

DECEMBER 12, 2012

REVISION 1

**WSCF Laboratory**

PO Box 650 S3-30  
Richland, WA 99352



December 12, 2012

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

Dear Scot Fitzgerald,

REVISED121377 - 696305 [Report ID: 121377]

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 WSCF121377

- \* 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 positioned above the typed name.

Electronically signed by Joseph Hale

For Lab Manager, Dan T. Smith

WSCF Analytical Lab

(509) 373-4804

Attachments 4

CC: w/Attachments

File/LB

REVISED121377 -

ATTACHMENT 1

**COVER SHEET**

Consisting of 2 pages  
Including cover page

**WSCF SAF Number Cross Reference**

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Group # WSCF121377

Data Deliverable Date 11/29/12

<b>SAF #</b>	<b>Sample ID</b>	<b>Sample #</b>	<b>Matrix</b>	<b>Sampled</b>	<b>Received</b>
I13-002	B2MPL6	121377001	WATER	10/29/12	10/29/12
I13-002	B2MPT3	121377002	WATER	10/29/12	10/29/12
I13-002	B2MPK9	121377003	WATER	10/29/12	10/29/12
I13-002	B2MPK8	121377004	WATER	10/29/12	10/29/12
I13-002	B2MPL5	121377005	WATER	10/29/12	10/29/12
I13-002	B2MPT2	121377006	WATER	10/29/12	10/29/12

ATTACHMENT 2

**NARRATIVE**

Consisting of 4 pages  
Including cover page

Attachment 2  
Narrative Rev1  
WSCF121377

**Revision 1: This case narrative replaces the prior in its entirety. RDR 121205WSCF-R7806 requested a recheck for nitrate. An error was found and the result was corrected.**

### **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), Master Contract 39818, Revision 3, "Laboratory Analytical Services to CHPRC Soil and Groundwater Remediation Project."*

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.

### **Analytical Methodology for Requested Analyses**

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

Attachment 2  
Narrative Rev1  
WSCF121377

### Inorganic Comments

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

- Batch QC 209257
  - Nitrate 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.

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

- 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 2  
 Narrative Rev1  
 WSCF121377

RECHECK, RECOUNT, OR REANALYSIS ORDER

12/05/2012

**Order Number:** 121205WSCF-R7806

Waste Sampling & Characterization  
 600 AREA Hanford, MSIN S3-28  
 Richland, WA 99352

Sample Delivery Group:WSCF121377

Sample(s):

Method Name:300.0\_ANIONS\_IC

Sample#: B2MPK8

Sample Date: 10/29/2012 1:24:00 PM

SAF #:113-002

Lab Sample ID	RDR Action Start Date	Constituent	Action	TAT (Hardcopy/EDD)
121377004	12/5/2012 8:14:58 AM	Nitrogen in Nitrate	RECHECK	15 Days / 15 Days
Special Instructions: Data point out of trend and inconsistent with other analytes. SLF 12/05/2012				

WSCF Response: The instrument software failed to identify a nitrate peak. The result has been corrected.

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Deliver Report Results to:CHPRC

P.O. Box 1600  
 Richland, WA 99352  
 C/O Mr.Scot Fitzgerald

ATTACHMENT 3

**ANALYTICAL RESULTS**

Consisting of 16 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 #** WSCF121377  
**Report Date** December 12, 2012

Analytical: Electronically signed by Joseph Hale

Client Services: Electronically signed by Heather Medley

*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.

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Batch QC List

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF121377

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
209254	209254	2	BLANK	84034	BLANK		Anions by Ion Chromatography (Water)
209254	209254	3	LCS	84035	LCS		Anions by Ion Chromatography (Water)
209254	209254	4	DUP	84036	B2MCK9(121363006DUP)	121363006	Anions by Ion Chromatography (Water)
209254	209254	5	MS	84037	B2MCK9(121363006MS)	121363006	Anions by Ion Chromatography (Water)
209254	209254	6	MSD	84038	B2MCK9(121363006MSD)	121363006	Anions by Ion Chromatography (Water)
209254	209254	17	SAMPLE	121377004	B2MPK8		Anions by Ion Chromatography (Water)
209257	209257	2	BLANK	84047	BLANK		Anions by Ion Chromatography (Water)
209257	209257	3	LCS	84048	LCS		Anions by Ion Chromatography (Water)
209257	209257	4	DUP	84049	B2MPL5(121377005DUP)	121377005	Anions by Ion Chromatography (Water)
209257	209257	5	MS	84050	B2MPL5(121377005MS)	121377005	Anions by Ion Chromatography (Water)
209257	209257	6	MSD	84051	B2MPL5(121377005MSD)	121377005	Anions by Ion Chromatography (Water)
209257	209257	8	SAMPLE	121377005	B2MPL5		Anions by Ion Chromatography (Water)
209257	209257	9	SAMPLE	121377006	B2MPT2		Anions by Ion Chromatography (Water)
209413	209413	1	BLANK	84220	BLANK		Hexavalent chromium Discrete Analyzer
209413	209413	3	LCS	84222	LCS		Hexavalent chromium Discrete Analyzer
209413	209413	4	DUP	84223	B2MC88(121375001DUP)	121375001	Hexavalent chromium Discrete Analyzer
209413	209413	5	MS	84224	B2MC88(121375001MS)	121375001	Hexavalent chromium Discrete Analyzer
209413	209413	9	SAMPLE	121377001	B2MPL6		Hexavalent chromium Discrete Analyzer
209413	209413	10	SAMPLE	121377002	B2MPT3		Hexavalent chromium Discrete Analyzer
209413	209413	11	SAMPLE	121377003	B2MPK9		Hexavalent chromium Discrete Analyzer

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Method Reference

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF121377

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.

<b>LA-265-403</b>	Hexavalent Chromium Analysis		
	EPA SW-846	7196A	Hexavalent Chromium
	HEIS	7196_CR6	Hexavalent Chromium
<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

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>

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF121377

Sample # 121377001  
 SAF# 113-002  
 Sample ID B2MPL6

Matrix WATER  
 Sampled 10/29/12  
 Received 10/29/12

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>10/29/12</b>										
<b>Hexavalent chromium Discrete Analyzer</b>										
Hexavalent chromium	18540-29-9	LA-265-403		0.131		mg/L	1	0.0020	0.0050	10/29/12

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.  
 o - LCS recovery outside established laboratory acceptance limits.

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Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF121377

Sample # 121377002  
 SAF# 113-002  
 Sample ID B2MPT3

Matrix WATER  
 Sampled 10/29/12  
 Received 10/29/12

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>10/29/12</b>										
<b>Hexavalent chromium Discrete Analyzer</b>										
Hexavalent chromium	18540-29-9	LA-265-403		0.00780		mg/L	1	0.0020	0.0050	10/29/12

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.  
 o - LCS recovery outside established laboratory acceptance limits.

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Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF121377

Sample # 121377003  
 SAF# 113-002  
 Sample ID B2MPK9

Matrix WATER  
 Sampled 10/29/12  
 Received 10/29/12

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
										10/29/12
<b>Hexavalent chromium Discrete Analyzer</b>										
Hexavalent chromium	18540-29-9	LA-265-403		0.00510		mg/L	1	0.0020	0.0050	10/29/12

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.  
 o - LCS recovery outside established laboratory acceptance limits.

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Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF121377

Sample # 121377004  
 SAF# 113-002  
 Sample ID B2MPK8

Matrix WATER  
 Sampled 10/29/12  
 Received 10/29/12

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>10/29/12</b>										
<b>Anions by Ion Chromatography (Water)</b>										
Fluoride	16984-48-8	LA-533-410	D	0.286		ug/mL	2	0.046	0.14	10/29/12
Chloride	16887-00-6	LA-533-410	D	19.6		ug/mL	2	0.12	0.81	10/29/12
Nitrite-N	NO2-N	LA-533-410	UD	<0.038		ug/mL	2	0.038	0.20	10/29/12
Nitrate-N	NO3-N	LA-533-410	D	9.39		ug/mL	2	0.038	0.20	10/29/12
Sulfate	14808-79-8	LA-533-410	D	29.9		ug/mL	2	0.22	2.1	10/29/12

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.  
 o - LCS recovery outside established laboratory acceptance limits.

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Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF121377

Sample # 121377005  
 SAF# 113-002  
 Sample ID B2MPL5

Matrix WATER  
 Sampled 10/29/12  
 Received 10/29/12

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>10/29/12</b>										
<b>Anions by Ion Chromatography (Water)</b>										
Fluoride	16984-48-8	LA-533-410	D	0.239		ug/mL	2	0.046	0.14	10/29/12
Chloride	16887-00-6	LA-533-410	D	6.34		ug/mL	2	0.12	0.81	10/29/12
Nitrite-N	NO2-N	LA-533-410	BD	0.0508		ug/mL	2	0.038	0.20	10/29/12
Nitrate-N	NO3-N	LA-533-410	D	10.1		ug/mL	2	0.038	0.20	10/29/12
Sulfate	14808-79-8	LA-533-410	D	38.5		ug/mL	2	0.22	2.1	10/29/12

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.  
 o - LCS recovery outside established laboratory acceptance limits.

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Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF121377

Sample # 121377006  
 SAF# 113-002  
 Sample ID B2MPT2

Matrix WATER  
 Sampled 10/29/12  
 Received 10/29/12

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
<b>10/29/12</b>										
<b>Anions by Ion Chromatography (Water)</b>										
Fluoride	16984-48-8	LA-533-410	BD	0.123		ug/mL	2	0.046	0.14	10/29/12
Chloride	16887-00-6	LA-533-410	D	14.9		ug/mL	2	0.12	0.81	10/29/12
Nitrite-N	NO2-N	LA-533-410	UD	<0.038		ug/mL	2	0.038	0.20	10/29/12
Nitrate-N	NO3-N	LA-533-410	D	3.13		ug/mL	2	0.038	0.20	10/29/12
Sulfate	14808-79-8	LA-533-410	D	37.3		ug/mL	2	0.22	2.1	10/29/12

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.  
 o - LCS recovery outside established laboratory acceptance limits.

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Quality Control Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF121377

Analytical Batch 209254 (QC Batch: 209254) Test Anions by Ion Chromatography (Water)  
 Associated Samples 121377004

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>		<b>QC Sample #84034</b>								
Fluoride	16984-48-8	<0.023		ug/mL					U	10/29/12
Chloride	16887-00-6	<0.058		ug/mL					U	10/29/12
Nitrite-N	NO2-N	<0.019		ug/mL					U	10/29/12
Nitrate-N	NO3-N	<0.019		ug/mL					U	10/29/12
Sulfate	14808-79-8	<0.11		ug/mL					U	10/29/12
<b>LCS</b>		<b>QC Sample #84035</b>								
Fluoride	16984-48-8	0.989		ug/mL	99.9	90 - 110				10/29/12
Chloride	16887-00-6	1.93		ug/mL	97.7	90 - 110				10/29/12
Nitrite-N	NO2-N	0.959		ug/mL	98.1	90 - 110				10/29/12
Nitrate-N	NO3-N	0.902		ug/mL	101.8	90 - 110				10/29/12
Sulfate	14808-79-8	4.00		ug/mL	102	90 - 110				10/29/12
<b>DUP</b>		<b>QC Sample #84036</b>								
		<b>Original 121363006</b>								
Fluoride	16984-48-8	0.163		ug/mL			3.10	20	D	10/29/12
Chloride	16887-00-6	10.2		ug/mL			2.60	20	D	10/29/12
Nitrite-N	NO2-N	<0.038		ug/mL			18.20	20	UD	10/29/12
Nitrate-N	NO3-N	4.80		ug/mL			0.20	20	D	10/29/12

\* - QC result out of range

n/a - Not Applicable

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Quality Control Report

DECEMBER 12, 2012

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Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF121377

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Sulfate	14808-79-8		51.8	ug/mL			0.20	20	D	10/29/12
<b>MS</b>			<b>QC Sample #84037</b>							
			<b>Original 121363006</b>							
Fluoride	16984-48-8		1.01	ug/mL	101.3	80 - 120			D	10/29/12
Chloride	16887-00-6		2.05	ug/mL	102.6	80 - 120			D	10/29/12
Nitrite-N	NO2-N		0.978	ug/mL	99	80 - 120			D	10/29/12
Nitrate-N	NO3-N		1.03	ug/mL	115.1	80 - 120			D	10/29/12
Sulfate	14808-79-8		4.39	ug/mL	110.9	80 - 120			D	10/29/12
<b>MSD</b>			<b>QC Sample #84038</b>							
			<b>Original 121363006</b>						<b>Paired 84037</b>	
Fluoride	16984-48-8		1.02	ug/mL	102.1	80 - 120	0.70	20	D	10/29/12
Chloride	16887-00-6		2.02	ug/mL	101	80 - 120	0.30	20	D	10/29/12
Nitrite-N	NO2-N		0.971	ug/mL	98.3	80 - 120	0.70	20	D	10/29/12
Nitrate-N	NO3-N		0.973	ug/mL	108.9	80 - 120	1.00	20	D	10/29/12
Sulfate	14808-79-8		4.18	ug/mL	105.5	80 - 120	0.40	20	D	10/29/12

\* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF121377

Analytical Batch 209257 (QC Batch: 209257) Test Anions by Ion Chromatography (Water)  
 Associated Samples 121377005, 121377006

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>		<b>QC Sample #84047</b>								
Fluoride	16984-48-8	<0.023		ug/mL					U	10/29/12
Chloride	16887-00-6	<0.058		ug/mL					U	10/29/12
Nitrite-N	NO2-N	<0.019		ug/mL					U	10/29/12
Nitrate-N	NO3-N	<0.019		ug/mL					U	10/29/12
Sulfate	14808-79-8	<0.11		ug/mL					U	10/29/12
<b>LCS</b>		<b>QC Sample #84048</b>								
Fluoride	16984-48-8	1.00		ug/mL	101.2	90 - 110				10/29/12
Chloride	16887-00-6	1.97		ug/mL	99.5	90 - 110				10/29/12
Nitrite-N	NO2-N	1.01		ug/mL	103	90 - 110				10/29/12
Nitrate-N	NO3-N	0.911		ug/mL	102.9	90 - 110				10/29/12
Sulfate	14808-79-8	4.09		ug/mL	104.4	90 - 110				10/29/12
<b>DUP</b>		<b>QC Sample #84049</b>								
		<b>Original 121377005</b>								
Fluoride	16984-48-8	0.239	0.233	ug/mL			2.50	20	D	10/29/12
Chloride	16887-00-6	6.34	6.45	ug/mL			1.70	20	D	10/29/12
Nitrite-N	NO2-N	0.0508	0.0502	ug/mL			1.20	20	BD	10/29/12
Nitrate-N	NO3-N	10.1	9.94	ug/mL			1.30	20	D	10/29/12

\* - QC result out of range

n/a - Not Applicable

REVISED121377 -

Quality Control Report

DECEMBER 12, 2012

REVISION 1

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF121377

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Sulfate <b>MS</b>	14808-79-8	38.5	38.0	ug/mL			1.30	20	D	10/29/12
<b>QC Sample #84050</b>										
<b>Original 121377005</b>										
Fluoride	16984-48-8	0.239	0.995	ug/mL	99.5	80 - 120			D	10/29/12
Chloride	16887-00-6	6.34	1.85	ug/mL	92.7	80 - 120			D	10/29/12
Nitrite-N	NO2-N	0.0508	0.926	ug/mL	93.8	80 - 120			D	10/29/12
Nitrate-N	NO3-N	10.1	0.779	ug/mL	87.2	80 - 120			DX	10/29/12
Sulfate <b>MSD</b>	14808-79-8	38.5	3.18	ug/mL	80.3	80 - 120			DX	10/29/12
<b>QC Sample #84051</b>										
<b>Original 121377005</b>										
<b>Paired 84050</b>										
Fluoride	16984-48-8	0.239	0.982	ug/mL	98.2	80 - 120	1.10	20	D	10/29/12
Chloride	16887-00-6	6.34	1.74	ug/mL	87.1	80 - 120	1.40	20	D	10/29/12
Nitrite-N	NO2-N	0.0508	0.902	ug/mL	91.3	80 - 120	2.50	20	D	10/29/12
Nitrate-N	NO3-N	10.1	0.638	ug/mL	71.4	80 - 120	1.30	20	DX	10/29/12
Sulfate	14808-79-8	38.5	2.77	ug/mL	69.9	80 - 120	1.00	20	DX	10/29/12

\* - QC result out of range

n/a - Not Applicable

REVISED121377 -

Quality Control Report

Attention Scot Fitzgerald  
 Department Inorganic

Group # WSCF121377

Analytical Batch 209413 (QC Batch: 209413) Test Hexavalent chromium Discrete Analyzer  
 Associated Samples 121377001, 121377002, 121377003

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
<b>BLANK</b>										
			<b>QC Sample #84220</b>							
Hexavalent chromium	18540-29-9		<0.0020	mg/L					U	10/29/12
<b>LCS</b>			<b>QC Sample #84222</b>							
Hexavalent chromium	18540-29-9		0.0507	mg/L	101.4	90 - 110				10/29/12
<b>DUP</b>			<b>QC Sample #84223</b>							
			<b>Original 121375001</b>							
Hexavalent chromium	18540-29-9		0.0112	mg/L			0.00	20		10/29/12
<b>MS</b>			<b>QC Sample #84224</b>							
			<b>Original 121375001</b>							
Hexavalent chromium	18540-29-9		0.0407	mg/L	101.8	85 - 115				10/29/12

\* - QC result out of range

n/a - Not Applicable

Attention: Scot Fitzgerald

Group #

WSCF121377

**Quality Control Comments**

Department Inorganic

84050 B2MPL5(121377005MS)

**Analyte** Nitrate-N - Anions by Ion Chromatography (Water)

[1] X5: Sample concentration exceed spiking level by a factor of 4. Spike recoveries are not valid.

**Analyte** Sulfate - Anions by Ion Chromatography (Water)

[1] X5: Sample concentration exceed spiking level by a factor of 4. Spike recoveries are not valid.

84051 B2MPL5(121377005MSD)

**Analyte** Nitrate-N - Anions by Ion Chromatography (Water)

[1] X5: Sample concentration exceed spiking level by a factor of 4. Spike recoveries are not valid.

**Analyte** Sulfate - Anions by Ion Chromatography (Water)

[1] X5: Sample concentration exceed spiking level by a factor of 4. Spike recoveries are not valid.

ATTACHMENT4

**SAMPLE RECEIPT**

Consisting of 8 pages  
Including cover page

**Waste Sampling and Characterization Facility**  
**P.O. Box 1970 S3-30, Richland WA 99352**  
**Phone: (509) 373-7004/FAX: (509) 373-7134**

## ACKNOWLEDGEMENT OF SAMPLES RECEIVED

### WSCF Laboratory

PO Box 650 S3-30  
 Richland, WA 99352

ATTN: Scot Fitzgerald

Customer Code: CHPRC

PO #: 401647

Work Order #: 121377

Profile #: 113-002-162

Proj. Mgr.:

Phone:

The following samples were received from you on 10/29/2012 2:05:00 PM. They have been scheduled for the tests listed beside each sample. If this information is incorrect, please contact your service representative. Thank you for using Waste Sampling and Characterization Facility.

Sample #	Sample ID	Matrix	Collected	Received
<b>Tests scheduled</b>				
121377001	B2MPL6	WATER	10/29/2012 10:14	10/29/2012 14:05
		CR6DA-W		
121377002	B2MPT3	WATER	10/29/2012 12:16	10/29/2012 14:05
		CR6DA-W		
121377003	B2MPK9	WATER	10/29/2012 13:24	10/29/2012 14:05
		CR6DA-W		
121377004	B2MPK8	WATER	10/29/2012 13:24	10/29/2012 14:05
		IC-W		
121377005	B2MPL5	WATER	10/29/2012 10:14	10/29/2012 14:05
		IC-W		
121377006	B2MPT2	WATER	10/29/2012 12:16	10/29/2012 14:05
		IC-W		

### Test Acronym Description

Test Acronym	Description
CR6DA-W	Cr6 (W Discrete analyzer)
IC-W	Anions by IC (W)

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C.#  
I13-002-162  
Page 1 of 1

Collector: Robert Crow  
 SAF No.: 113-002  
 Project Title: 100KR4(1) NOVEMBER 2012  
 Shipped To (Lab): Waste Sampling & Characterization  
 Protocol: CERCLA  
 Contact/Requester: Karen Waters-Husted  
 Telephone No.: 376-4650  
 Sampling Origin: Hanford Site  
 Purchase Order/Charge Code: 30007IES20  
 Logbook No.: INF-N-506 36 / 30  
 Method of Shipment: GOVERNMENT VEHICLE  
 Priority: 31 Days  
 Bill of Lading/Air Bill No.: N/A  
 Offsite Property No.: N/A  
 Total Activity Exemption: Yes  No

POSSIBLE SAMPLE HAZARDS/REMARKS

\*\* Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5480.5 (1990/1993)

SPECIAL INSTRUCTIONS  
 100 Area Generation Knowledge Information Form applies  
 The CACN for all analytical work at WSCF is 601647.  
 P17 and P173 samples cannot be in the same SDG

Sample No	Filler	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2MPL6	N	10/12/12	1014	1x500-mL AG	7196_OR6: Hexavalent Chromium (1)	24 Hours	Cool-4C

Relinquished By	Print	Signature	Date/Time	Received By	Print	Signature	Date/Time	Matrix*
Robert Crow	R Crow		OCT 29 2012 1405	JA Frazee	JA Frazee		OCT 29 2012 1405	S - Soil SF - Sediment SO - Solid SL - Sludge W - Water O - Oil A - Air
Relinquished By			Date/Time	Received By			Date/Time	DS - Drum Solids DL - Drum Liquids T - Tissue WI - Wipe L - Liquid V - Vegetation X - Other
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 procedure, used in process)								Date/Time
PRINTED ON 10/9/2012								A-8004-842 (REV 2)

Chain of Custody

C.O.C. # **113-002-186**  
Page 1 of 1

### CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

**CH2M Hill Plateau Remediation Company**

Collector: **Robert Crow** Telephone No. **376-4650**

SAF No. **113-002** Purchase Order/Charge Code **300071ES20**

Project Title **100KR4(1) NOVEMBER 2012** Ice Chest No. **N/A**

Shipped To (Lab) **Waste Sampling & Characterization** Bill of Lading/Air Bill No. **N/A**

Protocol **CERCLA** Offsite Property No. **N/A**

Priority: **31 Days** **PRIORITY** Total Activity Exemption Yes  No

**POSSIBLE SAMPLE HAZARDS/REMARKS**  
 100 Area Generator Knowledge Information Form applies  
 The CACN for all analytical work at WSCF is 401647  
 FY12 and FY13 samples cannot be in the same SDG.

Sample No	Filter	Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B2MP13	N	10/29/12	12:16	1x500-mL aG	7196_CR6: Hexavalent Chromium (1)	24-Hours	Cool-4C

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix *
Robert Crow	R Crow		OCT 29 2012 1405	J.A. Frazier	J.A. Frazier		OCT 29 2012 1405	S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air
Relinquished By			Date/Time	Received By			Date/Time	DS = Drums Solids DL = Drum Liquids T = Tissue WT = Waste L = Liquefied V = Vegetation X = Other
Relinquished By			Date/Time	Received By			Date/Time	
Relinquished By			Date/Time	Received By			Date/Time	
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method (e.g., Return to customer, per lab procedure, used in process)							

PRINTED ON 10/29/2012 A 6004-842 (REV 2)

Chain of Custody

C.O.C. # **113-002-159**  
Page 1 of 1

### CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

**CH2MHill Plateau Remediation Company**

Collector: **Robert Crow**      Contact/Requester: **Karen Waters-Husted**      Telephone No.: **376-4650**

SAF No.: **113-002**      Sampling Origin: **Hanford Site**      Purchase Order/Charge Code: **30007IES20**

Project Title: **100KR4(1) NOVEMBER 2012**      Logbook No.: **HNF-N-506 36/30**      Ice Chest No.: **N/A**

Shipped To (Lab): **Waste Sampling & Characterization**      Method of Shipment: **GOVERNMENT VEHICLE**      Bill of Lading/Air Bill No.: **N/A**

Protocol: **CERCLA**      Priority: **31 Days**      Offsite Property No.: **N/A**

**POSSIBLE SAMPLE HAZARDS/REMARKS**  
 \*\* \*\* Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

**SPECIAL INSTRUCTIONS**      Hold Time      Total Activity Exemption: Yes  No

100 Area Generator Knowledge Information Form applies.  
 The CACN for all analytical work at WSCF is 401647  
 FV12 and FV13 samples cannot be in the same SPG

Sample No.	Filter	Date	Time	No./Type Container	Sample Analysis	Holding Time	Preservative
B2MPK9	N	10/24/12	1324	1x500-mL aG	7196_CRE: Hexavalent Chromium (1)	24 Hours	Cool-4C

Relinquished By	Print	Signature	Date/Time	Received By	Signature	Date/Time	Matrix *
Robert Crow	R Crow		OCT 29 2012 1405	TA Anderson		OCT 29 2012 1405	S = Soil, SE = Sediment, SO = Solid, SL = Sludge, W = Water, O = Oil, A = Air, DS = Drain Solids, DL = Drain Liquids, Y = Tissue, WI = Wipe, L = Liquid, V = Volatiles, 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	
<b>FINAL SAMPLE DISPOSITION</b>				Disposal Method (e.g., Return to customer, per lab procedure, used in process)			
Disposed By				Date/Time			

A-6004-842 (REV 2)

Chain of Custody

C.O.C.# 113-002-158  
Page 1 of 1

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

CH2MHill Plateau Remediation Company

Collector: Robert Crow  
 SAF No: 113-002  
 Project Title: 100KR4(1) NOVEMBER 2012  
 Shipped To (Lab): Waste Sampling & Characterization  
 Protocol: CERCLA

Contact/Requester: Karen Waters-Husted  
 Sampling Origin: Hanford Site  
 Logbook No.: HNF-N-506 36 / 30  
 Method of Shipment: GOVERNMENT VEHICLE  
 Priority: 31 Days

Telephone No.: 376-4650  
 Purchase Order/Charge Code: 30007IES20  
 Ice Chest No.: N/A  
 Bill of Lading/Air Bill No.: N/A  
 Offsite Property No.: N/A

SPECIAL INSTRUCTIONS: Hold Time  
 106 Area Generator Knowledge Information Form applies  
 The CACN for all analytical work at WSCF is 401647  
 EV12 and EV13 samples cannot be in the same STX.

Total Activity Exemption: Yes  No

Sample No	Filter	Date	Time	Nuclide Container	Sample Analysis	Holding Time	Preservative
B2MPK8 4	N	10-24-12	1324	1x500-mL P	300.0_ANIONS_IC: List-1 (5)	48 Hours	Cool-4C

Relinquished By	Print	Sign	Date/Time	Received By	Sign	Date/Time	Matrix *
Relinquished By	Robert Crow	R Crow	OCT 29 2012 1405	Received By	JA FRAZIER	OCT 29 2012 1405	S = Soil DS = Drum Solids SE = Sediment DL = Drum Liquids SO = Solid T = Tissue SL = Sludge WI = Wipe W = Water L = Liquid O = Oil V = Volatilization A = All X = Other
Relinquished By				Received By			
Relinquished By				Received By			
FINAL SAMPLE DISPOSITION							Date/Time
Disposal Method (e.g., Return to customer, per lab procedure, used in process)							Date/Time
PRINTED ON 10/9/2012							A-6004-842 (REV 2)

Chain of Custody

C.O.C.# **113-002-161**  
Page 1 of 1

**CH2M Hill Plateau Remediation Company**

**CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST**

Collector: Robert Crow  
SAF No: 113-002  
Project Title: 100KR4(1) NOVEMBER 2012  
Shipped To (Lab): Waste Sampling & Characterization  
Protocol: CERCLA

Contact/Requester: Karen Waters-Husted  
Sampling Origin: Hanford Site  
Logbook No: HNF-N-506 36 / 30  
Method of Shipment: GOVERNMENT VEHICLE  
Priority: 31 Days

Telephone No: 376-4650  
Purchase Order/Charge Code: 300071ES20  
Ice Chest No: N/A  
Bill of Lading/Air Bill No: N/A  
Offsite Property No: N/A

SPECIAL INSTRUCTIONS: Hold Time: Total Activity Exemption: Yes  No

100 Area Generator Knowledge Information Form applies. This CACN for all analytical work at WSCF is 401647. PVD and PVI samples cannot be in the same SLG.

Sample No: B2MPL5  
Filter: N  
Time: 10:28:10  
Date: 10/29/12  
Volume: 1x500-ml\_P  
Container: 300 0\_ANIONS\_IC: List-1 (5)  
Sample Analysis: 1014  
Holding Time: 48 Hours  
Preservative: Cool-4C

Relinquished By	Print	Sign	Date/Time	Received By	Sign	Date/Time	Matrix *
Robert Crow	R Crow		OCT 29 2012 1405	DA FRAZIER		OCT 29 2012 1405	S = Soil SE = Sediment SL = Sludge W = Water U = Oil A = Air DS = Drum Solids DL = Drum Liquids T = Tissue WI = Wipe V = Vial 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	
FINAL SAMPLE DISPOSITION							Date/Time
Disposal Method (e.g., Return to customer per lab procedure, used in process)							Date/Time

PRINTED 0 10/27/2012

A-6004-842 (REV 2)

Chain of Custody

C.O.C. # **113-002-185**  
Page 1 of 1

### CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

**CH2MHill Plateau Remediation Company**

Collector: **Robert Crow**      Contact/Requester: **Karen Waters-Husted**      Telephone No.: **376-4650**  
 SAF No.: **113-002**      Sampling Origin: **Hanford Site**      Purchase Order/Charge Code: **300071ES20**  
 Project Title: **100KR4(1) NOVEMBER 2012**      Logbook No.: **HNF-N-506 36 / 30**      Ice Chest No.: **N/A**  
 Shipped To (Lab): **Waste Sampling & Characterization**      Method of Shipment: **GOVERNMENT VEHICLE**      Bill of Lading/Air Bill No.: **N/A**  
 Protocol: **CERCLA**      Priority: **31 Days**      Office Property No.: **N/A**      Total Activity Exemption: Yes  No

**POSSIBLE SAMPLE HAZARDS/REMARKS**  
 \*\* Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR but are not releasable per DOE Order 5400.5 (1990/1993)

**SPECIAL INSTRUCTIONS**      Hold Time:      Preservative: **Cool-4C**  
 100: Area Generator Knowledge Information Form applies  
 The CACN for all analytical work at WSCF is 401647  
 FY12 and FY13 samples cannot be in the same SDG.

Sample No.: **B2MPTZ**      Filter: **C**      N      W      Date: **10-29-12**      Time: **210**      No/Type Container: **1x500-mL P**      Sample Analysis: **300.0\_ANIONS\_IC: List-1 (5)**      Holding Time: **48 Hours**

Relinquished By <b>Robert Crow</b>	Date/Time <b>OCT 29 2012 1405</b>	Received By <b>JA FRAZIER</b>	Date/Time <b>OCT 29 2012 1705</b>
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
<b>FINAL SAMPLE DISPOSITION</b>		Disposal Method (e.g., Return to customer, per lab procedure, used in process)	
PRINTED ON 10/9/2012		A-6004-942 (REV 2)	