

MAY 6, 2014

**WSCF Laboratory**

PO Box 650 S3-30  
Richland, WA 99352



May 6, 2014

Scot Fitzgerald  
CH2M-HILL PRC  
PO Box 1600  
Richland, WA 99352

Dear Scot Fitzgerald,

**FINAL RESULT FOR SAMPLE DELIVERY GROUP WSCF140627**

Reference: (1) SOW, Mod 2, #36587, Release 3  
(2) MSC-SD-CD-QAPP-017, current version, Waste Sampling & Characterization Facility Quality Assurance Program Plan

This letter contains the following information for sample delivery group WSCF140627

- \* Cover Sheet (Attachment 1)
- \* Narrative (Attachment 2)
- \* Analytical Results (Attachment 3)
- \* Sample Receipt Information (Attachment 4)

Very truly yours,

A handwritten signature in black ink, appearing to read "Joseph Hale", is written over a horizontal line.

Electronically signed by Joseph Hale

For Lab Manager, Dan T. Smith

WSCF Analytical Lab

(509) 373-4804

Attachments 4

CC: w/Attachments

File/LB

ATTACHMENT 1

**COVER SHEET**

Consisting of 2 pages  
Including cover page

**WSCF SAF Number Cross Reference**

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Group # WSCF140627

Data Deliverable Date 05/08/14

<b>SAF #</b>	<b>Sample ID</b>	<b>Sample #</b>	<b>Matrix</b>	<b>Sampled</b>	<b>Received</b>
W14-004	B2W5M8	140627001	WATER	04/07/14	04/07/14
W14-004	B2W5M9	140627002	WATER	04/07/14	04/07/14
W14-004	B2W5M7	140627003	WATER	04/07/14	04/07/14
W14-004	B2W637	140627004	WATER	04/07/14	04/07/14
W14-004	B2W638	140627005	WATER	04/07/14	04/07/14
W14-004	B2W639	140627006	WATER	04/07/14	04/07/14
S14-004	B2W824	140627007	WATER	04/07/14	04/07/14

ATTACHMENT 2

**NARRATIVE**

Consisting of 4 pages  
Including cover page

### Introduction

Samples were received at the WSCF laboratory as referenced on the WSCF SAF Number Cross Reference table included in the final report. The samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Statement of Work (SOW)*, to Contract 39818, Revision 4, "WSCF ANALYTICAL SERVICES FOR GROUNDWATER."

The narrative (Attachment 2) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A Data Summary Report (Attachment 3) includes analytical results, a comment report detailing method abnormalities, tentatively identified peaks if applicable, method references, and Laboratory QC information as applicable. Copies of the chain of custody and sample receipt documentation are included as Attachment 4.

It should be noted that the attached chain of custody was not stamped "ICED" by the WSCF Laboratory Sample Custodian during sample receiving. However, based on procedure LO-090-403 form "NOTICE OF IMPROPER SAMPLE SUBMITTAL" was not submitted and was not stamped "NOT ICED". No anomaly was noted during sample receipt.

The following generic data qualifiers (i.e., B, C, D, J and U) may be applicable to this report, as appropriate.

- **B** – Sample results with a concentration greater than the MDL but less than the PQL are B flagged (applies to inorganic and wet chemical analyses), as appropriate.
- **C** – Analyte was detected in the blank and was evaluated. Affected sample results in the batch were C flagged (applies to inorganic and wet chemical analyses).
- **D** – Sample results are D flagged if dilution(s) were required, as appropriate.
- **J** – Sample results with a concentration greater than the MDL but less than the PQL are J flagged (applies to organic analyses), as appropriate.
- **B (organic analyses)** – Analyte was detected in the blank and was evaluated. Affected sample results in the batch were B flagged.
- **U** – Analyzed for but not detected above limiting criteria. Relative Percent Difference (RPD) values associated with an analyte qualified with a "U" are not applicable.
- **o** – LCS recovery outside established laboratory acceptance limits.

### Analytical Methodology for Requested Analyses

Refer to *WSCF Method References Report* for a complete listing of approved analytical methods.

### Inorganic Comments

**Anions** – Hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Nitrate, Chloride and Sulfate – Exceeded spiking levels by a factor of 4. Spike recoveries and associated RPDs are not valid.
- All other applicable QC controls are within the established limits.

**ICP-AES Metals** – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- Calcium – Exceeded spiking levels by a factor of 4. Spike recoveries and associated RPDs are not valid.
- All other applicable QC controls are within the established limits.

**ICP-MS Metals** – The hold time requirements for this analysis were met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

**Total Alkalinity** – The hold time requirement for this analysis was met. A Duplicate and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

**Total Organic Carbon** – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

**Total Organic Halides** – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

- All applicable QC controls are within the established limits.

#### **Radiochemistry Comments**

**Rad Chem** – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike (Matrix Spikes apply only to Technetium & Tritium), Blank and Laboratory Control Sample were analyzed with this delivery group. Analytical Note(s):

**Tritium:**

Attachment 2  
**Narrative**  
WSCF140627

- All applicable QC controls are within the established limits.

**Technetium-99:**

- All applicable QC controls are within the established limits.

We certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this data package has been authorized by the Analytical Laboratory Manager (or designee) and the Client Services representative as verified by electronic signatures shown on the WSCF ANALYTICAL RESULTS REPORT.

ATTACHMENT 3

**ANALYTICAL RESULTS**

Consisting of 37 pages  
Including cover page

**WSCF ANALYTICAL RESULTS REPORT**

For

CH2M Hill Plateau Remediation

PO Box 1600  
Richland, WA 99352

Attention: Scot Fitzgerald

**Contract #** MOA-FH-CHPRC-2008  
**Group #** WSCF140627  
**Report Date** May 6, 2014

Analytical: Electronically signed by Joseph Hale

Client Services: Electronically signed by Marisol Avila

*Solid samples results that have a 'Percent Solid' test are reported on a "dry weight basis", except results of TCLP, Percent Solid, and Total Activity. If no 'Percent Solid' test is reported then the results are reported on an "as received" basis.*

This information is intended for the use of the addressee only. If the reader of this report is not the intended recipient or is not authorized by the recipient to receive the report, you are hereby notified that any dissemination, distribution or copying of this report is strictly prohibited. If you have received this report in error, please notify WSCF Laboratory immediately by telephone at (509) 373-7005. Information designation of this report is the responsibility of the customer.

## Batch QC List

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140627

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
231237	231237	2	BLANK	108494	BLANK		Anions by Ion Chromatography (Water)
231237	231237	3	LCS	108495	LCS		Anions by Ion Chromatography (Water)
231237	231237	4	MS	108496	B2W5K1(140629001MS)	140629001	Anions by Ion Chromatography (Water)
231237	231237	5	MSD	108497	B2W5K1(140629001MSD)	140629001	Anions by Ion Chromatography (Water)
231237	231237	11	SAMPLE	140627001	B2W5M8		Anions by Ion Chromatography (Water)
231244	232244	5	BLANK	108543	BLANK		ICP-6010 - All possible metals
231244	232244	7	LCS	108545	LCS		ICP-6010 - All possible metals
231244	232244	9	MS	108546	B2W5L4(140615015MS)	140615015	ICP-6010 - All possible metals
231244	232244	10	MSD	108547	B2W5L4(140615015MSD)	140615015	ICP-6010 - All possible metals
231244	232244	24	SAMPLE	140627002	B2W5M9		ICP-6010 - All possible metals
231244	232244	25	SAMPLE	140627003	B2W5M7		ICP-6010 - All possible metals
232361	232362	1	BLANK	109481	BLANK		Total Organic Halides
232361	232362	2	LCS	109482	LCS		Total Organic Halides
232361	232362	20	MS	109488	B2W615(140626006MS)	140626006	Total Organic Halides
232361	232362	21	MSD	109489	B2W615(140626006MSD)	140626006	Total Organic Halides
232361	232362	23	SAMPLE	140627003	B2W5M7		Total Organic Halides
232361	232362	24	SAMPLE	140627004	B2W637		Total Organic Halides
232361	232362	25	SAMPLE	140627005	B2W638		Total Organic Halides
232363	232365	1	BLANK	109490	BLANK		Total Organic Halides
232363	232365	2	LCS	109491	LCS		Total Organic Halides
232363	232365	20	MS	109497	B2W639(140627006MS)	140627006	Total Organic Halides
232363	232365	21	MSD	109498	B2W639(140627006MSD)	140627006	Total Organic Halides
232363	232365	22	SAMPLE	140627006	B2W639		Total Organic Halides

## Batch QC List

Attention Scot Fitzgerald  
Department Inorganic

Group # WSCF140627

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
232555	232561	4	BLANK	109661	BLANK		3E-2008 ICP-MS 3 Elements
232555	232561	5	LCS	109662	LCS		3E-2008 ICP-MS 3 Elements
232555	232561	7	MS	109663	B2W820(140622007MS)	140622007	3E-2008 ICP-MS 3 Elements
232555	232561	8	MSD	109664	B2W820(140622007MSD)	140622007	3E-2008 ICP-MS 3 Elements
232555	232561	11	SAMPLE	140627007	B2W824		3E-2008 ICP-MS 3 Elements

## Batch QC List

Attention Scot Fitzgerald  
 Department Radiochemistry

Group # WSCF140627

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
231036	231865	1	BLANK	108441	BLANK		Tritium by LSC
231036	231865	2	LCS	108442	LCS		Tritium by LSC
231036	231865	4	DUP	108443	B2W904(140608001DUP)	140608001	Tritium by LSC
231036	231865	5	MSPK	108444	B2W904(140608001MSP)		Tritium by LSC
231036	231865	16	SAMPLE	140627007	B2W824		Tritium by LSC
231268	231735	1	BLANK	108585	BLANK		TC99 by Liquid Scintillation
231268	231735	2	LCS	108586	LCS		TC99 by Liquid Scintillation
231268	231735	4	DUP	108587	B2W820(140622007DUP)	140622007	TC99 by Liquid Scintillation
231268	231735	5	MS	108588	B2W820(140622007MS)	140622007	TC99 by Liquid Scintillation
231268	231735	8	SAMPLE	140627007	B2W824		TC99 by Liquid Scintillation

## Batch QC List

Attention Scot Fitzgerald  
 Department Wet Chemistry

Group # WSCF140627

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
231437	231437	1	LCS	108614	LCS		Total Alkalinity as mg/L CaCO3 (Water)
231437	231437	2	DUP	108615	B2W5H4(140615002DUP	140615002	Total Alkalinity as mg/L CaCO3 (Water)
231437	231437	10	SAMPLE	140627003	B2W5M7		Total Alkalinity as mg/L CaCO3 (Water)
231437	231437	13	LCS	108616	LCS		Total Alkalinity as mg/L CaCO3 (Water)
232550	232550	2	BLANK	109644	BLANK		Total Organic Carbon
232550	232550	3	LCS	109645	LCS		Total Organic Carbon
232550	232550	4	MS	109646	B2W614(140626005MS)	140626005	Total Organic Carbon
232550	232550	5	MSD	109647	B2W614(140626005MSD	140626005	Total Organic Carbon
232550	232550	8	SAMPLE	140627003	B2W5M7		Total Organic Carbon
232550	232550	9	SAMPLE	140627004	B2W637		Total Organic Carbon
232550	232550	10	SAMPLE	140627005	B2W638		Total Organic Carbon
232550	232550	11	SAMPLE	140627006	B2W639		Total Organic Carbon

## Method Reference

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**Attention** Scot Fitzgerald  
**Department** Inorganic

**Group #** WSCF140627

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The results provided in this report were generated using the following WSCF Laboratory procedures. For your convenience, this table provides a listing of the regulatory, industry methods or HEIS methods that are referenced by each of these WSCF procedures. Please note that the most recent version of the regulatory or industry method is listed here even though WSCF procedure may reference an older version of the method. Also, a reference to a regulatory or industry method here does not necessarily indicate a verbatim implementation of that method.

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<b>LA-505-411</b>	Elemental Analysis by ICP Atomic Emission Spectroscopy (ICP AES)		
	EPA SW-846	6010C	Inductively Coupled Plasma-Atomic Emission Spectrometry
	HEIS	6010_METALS_ICP	Inductively Coupled Plasma-Atomic Emission Spectrometry
<b>LA-505-412</b>	Determination of Trace Elements in Waters & Wastes by ICP Mass Spectrometry		
	EPA-600/R-94-111	200.8	Determination of Trace Elements in Waters and Waste by Inductively Coupled Plasma
	HEIS	200.8_METALS_ICPMS	Determination of Trace Elements in Waters and Waste by Inductively Coupled Plasma, Mass Spec.
<b>LA-523-444</b>	Total Organic Halides Based on SW-846 Method 9020B		
	EPA SW-846	9020B	Total Organic Halides (TOX)
	HEIS	9020_TOX	Total Organic Halides (TOX)
<b>LA-533-410</b>	Anion Analysis by Ion Chromatography		
	EPA-600/R-94-111	300.0	Determination of Inorganic Anions by Ion Chromatography
	HEIS	300.0_ANIONS_IC	Determination of Inorganic Anions by Ion Chromatography

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Note: A complete list of WSCF analytical procedures and reference regulatory or industry methods is available online at <http://www7.rl.gov/rapidweb/AS-DOL/index.cfm>

## Method Reference

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**Attention** Scot Fitzgerald  
**Department** Radiochemistry

**Group #** WSCF140627

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The results provided in this report were generated using the following WSCF Laboratory procedures. For your convenience, this table provides a listing of the regulatory, industry methods or HEIS methods that are referenced by each of these WSCF procedures. Please note that the most recent version of the regulatory or industry method is listed here even though WSCF procedure may reference an older version of the method. Also, a reference to a regulatory or industry method here does not necessarily indicate a verbatim implementation of that method.

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<b>LA-218-413</b>	Tritium By Ion Removal Using Eichrom Resin Columns (Prep)		
	N/A	PREP METHOD	
<b>LA-438-402</b>	Determination of Technetium-99 by RAD Disk Filtration & Liquid Scintillation Counting		
	N/A	PREP METHOD	
<b>LA-508-421</b>	Operation of the Tri-Carb Model 2500TR Liquid Scintillation Analyzer		
	HEIS	ALPHA_LSC	A/B Liquid Scintillation
	HEIS	BETA_LSC	A/B Liquid Scintillation
	HEIS	TC99_3MDSK_LSC	TC99 by Liquid Scintillation
	HEIS	TRITIUM_EIE_LSC	Tritium, by Eichrome ion exchange, LSC

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Note: A complete list of WSCF analytical procedures and reference regulatory or industry methods is available online at <http://www7.rl.gov/rapidweb/AS-DOL/index.cfm>

## Method Reference

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**Attention** Scot Fitzgerald  
**Department** Wet Chemistry

**Group #** WSCF140627

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The results provided in this report were generated using the following WSCF Laboratory procedures. For your convenience, this table provides a listing of the regulatory, industry methods or HEIS methods that are referenced by each of these WSCF procedures. Please note that the most recent version of the regulatory or industry method is listed here even though WSCF procedure may reference an older version of the method. Also, a reference to a regulatory or industry method here does not necessarily indicate a verbatim implementation of that method.

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<b>LA-531-411</b>	Alkalinity		
	SM	2320	Alkalinity
	HEIS	2320_ALKALINITY	Alkalinity
<b>LA-344-406</b>	Total Organic Carbon (TOC) Based on SW-846		
	EPA SW-846	9060	Total Organic Carbon
	HEIS	9060_TOC	Total Organic Carbon

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Note: A complete list of WSCF analytical procedures and reference regulatory or industry methods is available online at <http://www7.rl.gov/rapidweb/AS-DOL/index.cfm>

## WSCF Analytical Results Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140627

Sample # 140627001  
 SAF# W14-004  
 Sample ID B2W5M8

Matrix WATER  
 Sampled 04/07/14  
 Received 04/07/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>04/07/14</b>										
<b>Anions by Ion Chromatography (Water)</b>										
Fluoride	16984-48-8	LA-533-410	BD	0.289		ug/mL	2	0.050	1.0	04/07/14
Chloride	16887-00-6	LA-533-410	D	27.7		ug/mL	2	0.12	0.80	04/07/14
Nitrite-N	NO2-N	LA-533-410	UD	<0.040		ug/mL	2	0.040	0.20	04/07/14
Nitrate-N	NO3-N	LA-533-410	D	3.94		ug/mL	2	0.040	0.20	04/07/14
Sulfate	14808-79-8	LA-533-410	D	115		ug/mL	2	0.22	1.1	04/07/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 E - Analyte is an estimate, see comment section.  
 N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.

## WSCF Analytical Results Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140627

Sample # 140627002  
 SAF# W14-004  
 Sample ID B2W5M9

Matrix WATER  
 Sampled 04/07/14  
 Received 04/07/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>ICPAES Prep (W)</b>										<b>04/23/14</b>
<b>ICP-6010 - All possible metals</b>										
Iron	7439-89-6	LA-505-411	U	<40		ug/L	1	40	50	04/23/14
Magnesium	7439-95-4	LA-505-411		17500		ug/L	1	60	750	04/23/14
Manganese	7439-96-5	LA-505-411	U	<4.0		ug/L	1	4.0	5.0	04/23/14
Nickel	7440-02-0	LA-505-411	U	<10		ug/L	1	10	40	04/23/14
Potassium	7440-09-7	LA-505-411		7490		ug/L	1	250	4000	04/23/14
Silver	7440-22-4	LA-505-411	U	<5.0		ug/L	1	5.0	10	04/23/14
Sodium	7440-23-5	LA-505-411		24300		ug/L	1	100	500	04/23/14
Antimony	7440-36-0	LA-505-411	U	<20		ug/L	1	20	60	04/23/14
Barium	7440-39-3	LA-505-411		29.6		ug/L	1	4.0	20	04/23/14
Cadmium	7440-43-9	LA-505-411	U	<4.0		ug/L	1	4.0	5.0	04/23/14
Chromium	7440-47-3	LA-505-411	U	<5.0		ug/L	1	5.0	10	04/23/14
Cobalt	7440-48-4	LA-505-411	U	<4.0		ug/L	1	4.0	20	04/23/14
Copper	7440-50-8	LA-505-411	U	<4.0		ug/L	1	4.0	8.0	04/23/14
Vanadium	7440-62-2	LA-505-411	B	19.2		ug/L	1	5.0	25	04/23/14
Zinc	7440-66-6	LA-505-411	U	<5.0		ug/L	1	5.0	10	04/23/14
Calcium	7440-70-2	LA-505-411		60700		ug/L	1	50	1000	04/23/14
Strontium	7440-24-6	LA-505-411		299		ug/L	1	8.0	10	04/23/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 E - Analyte is an estimate, see comment section.  
 N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.

## WSCF Analytical Results Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140627

Sample # 140627002  
 SAF# W14-004  
 Sample ID B2W5M9

Matrix WATER  
 Sampled 04/07/14  
 Received 04/07/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Arsenic	7440-38-2	LA-505-411	U	<25		ug/L	1	25	30	04/23/14
Beryllium	7440-41-7	LA-505-411	U	<2.0		ug/L	1	2.0	4.0	04/23/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)  
 C - Analyte was found in the Associated Blank. (Inorganic)  
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U - Analyzed for but not detected above limiting criteria.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.

## WSCF Analytical Results Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140627

Sample # 140627003  
 SAF# W14-004  
 Sample ID B2W5M7

Matrix WATER  
 Sampled 04/07/14  
 Received 04/07/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>ICPAES Prep (W)</b>										<b>04/23/14</b>
<b>ICP-6010 - All possible metals</b>										
Iron	7439-89-6	LA-505-411		56.5		ug/L	1	40	50	04/23/14
Magnesium	7439-95-4	LA-505-411		17800		ug/L	1	60	750	04/23/14
Manganese	7439-96-5	LA-505-411	U	<4.0		ug/L	1	4.0	5.0	04/23/14
Nickel	7440-02-0	LA-505-411	U	<10		ug/L	1	10	40	04/23/14
Potassium	7440-09-7	LA-505-411		7590		ug/L	1	250	4000	04/23/14
Silver	7440-22-4	LA-505-411	U	<5.0		ug/L	1	5.0	10	04/23/14
Sodium	7440-23-5	LA-505-411		24600		ug/L	1	100	500	04/23/14
Antimony	7440-36-0	LA-505-411	U	<20		ug/L	1	20	60	04/23/14
Barium	7440-39-3	LA-505-411		30.4		ug/L	1	4.0	20	04/23/14
Cadmium	7440-43-9	LA-505-411	U	<4.0		ug/L	1	4.0	5.0	04/23/14
Chromium	7440-47-3	LA-505-411		10.5		ug/L	1	5.0	10	04/23/14
Cobalt	7440-48-4	LA-505-411	U	<4.0		ug/L	1	4.0	20	04/23/14
Copper	7440-50-8	LA-505-411	U	<4.0		ug/L	1	4.0	8.0	04/23/14
Vanadium	7440-62-2	LA-505-411	B	20.1		ug/L	1	5.0	25	04/23/14
Zinc	7440-66-6	LA-505-411	U	<5.0		ug/L	1	5.0	10	04/23/14
Calcium	7440-70-2	LA-505-411		61600		ug/L	1	50	1000	04/23/14
Strontium	7440-24-6	LA-505-411		302		ug/L	1	8.0	10	04/23/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 E - Analyte is an estimate, see comment section.  
 N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.

## WSCF Analytical Results Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140627

Sample # 140627003  
 SAF# W14-004  
 Sample ID B2W5M7

Matrix WATER  
 Sampled 04/07/14  
 Received 04/07/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
Arsenic	7440-38-2	LA-505-411	U	<25		ug/L	1	25	30	04/23/14
Beryllium	7440-41-7	LA-505-411	U	<2.0		ug/L	1	2.0	4.0	04/23/14
<b>Preparation for TOX (W)</b>										<b>04/15/14</b>
<b>Total Organic Halides</b>										
Total Organic Halides	59473-04-0	LA-523-444	B	11.3		ug/L	1	5.0	15	04/15/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 E - Analyte is an estimate, see comment section.  
 N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.

## WSCF Analytical Results Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140627

Sample # 140627004  
 SAF# W14-004  
 Sample ID B2W637

Matrix WATER  
 Sampled 04/07/14  
 Received 04/07/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>Preparation for TOX (W)</b>										<b>04/15/14</b>
<b>Total Organic Halides</b>										
Total Organic Halides	59473-04-0	LA-523-444	B	12.6		ug/L	1	5.0	15	04/15/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 E - Analyte is an estimate, see comment section.  
 N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.

## WSCF Analytical Results Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140627

Sample # 140627005  
 SAF# W14-004  
 Sample ID B2W638

Matrix WATER  
 Sampled 04/07/14  
 Received 04/07/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>Preparation for TOX (W)</b>										<b>04/15/14</b>
<b>Total Organic Halides</b>										
Total Organic Halides	59473-04-0	LA-523-444	B	12.2		ug/L	1	5.0	15	04/15/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 E - Analyte is an estimate, see comment section.  
 N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.

## WSCF Analytical Results Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140627

Sample # 140627006  
 SAF# W14-004  
 Sample ID B2W639

Matrix WATER  
 Sampled 04/07/14  
 Received 04/07/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>Preparation for TOX (W)</b>										<b>04/15/14</b>
<b>Total Organic Halides</b>										
Total Organic Halides	59473-04-0	LA-523-444	B	12.7		ug/L	1	5.0	15	04/15/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 E - Analyte is an estimate, see comment section.  
 N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.

## WSCF Analytical Results Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140627

Sample # 140627007  
 SAF# S14-004  
 Sample ID B2W824

Matrix WATER  
 Sampled 04/07/14  
 Received 04/07/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>ICPMS Prep 3-Elements (W)</b>										<b>04/30/14</b>
<b>3E-2008 ICP-MS 3 Elements</b>										
Uranium	7440-61-1	LA-505-412	D	3.78		ug/L	2	0.10	0.50	05/05/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the PQL(or EQL)but >= the IDL/MDL(Inorganic)  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 E - Analyte is an estimate, see comment section.  
 N - MS and/or MSD recovery outside control limits.

U - Analyzed for but not detected above limiting criteria.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.

## WSCF Analytical Results Report

Attention Scot Fitzgerald  
 Department Radiochemistry

Group # WSCF140627

Sample # 140627007  
 SAF# S14-004  
 Sample ID B2W824

Matrix WATER  
 Sampled 04/07/14  
 Received 04/07/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>TC99 by Liquid Scin. WATER/LIQUID PREP</b>										<b>04/10/14</b>
<b>TC99 by Liquid Scintillation</b>										
Technetium-99	14133-76-7	LA-508-421	U	-0.99	3.9	pCi/L	1	6.6		04/11/14
<b>Tritium by LSC EICHROM WA/LIQ PREP</b>										<b>04/09/14</b>
<b>Tritium by LSC</b>										
Tritium	10028-17-8	LA-508-421	U	52	190	pCi/L	1	290		04/14/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - The associated QC sample Blank has a result > or = the MDA  
 U - Analyzed for but not detected above limiting criteria.  
 N - Spike Recovery is Outside Control Limits.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)

o - LCS recovery outside established laboratory acceptance limits.

## WSCF Analytical Results Report

Attention Scot Fitzgerald  
 Department Wet Chemistry

Group # WSCF140627

Sample # 140627003  
 SAF# W14-004  
 Sample ID B2W5M7

Matrix WATER  
 Sampled 04/07/14  
 Received 04/07/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>04/09/14</b>										
<b>Total Alkalinity as mg/L CaCO3 (Water)</b>										
Total Alkalinity as CaCO3	ALKALINITY	LA-531-411		98		mg/L	1	1	10	04/09/14
Carbonate	CO3ALKALINI	LA-531-411	U	<1		mg/L	1	1		04/09/14
Bicarbonate	71-52-3	LA-531-411		98		mg/L	1	1		04/09/14
Hydroxyl ion	84625-61-6	LA-531-411	U	<1		mg/L	1	1		04/09/14
<b>04/28/14</b>										
<b>Total Organic Carbon</b>										
Total Organic Carbon	TOC	LA-344-406		0.315		mg/L	1	0.10	0.30	04/28/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the RDL but >= the IDL/MDL.  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 N - MS and/or MSD sample recovery outside control limits.  
 U - Analyzed for but not detected above limiting criteria.

N - Spike Recovery is Outside Control Limits.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.  
 Ignitability: <20C listed in the result field indicates sample ignited at room temperature. Maximum temperature tested for ignitability is at 100C

## WSCF Analytical Results Report

Attention Scot Fitzgerald  
 Department Wet Chemistry

Group # WSCF140627

Sample # 140627004  
 SAF# W14-004  
 Sample ID B2W637

Matrix WATER  
 Sampled 04/07/14  
 Received 04/07/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>04/28/14</b>										
<b>Total Organic Carbon</b>										
Total Organic Carbon	TOC	LA-344-406		0.346		mg/L	1	0.10	0.30	04/28/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the RDL but >= the IDL/MDL.  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 N - MS and/or MSD sample recovery outside control limits.  
 U - Analyzed for but not detected above limiting criteria.

N - Spike Recovery is Outside Control Limits.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.  
 Ignitability: <20C listed in the result field indicates sample ignited at room temperature. Maximum temperature tested for ignitability is at 100C

## WSCF Analytical Results Report

Attention Scot Fitzgerald  
 Department Wet Chemistry

Group # WSCF140627

Sample # 140627005  
 SAF# W14-004  
 Sample ID B2W638

Matrix WATER  
 Sampled 04/07/14  
 Received 04/07/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
										04/28/14
<b>Total Organic Carbon</b>										
Total Organic Carbon	TOC	LA-344-406		0.312		mg/L	1	0.10	0.30	04/28/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the RDL but >= the IDL/MDL.  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 N - MS and/or MSD sample recovery outside control limits.  
 U - Analyzed for but not detected above limiting criteria.

N - Spike Recovery is Outside Control Limits.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.  
 Ignitability: <20C listed in the result field indicates sample ignited at room temperature. Maximum temperature tested for ignitability is at 100C

## WSCF Analytical Results Report

Attention Scot Fitzgerald  
 Department Wet Chemistry

Group # WSCF140627

Sample # 140627006  
 SAF# W14-004  
 Sample ID B2W639

Matrix WATER  
 Sampled 04/07/14  
 Received 04/07/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
										04/28/14
<b>Total Organic Carbon</b>										
Total Organic Carbon	TOC	LA-344-406		0.334		mg/L	1	0.10	0.30	04/28/14

MDL = Minimum Detection Limit  
 RQ = Result Qualifier  
 TP Err = Total Propagated Error  
 DF = Dilution Factor  
 + - Indicates more than nine qualifier

B - Analyte < the RDL but >= the IDL/MDL.  
 C - Analyte was found in the Associated Blank. (Inorganic)  
 D - Analyte was reported at a secondary dilution factor.  
 N - MS and/or MSD sample recovery outside control limits.  
 U - Analyzed for but not detected above limiting criteria.

N - Spike Recovery is Outside Control Limits.  
 X,Y or Z - See comment detail and/or narrative.  
 PQL is equivalent to Estimated Quantitation Limit (EQL)  
 o - LCS recovery outside established laboratory acceptance limits.  
 Ignitability: <20C listed in the result field indicates sample ignited at room temperature. Maximum temperature tested for ignitability is at 100C

## Quality Control Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140627

Analytical Batch 231237 (QC Batch: 231237) Test Anions by Ion Chromatography (Water)  
 Associated Samples 140627001

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>		<b>QC Sample #108494</b>								
Fluoride	16984-48-8	<0.025		ug/mL					U	04/07/14
Chloride	16887-00-6	<0.060		ug/mL					U	04/07/14
Nitrite-N	NO2-N	<0.020		ug/mL					U	04/07/14
Nitrate-N	NO3-N	<0.020		ug/mL					U	04/07/14
Sulfate	14808-79-8	<0.11		ug/mL					U	04/07/14
<b>LCS</b>		<b>QC Sample #108495</b>								
Fluoride	16984-48-8	0.903		ug/mL	91.2	90 - 110				04/07/14
Chloride	16887-00-6	1.90		ug/mL	96	90 - 110				04/07/14
Nitrite-N	NO2-N	1.04		ug/mL	106.3	90 - 110				04/07/14
Nitrate-N	NO3-N	0.900		ug/mL	101.6	90 - 110				04/07/14
Sulfate	14808-79-8	3.83		ug/mL	97.7	90 - 110				04/07/14
<b>MS</b>		<b>QC Sample #108496</b>								
		<b>Original 140629001</b>								
Fluoride	16984-48-8	0.948		ug/mL	94.8	80 - 120			D	04/07/14
Chloride	16887-00-6	2.35		ug/mL	117.6	80 - 120			DX	04/07/14
Nitrite-N	NO2-N	0.903		ug/mL	91.4	80 - 120			D	04/07/14
Nitrate-N	NO3-N	1.08		ug/mL	121	80 - 120			DX	04/07/14

\* - QC result out of range

n/a - Not Applicable

## Quality Control Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140627

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Sulfate	14808-79-8		5.32	ug/mL	134.4	80 - 120			DX	04/07/14
<b>MSD</b>			<b>QC Sample #108497</b>							
			<b>Original</b>	<b>140629001</b>				<b>Paired</b>	<b>108496</b>	
Fluoride	16984-48-8		0.805	ug/mL	80.5	80 - 120	13.20	20	D	04/07/14
Chloride	16887-00-6		2.43	ug/mL	121.6	80 - 120	0.40	20	DX	04/07/14
Nitrite-N	NO2-N		0.915	ug/mL	92.6	80 - 120	1.40	20	D	04/07/14
Nitrate-N	NO3-N		1.04	ug/mL	115.8	80 - 120	0.30	20	DX	04/07/14
Sulfate	14808-79-8		5.28	ug/mL	133.2	80 - 120	0.10	20	DX	04/07/14

\* - QC result out of range

n/a - Not Applicable

## Quality Control Report

Attention Scot Fitzgerald  
 Department Wet Chemistry

Group # WSCF140627

Analytical Batch 231437 (QC Batch: 231437) Test Total Alkalinity as mg/L CaCO<sub>3</sub> (Water)  
 Associated Samples 140627003

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>LCS</b>		<b>QC Sample #108614</b>								
Total Alkalinity as CaCO <sub>3</sub>	ALKALINITY	95		mg/L	94.8	80 - 120				04/09/14
<b>DUP</b>		<b>QC Sample #108615</b>								
		<b>Original 140615002</b>								
Total Alkalinity as CaCO <sub>3</sub>	ALKALINITY	67		mg/L			2.90	20		04/09/14
<b>LCS</b>		<b>QC Sample #108616</b>								
Total Alkalinity as CaCO <sub>3</sub>	ALKALINITY	97		mg/L	96.9	80 - 120				04/09/14
* - QC result out of range				n/a - Not Applicable						

## Quality Control Report

Attention Scot Fitzgerald  
 Department Radiochemistry

Group # WSCF140627

Analytical Batch 231735 (QC Batch: 231268) Test TC99 by Liquid Scintillation  
 Associated Samples 140627007

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>										
Technetium-99	14133-76-7		-1.1	pCi/L					U	04/11/14
<b>LCS</b>										
Technetium-99	14133-76-7		270	pCi/L	102.7	80 - 120				04/11/14
<b>DUP</b>										
Technetium-99	14133-76-7		60	pCi/L			16.30	20		04/11/14
<b>MS</b>										
Technetium-99	14133-76-7		1100	pCi/L	103.8	75 - 125				04/11/14

\* - QC result out of range

n/a - Not Applicable



## Quality Control Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140627

Analytical Batch 232244 (QC Batch: 231244) Test ICP-6010 - All possible metals  
 Associated Samples 140627002, 140627003

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>		<b>QC Sample #108543</b>								
Iron	7439-89-6	<40		ug/L					U	04/23/14
Magnesium	7439-95-4	<60		ug/L					U	04/23/14
Manganese	7439-96-5	<4.0		ug/L					U	04/23/14
Nickel	7440-02-0	<10		ug/L					U	04/23/14
Potassium	7440-09-7	<250		ug/L					U	04/23/14
Silver	7440-22-4	<5.0		ug/L					U	04/23/14
Sodium	7440-23-5	<100		ug/L					U	04/23/14
Antimony	7440-36-0	<20		ug/L					U	04/23/14
Barium	7440-39-3	<4.0		ug/L					U	04/23/14
Cadmium	7440-43-9	<4.0		ug/L					U	04/23/14
Chromium	7440-47-3	<5.0		ug/L					U	04/23/14
Cobalt	7440-48-4	<4.0		ug/L					U	04/23/14
Copper	7440-50-8	<4.0		ug/L					U	04/23/14
Vanadium	7440-62-2	<5.0		ug/L					U	04/23/14
Zinc	7440-66-6	<5.0		ug/L					U	04/23/14
Calcium	7440-70-2	<50		ug/L					U	04/23/14
Strontium	7440-24-6	<8.0		ug/L					U	04/23/14

\* - QC result out of range

n/a - Not Applicable

## Quality Control Report

Attention Scot Fitzgerald  
 Department Inorganic

Group #

WSCF140627

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Arsenic	7440-38-2		<25	ug/L					U	04/23/14
Beryllium	7440-41-7		<2.0	ug/L					U	04/23/14
<b>LCS</b>			<b>QC Sample #108545</b>							
Iron	7439-89-6		1010	ug/L	101	80 - 120				04/23/14
Magnesium	7439-95-4		10100	ug/L	100.6	80 - 120				04/23/14
Manganese	7439-96-5		994	ug/L	99.4	80 - 120				04/23/14
Nickel	7440-02-0		976	ug/L	97.6	80 - 120				04/23/14
Potassium	7440-09-7		9950	ug/L	99.5	80 - 120				04/23/14
Silver	7440-22-4		971	ug/L	97.1	80 - 120				04/23/14
Sodium	7440-23-5		10000	ug/L	100.2	80 - 120				04/23/14
Antimony	7440-36-0		974	ug/L	97.4	80 - 120				04/23/14
Barium	7440-39-3		989	ug/L	98.9	80 - 120				04/23/14
Cadmium	7440-43-9		967	ug/L	96.7	80 - 120				04/23/14
Chromium	7440-47-3		973	ug/L	97.3	80 - 120				04/23/14
Cobalt	7440-48-4		974	ug/L	97.4	80 - 120				04/23/14
Copper	7440-50-8		974	ug/L	97.4	80 - 120				04/23/14
Vanadium	7440-62-2		968	ug/L	96.8	80 - 120				04/23/14
Zinc	7440-66-6		971	ug/L	97.1	80 - 120				04/23/14
Calcium	7440-70-2		20200	ug/L	101.1	80 - 120				04/23/14
Strontium	7440-24-6		1010	ug/L	101.4	80 - 120				04/23/14
Arsenic	7440-38-2		987	ug/L	98.7	80 - 120				04/23/14
Beryllium	7440-41-7		972	ug/L	97.2	80 - 120				04/23/14

\* - QC result out of range

n/a - Not Applicable

## Quality Control Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140627

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>MS</b>		<b>QC Sample #108546</b>								
		<b>Original 140615015</b>								
Iron	7439-89-6	1030		ug/L	102.8	75 - 125				04/23/14
Magnesium	7439-95-4	8610		ug/L	86.1	75 - 125				04/23/14
Manganese	7439-96-5	1000		ug/L	100.4	75 - 125				04/23/14
Nickel	7440-02-0	983		ug/L	98.3	75 - 125				04/23/14
Potassium	7440-09-7	10700		ug/L	107.2	75 - 125				04/23/14
Silver	7440-22-4	1030		ug/L	103	75 - 125				04/23/14
Sodium	7440-23-5	9270		ug/L	92.7	75 - 125				04/23/14
Antimony	7440-36-0	1030		ug/L	102.8	75 - 125				04/23/14
Barium	7440-39-3	987		ug/L	98.7	75 - 125				04/23/14
Cadmium	7440-43-9	1020		ug/L	101.5	75 - 125				04/23/14
Chromium	7440-47-3	998		ug/L	99.8	75 - 125				04/23/14
Cobalt	7440-48-4	990		ug/L	99	75 - 125				04/23/14
Copper	7440-50-8	1030		ug/L	102.7	75 - 125				04/23/14
Vanadium	7440-62-2	1000		ug/L	100.2	75 - 125				04/23/14
Zinc	7440-66-6	984		ug/L	98.4	75 - 125				04/23/14
Calcium	7440-70-2	15500		ug/L	77.6	75 - 125			X	04/23/14
Strontium	7440-24-6	995		ug/L	99.5	75 - 125				04/23/14
Arsenic	7440-38-2	1050		ug/L	104.6	75 - 125				04/23/14
Beryllium	7440-41-7	1000		ug/L	100.2	75 - 125				04/23/14
<b>MSD</b>		<b>QC Sample #108547</b>								
		<b>Original 140615015</b>								
		<b>Paired 108546</b>								
Iron	7439-89-6	1010		ug/L	100.9	75 - 125	1.90	20		04/23/14

\* - QC result out of range

n/a - Not Applicable

## Quality Control Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140627

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Magnesium	7439-95-4		8160	ug/L	81.6	75 - 125	1.10	20		04/23/14
Manganese	7439-96-5		996	ug/L	99.6	75 - 125	0.80	20		04/23/14
Nickel	7440-02-0		975	ug/L	97.5	75 - 125	0.90	20		04/23/14
Potassium	7440-09-7		10300	ug/L	102.9	75 - 125	2.10	20		04/23/14
Silver	7440-22-4		1030	ug/L	103	75 - 125	0.00	20		04/23/14
Sodium	7440-23-5		9090	ug/L	90.9	75 - 125	0.60	20		04/23/14
Antimony	7440-36-0		1030	ug/L	102.9	75 - 125	0.10	20		04/23/14
Barium	7440-39-3		971	ug/L	97.1	75 - 125	1.50	20		04/23/14
Cadmium	7440-43-9		1010	ug/L	100.5	75 - 125	1.00	20		04/23/14
Chromium	7440-47-3		988	ug/L	98.8	75 - 125	1.00	20		04/23/14
Cobalt	7440-48-4		986	ug/L	98.6	75 - 125	0.40	20		04/23/14
Copper	7440-50-8		1020	ug/L	102.1	75 - 125	0.60	20		04/23/14
Vanadium	7440-62-2		989	ug/L	98.9	75 - 125	1.30	20		04/23/14
Zinc	7440-66-6		971	ug/L	97.1	75 - 125	1.30	20		04/23/14
Calcium	7440-70-2		14300	ug/L	71.7	75 - 125	1.00	20	X	04/23/14
Strontium	7440-24-6		982	ug/L	98.2	75 - 125	0.90	20		04/23/14
Arsenic	7440-38-2		1040	ug/L	103.7	75 - 125	0.80	20		04/23/14
Beryllium	7440-41-7		994	ug/L	99.4	75 - 125	0.90	20		04/23/14

\* - QC result out of range

n/a - Not Applicable

## Quality Control Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140627

Analytical Batch 232362 (QC Batch: 232361) Test Total Organic Halides  
 Associated Samples 140627003, 140627004, 140627005

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>										
			<b>QC Sample #109481</b>							
Total Organic Halides	59473-04-0		<5.0	ug/L					U	04/15/14
<b>LCS</b>										
			<b>QC Sample #109482</b>							
Total Organic Halides	59473-04-0		404	mg/L	101	80 - 120				04/15/14
<b>MS</b>										
			<b>QC Sample #109488</b>							
			<b>Original 140626006</b>							
Total Organic Halides	59473-04-0		43.4	ug/L	108.6	75 - 125				04/15/14
<b>MSD</b>										
			<b>QC Sample #109489</b>							
			<b>Original 140626006</b>							
			<b>Paired 109488</b>							
Total Organic Halides	59473-04-0		37.9	ug/L	94.8	75 - 125	10.20	20		04/15/14

\* - QC result out of range

n/a - Not Applicable

## Quality Control Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140627

Analytical Batch 232365 (QC Batch: 232363) Test Total Organic Halides  
 Associated Samples 140627006

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>										
			<b>QC Sample #109490</b>							
Total Organic Halides	59473-04-0		<5.0	ug/L					U	04/15/14
<b>LCS</b>										
			<b>QC Sample #109491</b>							
Total Organic Halides	59473-04-0		389	mg/L	97.3	80 - 120				04/15/14
<b>MS</b>										
			<b>QC Sample #109497</b>							
			<b>Original 140627006</b>							
Total Organic Halides	59473-04-0	12.7	38.4	ug/L	96	75 - 125				04/15/14
<b>MSD</b>										
			<b>QC Sample #109498</b>							
			<b>Original 140627006</b>							
			<b>Paired 109497</b>							
Total Organic Halides	59473-04-0	12.7	38.8	ug/L	97.1	75 - 125	0.90	20		04/15/14

\* - QC result out of range

n/a - Not Applicable

## Quality Control Report

Attention Scot Fitzgerald  
 Department Wet Chemistry

Group # WSCF140627

Analytical Batch 232550 (QC Batch: 232550) Test Total Organic Carbon  
 Associated Samples 140627003, 140627004, 140627005, 140627006

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>										
Total Organic Carbon	TOC		<0.045	mg/L					U	04/28/14
<b>LCS</b>										
Total Organic Carbon	TOC		2.17	mg/L	108.5	80 - 120				04/28/14
<b>MS</b>										
Total Organic Carbon	TOC		2.17	mg/L	108.3	75 - 125				04/28/14
<b>MSD</b>										
Total Organic Carbon	TOC		2.14	mg/L	107.1	75 - 125	1.00	20	Paired 109646	04/28/14

\* - QC result out of range

n/a - Not Applicable

## Quality Control Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF140627

Analytical Batch 232561 (QC Batch: 232555) Test 3E-2008 ICP-MS 3 Elements  
 Associated Samples 140627007

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>										
Uranium	7440-61-1		<0.050	ug/L					U	05/05/14
<b>LCS</b>										
Uranium	7440-61-1		35.5	ug/L	88.8	85 - 115				05/05/14
<b>MS</b>										
Uranium	7440-61-1		35.9	ug/L	89.7	70 - 130				05/05/14
<b>MSD</b>										
Uranium	7440-61-1		32.1	ug/L	80.1	70 - 130	10.20	20	Paired 109663	05/05/14

\* - QC result out of range

n/a - Not Applicable

## Analytical Comment Report

Attention: Scot Fitzgerald

Group #

WSCF140627

## Quality Control Comments

Department Inorganic

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108496	B2W5K1(140629001MS)
<b>Analyte</b>	Chloride - Anions by Ion Chromatography (Water)
[1]	X5: Sample concentration exceed spiking level by a factor of 4. Spike recoveries are not valid.
<b>Analyte</b>	Nitrate-N - Anions by Ion Chromatography (Water)
[1]	X5: Sample concentration exceed spiking level by a factor of 4. Spike recoveries are not valid.
<b>Analyte</b>	Sulfate - Anions by Ion Chromatography (Water)
[1]	X5: Sample concentration exceed spiking level by a factor of 4. Spike recoveries are not valid.
108497	B2W5K1(140629001MSD)
<b>Analyte</b>	Chloride - Anions by Ion Chromatography (Water)
[1]	X5: Sample concentration exceed spiking level by a factor of 4. Spike recoveries are not valid.
<b>Analyte</b>	Nitrate-N - Anions by Ion Chromatography (Water)
[1]	X5: Sample concentration exceed spiking level by a factor of 4. Spike recoveries are not valid.
<b>Analyte</b>	Sulfate - Anions by Ion Chromatography (Water)
[1]	X5: Sample concentration exceed spiking level by a factor of 4. Spike recoveries are not valid.
108546	B2W5L4(140615015MS)
<b>Analyte</b>	Calcium - ICP-6010 - All possible metals
[1]	X5: Sample concentration exceed spiking level by a factor of 4. Spike recoveries are not valid.
108547	B2W5L4(140615015MSD)
<b>Analyte</b>	Calcium - ICP-6010 - All possible metals
[1]	X5: Sample concentration exceed spiking level by a factor of 4. Spike recoveries are not valid.

ATTACHMENT4

**SAMPLE RECEIPT**

Consisting of 6 pages  
Including cover page

## Sample Receipt

**Waste Sampling and Characterization Facility**  
**P.O. Box 650 S3-30, Richland WA 99352**  
**Phone: (509) 373-7005/FAX: (509) 372-0456**

**ACKNOWLEDGEMENT OF SAMPLES RECEIVED****WSCF Laboratory**

PO Box 650 S3-30  
 Richland, WA 99352

**ATTN:** Scot Fitzgerald

**Customer Code:** CHPRC  
**CA CN:** 401647  
**Work Order #:** 140627  
**Customer Work ID:** W14-004-075  
**Due Date:** 05/08/2014 **(R031)**

The following samples were received from you on 4/7/2014 1:20:00 PM. They have been scheduled for the tests listed below each sample. If this information is incorrect, please contact WSCF Client Services. Thank you for using Waste Sampling and Characterization Facility.

Sample #	Sample ID	Matrix	Collected	Received
140627001	B2W5M8	WATER	4/7/2014 12:46	4/7/2014 13:20
<b>Procedure</b>		<b>Compound List</b>		
Anions by Ion Chromatography (Water)		F,Cl,NO2,NO3,SO4		
Sample #	Sample ID	Matrix	Collected	Received
140627002	B2W5M9	WATER	4/7/2014 12:46	4/7/2014 13:20
<b>Procedure</b>		<b>Compound List</b>		
ICP-6010 - All possible metals		6010 ICP Common + GW03		
Sample #	Sample ID	Matrix	Collected	Received
140627003	B2W5M7	WATER	4/7/2014 12:46	4/7/2014 13:20
<b>Procedure</b>		<b>Compound List</b>		
ICP-6010 - All possible metals		6010 ICP Common + GW03		
Total Alkalinity as mg/L CaCO3 (Water)		Alkalinity,Carbonate,Bicarbonate,Hydroxyl Ion		
Total Organic Carbon		TOC		
Total Organic Halides		TOX		
Sample #	Sample ID	Matrix	Collected	Received
140627004	B2W637	WATER	4/7/2014 12:46	4/7/2014 13:20
<b>Procedure</b>		<b>Compound List</b>		
Total Organic Carbon		TOC		
Total Organic Halides		TOX		
Sample #	Sample ID	Matrix	Collected	Received
140627005	B2W638	WATER	4/7/2014 12:46	4/7/2014 13:20
<b>Procedure</b>		<b>Compound List</b>		
Total Organic Carbon		TOC		
Total Organic Halides		TOX		
Sample #	Sample ID	Matrix	Collected	Received
140627006	B2W639	WATER	4/7/2014 12:46	4/7/2014 13:20
<b>Procedure</b>		<b>Compound List</b>		
Total Organic Carbon		TOC		
Total Organic Halides		TOX		
Sample #	Sample ID	Matrix	Collected	Received
140627007	B2W824 (S14-004)	WATER	4/7/2014 12:46	4/7/2014 13:20
<b>Procedure</b>		<b>Compound List</b>		

MAY 6, 2014

Sample Receipt

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**Waste Sampling and Characterization Facility**  
**P.O. Box 650 S3-30, Richland WA 99352**  
**Phone: (509) 373-7005/FAX: (509) 372-0456**

3E-2008 ICP-MS 3 Elements  
TC99 by Liquid Scintillation  
Tritium by LSC

U  
Tc-99  
H3

Sample Receipt

CH2MHill Parcrau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. #  
**W14-004-076**  
Page 1 of 1

Collector	Juan Aguilar	Contact/Requester	Karen Waters-Husted	Telephone No.	509-376-4650
SAF No.	W14-004	Sampling Origin	Hanford Site	Purchase Order/Change Code	300071ESS20
Project Title	RCRA, APRIL 2014	Logbook No.	HNF-N-506 41 / 52	Ice Chest No.	N/A
Shipped To (Lab)	Waste Sampling & Characterization	Method of Shipment	GOVERNMENT VEHICLE	Bill of Lading/Air Bill No.	N/A
Priority	RCRA	Priority	31 Days	Offsite Property No.	N/A

POSSIBLE SAMPLE HAZARDS/REMARKS  
 \*\*\* Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR/ATA Dangerous Goods Regulations but are not releasable per DOE Order 438.1.

140627

Sample No.	Filter	Date	Time	No. Type Container	Sample Analysis	Holding Time	Preservative
BZV50M8	N	4-7-14	1246	1X500-ML	300.0 ANIONS_IC: COMMON	48 Hours	Cool-4C

SPECIAL INSTRUCTIONS  
 Site Wide Generator Knowledge Information from applies. The CACH for analytical work at WSCF is 401647.

Hold Time  
 Total Activity Exemption: Yes  No

Chain of Custody

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix *
Juan Aguilar			APR 07 2014 1320	KRISBY			APR 07 2014 1320	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time	DS = Drums Solids DL = Drums Liquids T = Tissue WI = Wipe L = Leachate V = Vegetation X = Other
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time	
FINAL SAMPLE DISPOSITION	Disposed Method (e.g., Return to vendor, per lab procedure, used in process)							Disposed By

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A 6004 842 (REV 2)



Sample Receipt

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.#  
**S14-004-264**  
Page 1 of 1

Collector	<b>Janie Aquilar</b>	Contact/Requester	Karen Waters-Husted	Telephone No.	509-376-4650
SAF No.	S14-004	Sampling Origin	Hanford Site	Purchase Order/Charge Code	300071ES20
Project Title	SURV, APRIL 2014	Logbook No.	HNF-N-506-01 / 82	Ice Check No.	N/A
Shipped To (Lab)	Waste Sampling & Characterization	Method of Shipment:	GOVERNMENT VEHICLE	Bill of Lading/Air Bill No.	N/A
Prepared	SURV	Priority:	31 Days	Offsite Property No.	N/A

**POSSIBLE SAMPLE HAZARDS/REMARKS**  
 \*\*\* Certain Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR/171A Dangerous Goods Regulations but are not releasable per DOE Order 438.1.

**SPECIAL INSTRUCTIONS**  
 Site With Generator Knowledge Information Form applies  
 The CACH for analytical work at WSCF is 401547.

Hold Time  
 Total Activity Exemption: Yes  No

Sample No.	Filter	Date	Time	No./Type Container	Sample Analysis	Hold Time	Preservative
B2W824	N	4-7-14	1246	1x500-mL G/P	200 & METALS ICPMS: Uranium (1)	6 Months	HNO3 to pH <2
B2W824	N	4-7-14	1246	1x1-L G/P	TC99_3MDSK_13SC: COMMON	6 Months	HCl to pH <2
B2W824	N	4-7-14	1246	1x250-mL G	TRITIUM_EIE_13C: COMMON	6 Months	None

Chain of Custody

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix *
Janie Aquilar		APR 07 2014	1330	KARISBI		APR 07 2014	4330	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air DS = Drier Soils DL = Drier Liquids T = Tissue WT = Wipe L = Liquid V = Vegetation X = Other
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time	
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time	
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time	

FINAL SAMPLE DISPOSITION

Disposal Method (e.g., Return to customer, per lab procedures, used in process)

PRINTED ON 3/6/2014

A-6004-812 (REV 2)