121038

INTRODUCTION

This memorandum presents the results of data validation for SDGs WSCF121032 and WSCF121038 prepared by WSCF Analytical Laboratories. A list of samples validated along with the analytical methods is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analytical Methods
B2LXF0	08/13/12	Soil	C	7196 (Cr^{+6}) & 300.0
B2LXF1	08/13/12	Soil	C	7196 (Cr^{+6}) & 300.0
B2LXF2	08/13/12	Soil	C	7196 (Cr^{+6}) & 300.0
B2LXF6	08/13/12	Soil	C	7196 (Cr^{+6}) & 300.0
B2LXF7	08/13/12	Soil	C	7196 (Cr^{+6}) & 300.0
B2LXD8	08/13/12	Soil	C	7196 (Cr^{+6}) & 300.0
B2LXD9	08/13/12	Soil	C	7196 (Cr^{+6}) & 300.0
B2M011	08/14/12	Soil	C	7196 (Cr^{+6}) & 300.0
B2M012	08/14/12	Soil	C	7196 (Cr^{+6}) & 300.0
B2M013	08/14/12	Soil	C	7196 (Cr^{+6}) & 300.0
B2LXF3	08/14/12	Soil	C	7196 (Cr^{+6}) & 300.0
B2LXF4	08/14/12	Soil	C	7196 (Cr^{+6}) & 300.0
B2LXF5	08/14/12	Soil	C	7196 (Cr^{+6}) & 300.0
B2LXF8	08/14/12	Soil	C	7196 (Cr^{+6}) & 300.0
B2LXF9	0814/12	Soil	C	7196 (Cr^{+6}) & 300.0
B2LXH0	08/14/12	Soil	C	7196 (Cr^{+6}) & 300.0
B2LXH1	08/14/12	Soil	C	7196 (Cr^{+6}) & 300.0
B2LXH2	08/14/12	Soil	C	7196 (Cr^{+6}) & 300.0
B2LXH3	08/14/12	Soil	C	7196 (Cr^{+6}) & 300.0

Data validation was conducted in accordance with the CHPRC validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev. 5 (SAP). Appendices 1 through 4 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers
Appendix 2. Summary of Data Qualification
Appendix 3. Data Validation Supporting Documentation
Appendix 4. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

- **Holding Times and Sample Preservation**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The holding time requirements are as follows:

- Chloride and sulfate – analysis within 28 days of sample collection
- Nitrate – extraction within 28 days of sample collection and analysis within 48 hours of extraction
- Hexavalent chromium – extraction within 30 days of sample collection and analysis within 24 hours of extraction

Sample preservation requires chilling to 4 degrees Celsius.

The samples were extracted and analyzed within the prescribed holding times and properly preserved.

- **Blanks**

The blank data results are reviewed to assess the extent of contamination introduced through sampling, sample preparation, and analysis.

Laboratory Blanks

All laboratory blank results were acceptable.

Trip Blanks

No trip blanks were submitted for validation.

Field Blanks

No field blanks were submitted for validation.

Equipment Blanks

All equipment blank results were acceptable.

- **Accuracy**

Accuracy is evaluated by reviewing matrix spike sample results and laboratory control sample results. According to the SAP, the matrix spike and laboratory control sample accuracy limits are 70% to 130%. The limits for reported analytes not listed in the SAP are specified by the DV procedure.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All MS/MSD recoveries were acceptable.

Laboratory Control Samples (LCSs)

All LCS recoveries were acceptable.

- **Precision**

Precision is evaluated by reviewing MS/MSD results, laboratory duplicate sample results, field duplicate sample results, and field split sample results. These QC results provide information on the laboratory reproducibility and whether sampling activities are adequate to acquire consistent sample results. According to the SAP, the relative percent difference (RPD) limits are ±30%. The RPD limits for reported analytes not listed in the SAP are specified by the DV procedure. When duplicate RPDs exceed the limits and have associated results <5X the reporting limits with difference <2X the required detection limits no precision infraction occurred

MS/MSD Samples

All MS/MSD RPD values were acceptable.

Laboratory Duplicate Samples

All laboratory duplicate results were acceptable.

Field Duplicate Samples

All field duplicate results were acceptable.

Field Split Samples

No field splits were submitted for validation.

- **Detection Limits**

Reported MDLs are compared against the contractually required detection limits (CRDLs) to ensure that laboratory detection limits meet the required criteria.

All reported sample MDLs were below the CRDLs with the following exception. The sulfate MDLs for all samples were slightly greater than the CRDL.

CRDLs for chloride and nitrate were not provided in the SAP.

- **Completeness**

SDGs WSCF121032 and WSCF121038 were submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

It should also be noted that page two of COC F12-037-017 did not list collector name.

REFERENCES

GRP-GD-003, Rev. 0, Change 0, *Data Validation for Chemical Analyses*, August 2010.

DOE/RL-96-22, Rev. 5, *100 Area Remedial Action Sampling and Analysis Plan*, September 2009.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers that may be applied by data validators in compliance with the CHPRC statement of work are as follows:

- **U** — The constituent was analyzed for, but was not detected. The data should be considered usable for decision-making purposes.

- **UJ** — The constituent was analyzed for and was not detected. Due to a quality control deficiency identified during data validation the value reported may not accurately reflect the RL. The data should be considered usable for decision-making purposes.

- **J** — Indicates the constituent was analyzed for and detected. The associated value is estimated due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J+** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **J-** — Indicates the constituent was analyzed for and detected. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation. The data should be considered usable for decision-making purposes.

- **N** — The analysis indicates the presence of an analyte that has been tentatively identified.

- **NJ** — The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

- **NJ+** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected positive bias due to a quality control deficiency identified during data validation.

- **NJ-** — The analysis indicates the presence of an analyte that has been tentatively identified. The associated value is estimated with a suspected negative bias due to a quality control deficiency identified during data validation.

- **UR** — Indicates the constituent was analyzed for and not detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

- **R** — Indicates the constituent was analyzed for and detected; however, due to an identified quality control deficiency the data should be considered unusable for decision-making purposes.

Appendix 2

Summary of Data Qualification

General Chemistry Data Qualification Summary			
SDG: WSCF121032, WSCF121038	Reviewer: AQA	Project: 100 K	Page 1 of 1
Analyte(s)	**Qualifier**	**Samples Affected**	**Reason**
Cr^{+6}, Anions	None	N/A	N/A

Comments: None

Appendix 3

Data Validation Supporting Documentation

Data Validation for Chemical Analyses

Published Date: 08/16/10 Effective Date: 08/16/10

VALIDATION LEVEL:	A	B	(C)	D	E
PROJECT: 100 K			DATA PACKAGE: VSR12-027		
VALIDATOR: Eyda Hergenreder		LAB: WSCF		DATE: 09-20-2012	
			SDG: WSCF121032, WSCF121038		
ANALYSES PERFORMED					
Anions/IC X	TOC	TOX	TPH-418.1	Oil and Grease	Alkalinity
Ammonia	BOD/COD	Chloride	Chromium-VI X	pH	NO_3/NO_2
Sulfate	TDS	TKN	Phosphate	Cyanide	

SAMPLES/MATRIX Soil samples

SDG WSCF121032: B2LXF0, B2LXF1, B2LXF2, F2LXF6, B2LXF7, B2LXD8, B2LXD9

SDG WSCF121038: B2M011, B2M012, B2M013, B2LXF3, B2LXF4, B2LXF5, B2LXF8, B2LXF9, B2LXH0, B2LXH1, B2LXH2, B2LXH3

1. DATA PACKAGE COMPLETENESS AND CASE NARRATIVE

Technical verification documentation present?.....(Yes) No N/A

Comments: None

2. INSTRUMENT PERFORMANCE AND CALIBRATIONS (Levels D and E)

Initial calibrations performed on all instruments? ..... Yes No N/A

Initial calibrations acceptable? ..... Yes No N/A

ICV and CCV checks performed on all instruments? ..... Yes No N/A

ICV and CCV checks acceptable? ..... Yes No N/A

Standards traceable? ..... Yes No N/A

Standards expired? ..... Yes No N/A

Calculation check acceptable? ..... Yes No N/A

Comments:

3. BLANKS (Levels B, C, D, and E)

ICB and CCB checks performed for all applicable analyses? (Levels D, E) ..... Yes No N/A

ICB and CCB results acceptable? (Levels D, E) ..... Yes No N/A

Laboratory blanks analyzed? ..... (Yes) No N/A

Laboratory blank results acceptable? ..... (Yes) No N/A

Field blanks analyzed? (Levels C, D, E) ..... (Yes) No N/A

Field blank results acceptable? (Levels C, D, E) ..... (Yes) No N/A

Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)

Comments: None

4. ACCURACY (Levels C, D, and E)

Spike samples analyzed?	(Yes)	No	N/A
Spike recoveries acceptable?	(Yes)	No	N/A
Spike standards NIST traceable? (Levels D, E)	Yes	No	(N/A)
Spike standards expired? (Levels D, E)	Yes	No	(N/A)
LCS/BSS samples analyzed?	(Yes)	No	N/A
LCS/BSS results acceptable?	(Yes)	No	N/A
Standards traceable? (Levels D, E)	Yes	No	(N/A)
Standards expired? (Levels D, E)	Yes	No	(N/A)
Transcription/calculation errors? (Levels D, E)	Yes	No	(N/A)
Performance audit sample(s) analyzed?	Yes	No	(N/A)
Performance audit sample results acceptable?	Yes	No	(N/A)

Comments: None

5. PRECISION (Levels C, D, and E)

Duplicate RPD values acceptable? ..... (Yes) No N/A

Duplicate results acceptable? ..... (Yes) No N/A

MS/MSD standards NIST traceable? (Levels D, E) ..... Yes No (N/A)

MS/MSD standards expired? (Levels D, E) ..... Yes No (N/A)

Field duplicate RPD values acceptable? ..... (Yes) No N/A

Field split RPD values acceptable? ..... Yes No (N/A)

Transcription/calculation errors? (Levels D, E) ..... Yes No (N/A)

Comments: None

6. HOLDING TIMES (all levels)

Samples properly preserved? ..... (Yes) No N/A

Sample holding times acceptable? ..... (Yes) No N/A

Comments: None

7. RESULT QUANTITATION AND DETECTION LIMITS (all levels)

Results reported for all requested analyses?..... (Yes) No N/A

Results supported in the raw data? (Levels D, E) ..... Yes No (N/A)

Samples properly prepared? (Levels D, E)..... Yes No (N/A)

Detection limits meet RDL?..... Yes (No) N/A

Transcription/calculation errors? (Levels D, E)..... Yes No (N/A)

Comments:

All sulfate MDLs > CRDL

Comments (attach additional sheets as necessary):

More

Appendix 4

Additional Documentation Requested By Client

Batch QC List

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121032

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
206267	206301	4	BLANK	79846	BLANK		ICP-2008 MS All possible metal
206267	206301	5	LCS	79847	LCS		ICP-2008 MS All possible metal
206267	206301	6	SAMPLE	121032001	B2LXF0		ICP-2008 MS All possible metal
206267	206301	7	MS	79848	B2LXF0(121032001MS)	121032001	ICP-2008 MS All possible metal
206267	206301	8	MSD	79849	B2LXF0(121032001MSD)	121032001	ICP-2008 MS All possible metal
206267	206301	9	SAMPLE	121032002	B2LXF1		ICP-2008 MS All possible metal
206267	206301	10	SAMPLE	121032003	B2LXF2		ICP-2008 MS All possible metal
206267	206301	11	SAMPLE	121032004	B2LXF6		ICP-2008 MS All possible metal
206267	206301	12	SAMPLE	121032005	B2LXF7		ICP-2008 MS All possible metal
206267	206301	13	SAMPLE	121032006	B2LXD8		ICP-2008 MS All possible metal
206267	206301	14	SAMPLE	121032007	B2LXD9		ICP-2008 MS All possible metal
206267	206361	1	LCS	79847	LCS		ICP-2008 MS All possible metal
206267	206361	2	BLANK	79846	BLANK		ICP-2008 MS All possible metal
206267	206361	13	MSD	79849	B2LXF0(121032001MSD)	121032001	ICP-2008 MS All possible metal
206267	206361	14	MS	79848	B2LXF0(121032001MS)	121032001	ICP-2008 MS All possible metal
206267	206361	15	SAMPLE	121032007	B2LXD9		ICP-2008 MS All possible metal
206267	206361	16	SAMPLE	121032006	B2LXD8		ICP-2008 MS All possible metal
206267	206361	17	SAMPLE	121032005	B2LXF7		ICP-2008 MS All possible metal
206267	206361	18	SAMPLE	121032004	B2LXF6		ICP-2008 MS All possible metal
206267	206361	19	SAMPLE	121032003	B2LXF2		ICP-2008 MS All possible metal
206267	206361	20	SAMPLE	121032002	B2LXF1		ICP-2008 MS All possible metal
206267	206361	21	SAMPLE	121032001	B2LXF0		ICP-2008 MS All possible metal
206297	206299	1	BLANK	79902	BLANK		Anions by Ion Chromatography (Solid)

Batch QC List

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121032

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
206297	206299	2	LCS	79903	LCS		Anions by Ion Chromatography (Solid)
206297	206299	4	MS	79904	B2LXF7(121032005MS)	121032005	Anions by Ion Chromatography (Solid)
206297	206299	5	MSD	79905	B2LXF7(121032005MSD)	121032005	Anions by Ion Chromatography (Solid)
206297	206299	6	DUP	79906	B2LXF7(121032005DUP)	121032005	Anions by Ion Chromatography (Solid)
206297	206299	7	SAMPLE	121032001	B2LXF0		Anions by Ion Chromatography (Solid)
206297	206299	8	SAMPLE	121032002	B2LXF1		Anions by Ion Chromatography (Solid)
206297	206299	9	SAMPLE	121032003	B2LXF2		Anions by Ion Chromatography (Solid)
206297	206299	10	SAMPLE	121032004	B2LXF6		Anions by Ion Chromatography (Solid)
206297	206299	11	SAMPLE	121032005	B2LXF7		Anions by Ion Chromatography (Solid)
206297	206299	12	SAMPLE	121032006	B2LXD8		Anions by Ion Chromatography (Solid)
206297	206299	13	SAMPLE	121032007	B2LXD9		Anions by Ion Chromatography (Solid)
206406	206407	1	BLANK	80121	BLANK		Hexavalent chromium
206406	206407	4	LCS	80122	LCS		Hexavalent chromium
206406	206407	5	DUP	80123	B2LXF0(121032001DUP)	121032001	Hexavalent chromium
206406	206407	6	MS	80124	B2LXF0(121032001MS)	121032001	Hexavalent chromium
206406	206407	7	PSTSPK	80125	PSTSPK		Hexavalent chromium
206406	206407	8	IMS	80126	B2LXF0(121032001IMS)	121032001	Hexavalent chromium
206406	206407	9	SAMPLE	121032001	B2LXF0		Hexavalent chromium
206406	206407	10	SAMPLE	121032002	B2LXF1		Hexavalent chromium
206406	206407	11	SAMPLE	121032003	B2LXF2		Hexavalent chromium
206406	206407	12	SAMPLE	121032004	B2LXF6		Hexavalent chromium
206406	206407	13	SAMPLE	121032005	B2LXF7		Hexavalent chromium
206406	206407	14	SAMPLE	121032006	B2LXD8		Hexavalent chromium

Batch QC List

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121032

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
206406	206407	15	SAMPLE	121032007	B2LXD9		Hexavalent chromium

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121032

Analytical Batch 206299 (QC Batch: 206297) **Test** Anions by Ion Chromatography (Solid)
Associated Samples 121032001, 121032002, 121032003, 121032004, 121032005, 121032006, 121032007

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #79902**							
Chloride	16887-00-6		<0.058	ug/mL					U	08/15/12
Nitrate-N	NO3-N		<0.019	ug/mL					U	08/15/12
Sulfate	14808-79-8		<0.11	ug/mL					U	08/15/12
LCS			**QC Sample #79903**							
Chloride	16887-00-6		1.84	ug/mL	92.8	90 - 110				08/15/12
Nitrate-N	NO3-N		0.880	ug/mL	99.4	90 - 110				08/15/12
Sulfate	14808-79-8		3.66	ug/mL	93.4	90 - 110				08/15/12
MS			**QC Sample #79904**							
			Original 121032005							
Chloride	16887-00-6	<2.9	40.8	mg/kg	82.3	80 - 120				08/15/12
Nitrate-N	NO3-N	<0.93	19.7	mg/kg	89.1	80 - 120				08/15/12
Sulfate	14808-79-8	<5.5	84.6	mg/kg	86.2	80 - 120				08/15/12
MSD			**QC Sample #79905**							
			Original 121032005						**Paired 79904**	
Chloride	16887-00-6	<2.9	40.5	mg/kg	81.1	80 - 120	0.70	30		08/15/12
Nitrate-N	NO3-N	<0.93	19.8	mg/kg	89	80 - 120	0.60	30		08/15/12
Sulfate	14808-79-8	<5.5	86.0	mg/kg	87.1	80 - 120	1.70	30		08/15/12

* - QC result out of range n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121032

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
DUP			**QC Sample #79906**							
			Original 121032005							
Chloride	16887-00-6	<2.9	<2.8	mg/kg			6.90	30	U	08/15/12
Nitrate-N	NO3-N	<0.93	<0.91	mg/kg			25.80	30	U	08/15/12
Sulfate	14808-79-8	<5.5	<5.4	mg/kg			0.00	30	U	08/15/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121032

Analytical Batch 206407 (QC Batch: 206406) **Test** Hexavalent chromium
Associated Samples 121032001, 121032002, 121032003, 121032004, 121032005, 121032006, 121032007

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #80121**							
Hexavalent chromium	18540-29-9		<0.098	ug/g					U	08/14/12
LCS			**QC Sample #80122**							
Hexavalent chromium	18540-29-9		3.82	ug/g	98.1	80 - 120				08/14/12
DUP			**QC Sample #80123**							
			Original 121032001							
Hexavalent chromium	18540-29-9	<0.098	<0.099	ug/g			24.40	30	U	08/14/12
MS			**QC Sample #80124**							
			Original 121032001							
Hexavalent chromium	18540-29-9	<0.098	3.26	ug/g	83.2	75 - 125				08/14/12
PSTSPK			**QC Sample #80125**							
Hexavalent chromium	18540-29-9		0.0779	ug/g	103.9	85 - 115				08/14/12
IMS			**QC Sample #80126**							
			Original 121032001							
Hexavalent chromium	18540-29-9	<0.098	369	ug/g	88.3	75 - 125				08/14/12

* - QC result out of range n/a - Not Applicable

Batch QC List

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121038

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
206268	206302	5	LCS	79851	LCS		ICP-2008 MS All possible metal
206268	206302	6	SAMPLE	121038008	B2LXF9		ICP-2008 MS All possible metal
206268	206302	7	MS	79852	B2LXF9(121038008MS)	121038008	ICP-2008 MS All possible metal
206268	206302	8	MSD	79853	B2LXF9(121038008MSD)	121038008	ICP-2008 MS All possible metal
206268	206302	9	SAMPLE	121038009	B2LXH0		ICP-2008 MS All possible metal
206268	206302	10	SAMPLE	121038010	B2LXH1		ICP-2008 MS All possible metal
206268	206302	11	SAMPLE	121038011	B2LXH2		ICP-2008 MS All possible metal
206268	206302	12	SAMPLE	121038012	B2LXH3		ICP-2008 MS All possible metal
206268	206356	1	LCS	79851	LCS		ICP-2008 MS All possible metal
206268	206356	2	BLANK	79850	BLANK		ICP-2008 MS All possible metal
206268	206356	8	SAMPLE	121038012	B2LXH3		ICP-2008 MS All possible metal
206268	206356	9	SAMPLE	121038011	B2LXH2		ICP-2008 MS All possible metal
206268	206356	10	SAMPLE	121038010	B2LXH1		ICP-2008 MS All possible metal
206268	206356	11	SAMPLE	121038009	B2LXH0		ICP-2008 MS All possible metal
206268	206356	12	MSD	79853	B2LXF9(121038008MSD)	121038008	ICP-2008 MS All possible metal
206268	206356	13	MS	79852	B2LXF9(121038008MS)	121038008	ICP-2008 MS All possible metal
206268	206356	14	SAMPLE	121038008	B2LXF9		ICP-2008 MS All possible metal
206297	206299	1	BLANK	79902	BLANK		Anions by Ion Chromatography (Solid)
206297	206299	2	LCS	79903	LCS		Anions by Ion Chromatography (Solid)
206297	206299	4	MS	79904	B2LXF7(121032005MS)	121032005	Anions by Ion Chromatography (Solid)
206297	206299	5	MSD	79905	B2LXF7(121032005MSD)	121032005	Anions by Ion Chromatography (Solid)
206297	206299	6	DUP	79906	B2LXF7(121032005DUP)	121032005	Anions by Ion Chromatography (Solid)
206297	206299	14	SAMPLE	121038001	B2M011		Anions by Ion Chromatography (Solid)

Batch QC List

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Group # WSCF121038

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
206297	206299	15	SAMPLE	121038002	B2M012		Anions by Ion Chromatography (Solid)
206297	206299	16	SAMPLE	121038003	B2M013		Anions by Ion Chromatography (Solid)
206298	206300	1	BLANK	79907	BLANK		Anions by Ion Chromatography (Solid)
206298	206300	2	LCS	79908	LCS		Anions by Ion Chromatography (Solid)
206298	206300	4	MS	79909	B2LXH1(121038010MS)	121038010	Anions by Ion Chromatography (Solid)
206298	206300	5	MSD	79910	B2LXH1(121038010MSD)	121038010	Anions by Ion Chromatography (Solid)
206298	206300	6	DUP	79911	B2LXH1(121038010DUP)	121038010	Anions by Ion Chromatography (Solid)
206298	206300	7	SAMPLE	121038004	B2LXF3		Anions by Ion Chromatography (Solid)
206298	206300	8	SAMPLE	121038005	B2LXF4		Anions by Ion Chromatography (Solid)
206298	206300	9	SAMPLE	121038006	B2LXF5		Anions by Ion Chromatography (Solid)
206298	206300	10	SAMPLE	121038007	B2LXF8		Anions by Ion Chromatography (Solid)
206298	206300	11	SAMPLE	121038008	B2LXF9		Anions by Ion Chromatography (Solid)
206298	206300	12	SAMPLE	121038009	B2LXH0		Anions by Ion Chromatography (Solid)
206298	206300	13	SAMPLE	121038010	B2LXH1		Anions by Ion Chromatography (Solid)
206298	206300	14	SAMPLE	121038011	B2LXH2		Anions by Ion Chromatography (Solid)
206298	206300	15	SAMPLE	121038012	B2LXH3		Anions by Ion Chromatography (Solid)
206638	206643	3	BLANK	80377	BLANK		Hexavalent chromium
206638	206643	4	LCS	80378	LCS		Hexavalent chromium
206638	206643	5	DUP	80379	B2M011(121038001DUP)	121038001	Hexavalent chromium
206638	206643	6	MS	80380	B2M011(121038001MS)	121038001	Hexavalent chromium
206638	206643	7	PSTSPK	80381	PSTSPK		Hexavalent chromium
206638	206643	8	IMS	80382	B2M011(121038001IMS)	121038001	Hexavalent chromium
206638	206643	9	SAMPLE	121038001	B2M011		Hexavalent chromium

Batch QC List

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Group # WSCF121038

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
206638	206643	10	SAMPLE	121038002	B2M012		Hexavalent chromium
206638	206643	11	SAMPLE	121038003	B2M013		Hexavalent chromium
206638	206643	12	SAMPLE	121038004	B2LXF3		Hexavalent chromium
206638	206643	13	SAMPLE	121038005	B2LXF4		Hexavalent chromium
206638	206643	14	SAMPLE	121038006	B2LXF5		Hexavalent chromium
206638	206643	15	SAMPLE	121038007	B2LXF8		Hexavalent chromium
206638	206643	16	SAMPLE	121038008	B2LXF9		Hexavalent chromium
206638	206643	17	SAMPLE	121038009	B2LXH0		Hexavalent chromium
206638	206643	18	SAMPLE	121038010	B2LXH1		Hexavalent chromium
206638	206643	20	SAMPLE	121038011	B2LXH2		Hexavalent chromium
206638	206643	21	SAMPLE	121038012	B2LXH3		Hexavalent chromium

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121038

Analytical Batch 206299 (QC Batch: 206297)
Associated Samples 121038001, 121038002, 121038003

Test Anions by Ion Chromatography (Solid)

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #79902**							
Chloride	16887-00-6		<0.058	ug/mL					U	08/15/12
Nitrate-N	NO3-N		<0.019	ug/mL					U	08/15/12
Sulfate	14808-79-8		<0.11	ug/mL					U	08/15/12
LCS			**QC Sample #79903**							
Chloride	16887-00-6		1.84	ug/mL	92.8	90 - 110				08/15/12
Nitrate-N	NO3-N		0.880	ug/mL	99.4	90 - 110				08/15/12
Sulfate	14808-79-8		3.66	ug/mL	93.4	90 - 110				08/15/12
MS			**QC Sample #79904**							
			Original 121032005							
Chloride	16887-00-6		40.8	mg/kg	82.3	80 - 120				08/15/12
Nitrate-N	NO3-N		19.7	mg/kg	89.1	80 - 120				08/15/12
Sulfate	14808-79-8		84.6	mg/kg	86.2	80 - 120				08/15/12
MSD			**QC Sample #79905**							
			Original 121032005						**Paired 79904**	
Chloride	16887-00-6		40.5	mg/kg	81.1	80 - 120	0.70	30		08/15/12
Nitrate-N	NO3-N		19.8	mg/kg	89	80 - 120	0.60	30		08/15/12
Sulfate	14808-79-8		86.0	mg/kg	87.1	80 - 120	1.70	30		08/15/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

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Department Inorganic

Group # WSCF121038

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
DUP			**QC Sample #79906**							
			Original 121032005							
Chloride	16887-00-6		<2.8	mg/kg			6.90	30	U	08/15/12
Nitrate-N	NO3-N		<0.91	mg/kg			25.80	30	U	08/15/12
Sulfate	14808-79-8		<5.4	mg/kg			0.00	30	U	08/15/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121038

Analytical Batch 206300 (QC Batch: 206298) **Test** Anions by Ion Chromatography (Solid)
Associated Samples 121038004, 121038005, 121038006, 121038007, 121038008, 121038009, 121038010, 121038011, 121038012

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #79907**							
Chloride	16887-00-6		<0.058	ug/mL					U	08/15/12
Nitrate-N	NO3-N		<0.019	ug/mL					U	08/15/12
Sulfate	14808-79-8		<0.11	ug/mL					U	08/15/12
LCS			**QC Sample #79908**							
Chloride	16887-00-6		1.84	ug/mL	92.8	90 - 110				08/15/12
Nitrate-N	NO3-N		0.877	ug/mL	99.1	90 - 110				08/15/12
Sulfate	14808-79-8		3.66	ug/mL	93.3	90 - 110				08/15/12
MS			**QC Sample #79909**							
			Original 121038010							
Chloride	16887-00-6	31.5	43.0	mg/kg	88.1	80 - 120				08/15/12
Nitrate-N	NO3-N	<0.93	19.5	mg/kg	89.4	80 - 120				08/15/12
Sulfate	14808-79-8	<5.5	81.3	mg/kg	84	80 - 120				08/15/12
MSD			**QC Sample #79910**							
			Original 121038010						**Paired 79909**	
Chloride	16887-00-6	31.5	41.1	mg/kg	84.3	80 - 120	2.70	30		08/15/12
Nitrate-N	NO3-N	<0.93	19.4	mg/kg	88.9	80 - 120	0.80	30		08/15/12
Sulfate	14808-79-8	<5.5	80.8	mg/kg	83.8	80 - 120	0.50	30		08/15/12

* - QC result out of range n/a - Not Applicable

Quality Control Report

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Department Inorganic

Group # WSCF121038

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
DUP			**QC Sample #79911**							
			Original 121038010							
Chloride	16887-00-6	31.5	32.4	mg/kg			2.70	30		08/15/12
Nitrate-N	NO3-N	<0.93	<0.91	mg/kg			13.50	30	U	08/15/12
Sulfate	14808-79-8	<5.5	<5.4	mg/kg			12.10	30	U	08/15/12

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF121038

Analytical Batch 206643 (QC Batch: 206638) **Test** Hexavalent chromium
Associated Samples 121038001, 121038002, 121038003, 121038004, 121038005, 121038006, 121038007, 121038008, 121038009, 121038010, 121038011, 121038012

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #80377**							
Hexavalent chromium	18540-29-9		<0.10	ug/g					U	08/23/12
LCS			**QC Sample #80378**							
Hexavalent chromium	18540-29-9		3.91	ug/g	97.7	80 - 120				08/23/12
DUP			**QC Sample #80379**							
			Original 121038001							
Hexavalent chromium	18540-29-9	<0.10	<0.10	ug/g			0.60	30	U	08/23/12
MS			**QC Sample #80380**							
			Original 121038001							
Hexavalent chromium	18540-29-9	<0.10	3.51	ug/g	87.8	75 - 125				08/23/12
PSTSPK			**QC Sample #80381**							
Hexavalent chromium	18540-29-9		0.0456	ug/g	91.2	85 - 115				08/23/12
IMS			**QC Sample #80382**							
			Original 121038001							
Hexavalent chromium	18540-29-9	<0.10	378	ug/g	88.9	75 - 125			D	08/23/12

* - QC result out of range n/a - Not Applicable