WSCF Laboratory
PO Box 650 S3-30
Richland, WA 99352

May 7, 2014

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

Dear Scot Fitzgerald,

FINAL RESULT FOR SAMPLE DELIVERY GROUP WSCF140635

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 WSCF140635

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

Very truly yours,

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

Group # WSCF140635
Data Deliverable Date 05/12/14

SAF #	Sample ID	Sample #	Matrix	Sampled	Received
F14-009	B2W596	140635001	OTHERSOLID	04/07/14	04/08/14

ATTACHMENT 2

NARRATIVE

Consisting of 3 pages
Including cover page

Attachment 2
Narrative
WSCF140635

Introduction

A sample was received at the WSCF laboratory as referenced on the WSCF SAF Number Cross Reference table included in the final report. The sample was 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

Narrative

Attachment 2
Narrative
WSCF140635

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):

- Magnesium and Manganese – Matrix Spike and Matrix Spike Duplicate recoveries are outside established laboratory limits. Affected sample results in this batch were "N" flagged.
- Iron, Copper and 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.

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 13 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 # WSCF140635
Report Date May 7, 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.

Batch QC List

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF140635

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
231549	231842	5	BLANK	108714	BLANK		ICP-6010 - All possible metals
231549	231842	7	LCS	108716	LCS		ICP-6010 - All possible metals
231549	231842	8	SAMPLE	140635001	B2W596		ICP-6010 - All possible metals
231549	231842	9	MS	108717	B2W596(140635001MS)	140635001	ICP-6010 - All possible metals
231549	231842	10	MSD	108718	B2W596(140635001MSD	140635001	ICP-6010 - All possible metals
231549	231842	11	SAMPLE	140635001	B2W596		ICP-6010 - All possible metals
231549	231842	12	SAMPLE	140635001	B2W596		ICP-6010 - All possible metals

Batch QC List

Attention Scot Fitzgerald
Department Wet Chemistry

Group # WSCF140635

QC Batch	Analytical Batch	S#	Type	Sample #	Client Sample#	Original	Test
232468	232468	1	LCS	109595	LCS		Dry Weight/Percent Moisture
232468	232468	3	DUP	109596	B2WB66(140684001DUP	140684001	Dry Weight/Percent Moisture
232468	232468	10	SAMPLE	140635001	B2W596		Dry Weight/Percent Moisture

Method Reference

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF140635

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.

LA-505-411 Elemental Analysis by ICP Atomic Emission Spectroscopy (ICP AES)

EPA SW-846	6010C	Inductively Coupled Plasma-Atomic Emmision Spectrometry
HEIS	6010_METALS_ICP	Inductively Coupled Plasma-Atomic Emmision Spectrometry

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

Attention Scot Fitzgerald
Department Wet Chemistry

Group # WSCF140635

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.

LA-519-412 Total Residual Percent Solids Dried at 103 - 105 Degrees C

EPA-600/4-79-020	160.3	Total Residue
Standard Methods	2540B	Total Solids Dried at 103-105 C
HEIS	%SOLIDS	Dry Weight, Percent Solids

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 # WSCF140635

Sample # 140635001
SAF# F14-009
Sample ID B2W596

Matrix OTHERSOLID
Sampled 04/07/14
Received 04/08/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
ICPAES Prep (S)										**04/14/14**
ICP-6010 - All possible metals										
Iron	7439-89-6	LA-505-411	D	13800		mg/kg	10	42	52	04/14/14
Magnesium	7439-95-4	LA-505-411	DN	3840		mg/kg	10	62	780	04/14/14
Manganese	7439-96-5	LA-505-411	DN	680		mg/kg	10	4.2	5.2	04/14/14
Nickel	7440-02-0	LA-505-411		59.7		mg/kg	1	1.0	4.2	04/14/14
Potassium	7440-09-7	LA-505-411	B	66.1		mg/kg	1	26	420	04/14/14
Chromium	7440-47-3	LA-505-411		101		mg/kg	1	0.52	1.0	04/14/14
Cobalt	7440-48-4	LA-505-411		15.7		mg/kg	1	0.42	2.1	04/14/14
Copper	7440-50-8	LA-505-411	D	2350		mg/kg	100	42	83	04/14/14
Calcium	7440-70-2	LA-505-411	D	3.10E5		mg/kg	100	520	1.0E4	04/14/14

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 Wet Chemistry

Group # WSCF140635

Sample # 140635001
SAF# F14-009
Sample ID B2W596

Matrix OTHERSOLID
Sampled 04/07/14
Received 04/08/14

Test Performed	CAS #	Method	RQ	Result	TP Err	Units	DF	MDL	PQL	Analyzed
										04/29/14
Dry Weight/Percent Moisture										
Percent Solids	%SOLIDS	LA-519-412		96		%	1			04/29/14

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 # WSCF140635

Analytical Batch 231842 (QC Batch: 231549) **Test** ICP-6010 - All possible metals
Associated Samples 140635001

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
BLANK			**QC Sample #108714**							
Iron	7439-89-6		<40	ug/L					U	04/14/14
Magnesium	7439-95-4		<60	ug/L					U	04/14/14
Manganese	7439-96-5		<4.0	ug/L					U	04/14/14
Nickel	7440-02-0		<10	ug/L					U	04/14/14
Potassium	7440-09-7		<250	ug/L					U	04/14/14
Chromium	7440-47-3		<5.0	ug/L					U	04/14/14
Cobalt	7440-48-4		<4.0	ug/L					U	04/14/14
Copper	7440-50-8		<4.0	ug/L					U	04/14/14
Calcium	7440-70-2		<50	ug/L					U	04/14/14
LCS			**QC Sample #108716**							
Iron	7439-89-6		14700	mg/kg	99.1	36 - 164				04/14/14
Magnesium	7439-95-4		1550	mg/kg	91.9	55 - 144				04/14/14
Manganese	7439-96-5		196	mg/kg	88.5	48 - 152				04/14/14
Nickel	7440-02-0		51.2	mg/kg	98.6	69 - 130				04/14/14
Potassium	7440-09-7		2420	mg/kg	100.5	60 - 140				04/14/14
Chromium	7440-47-3		57.0	mg/kg	98.7	68 - 132				04/14/14

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

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF140635

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit		RQ	Analyzed
Cobalt	7440-48-4		47.3	mg/kg	106.7	74 - 126					04/14/14
Copper	7440-50-8		56.9	mg/kg	100.1	72 - 127					04/14/14
Calcium	7440-70-2		2950	mg/kg	101.8	59 - 141					04/14/14
MS			**QC Sample #108717**								
			Original 140635001								
Iron	7439-89-6	13800	9120	mg/kg	4563.8	75 - 125				X	04/14/14
Magnesium	7439-95-4	3840	4680	mg/kg	234.1	75 - 125				N	04/14/14
Manganese	7439-96-5	680	697	mg/kg	348.9	75 - 125				N	04/14/14
Nickel	7440-02-0	59.7	172	mg/kg	86	75 - 125					04/14/14
Potassium	7440-09-7	66.1	1970	mg/kg	98.5	75 - 125					04/14/14
Chromium	7440-47-3	101	180	mg/kg	90.2	75 - 125					04/14/14
Cobalt	7440-48-4	15.7	166	mg/kg	82.8	75 - 125					04/14/14
Copper	7440-50-8	2350	3990	mg/kg	1994.1	75 - 125				X	04/14/14
Calcium	7440-70-2	3.10E5	270000	mg/kg	6760.7	75 - 125				X	04/14/14
MSD			**QC Sample #108718**								
			Original 140635001						**Paired**	**108717**	
Iron	7439-89-6	13800	13100	mg/kg	6577	75 - 125	32.30	30	*	X	04/14/14
Magnesium	7439-95-4	3840	5370	mg/kg	268.6	75 - 125	12.70	30		N	04/14/14
Manganese	7439-96-5	680	721	mg/kg	360.9	75 - 125	3.00	30		N	04/14/14
Nickel	7440-02-0	59.7	195	mg/kg	97.5	75 - 125	9.50	30			04/14/14
Potassium	7440-09-7	66.1	2170	mg/kg	108.5	75 - 125	9.30	30			04/14/14
Chromium	7440-47-3	101	225	mg/kg	112.8	75 - 125	15.10	30			04/14/14
Cobalt	7440-48-4	15.7	179	mg/kg	89.6	75 - 125	7.20	30			04/14/14
Copper	7440-50-8	2350	3660	mg/kg	1833	75 - 125	8.50	30		X	04/14/14

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Inorganic

Group # WSCF140635

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
Calcium	7440-70-2	3.10E5	299000	mg/kg	7472.8	75 - 125	9.90	30	X	04/14/14

* - QC result out of range

n/a - Not Applicable

Quality Control Report

Attention Scot Fitzgerald
Department Wet Chemistry

Group # WSCF140635

Analytical Batch 232468 (QC Batch: 232468) **Test** Dry Weight/Percent Moisture
Associated Samples 140635001

Analyte	CAS #	Original Found	QC Found	Units	% Recov	Limits	RPD	RPD Limit	RQ	Analyzed
LCS			**QC Sample #109595**							
Percent Solids	%SOLIDS		95.2	%	99.5	80 - 120				04/29/14
DUP			**QC Sample #109596**							
			Original 140684001							
Percent Solids	%SOLIDS		82	%			0.31	5		04/29/14

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

Analytical Comment Report

Attention: Scot Fitzgerald

Group # WSCF140635

Quality Control Comments

Department Inorganic

108717 B2W596(140635001MS)

Analyte Calcium - ICP-6010 - All possible metals
[1] X5: Sample concentration exceed spiking level by a factor of 4. Spike recoveries are not valid.

Analyte Copper - ICP-6010 - All possible metals
[1] X5: Sample concentration exceed spiking level by a factor of 4. Spike recoveries are not valid.

Analyte Iron - ICP-6010 - All possible metals
[1] X5: Sample concentration exceed spiking level by a factor of 4. Spike recoveries are not valid.

108718 B2W596(140635001MSD)

Analyte Calcium - ICP-6010 - All possible metals
[1] X5: Sample concentration exceed spiking level by a factor of 4. Spike recoveries are not valid.

Analyte Copper - ICP-6010 - All possible metals
[1] X5: Sample concentration exceed spiking level by a factor of 4. Spike recoveries are not valid.

Analyte Iron - ICP-6010 - All possible metals
[1] X5: Sample concentration exceed spiking level by a factor of 4. Spike recoveries are not valid.
[2] Matrix Spike RPD outside established laboratory limits No flags assigned.

ATTACHMENT4

SAMPLE RECEIPT

Consisting of 3 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	
CACN:	404736	
Work Order #:	140635	
Customer Work ID:	F14-009-001	
Due Date:	05/12/2014	**(C06)**

The following samples were received from you on 4/8/2014 10:50:04 AM. 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
140635001	B2W596	OTHERSOLID	4/7/2014 10:00	4/8/2014 10:50

Procedure	Compound List
ICP-6010 - All possible metals	Fe,Mg,Mn,Ni,K,Cr,Co,Cu,Ca

Sample Receipt

Chain of Custody

CH2MHill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F14-099-001

PAGE 1 OF 1

COLLECTOR: FM Hall CHPRC
COMPANY CONTACT: TRENT, SJ
TELEPHONE NO.: 373-5869
PROJECT COORDINATOR: TRENT, SJ
PRICE CODE: C06
DATA TURNAROUND: 31 Days / 31 Days

SAMPLING LOCATION: 299-E33-337 Encrustation Sample 1
PROJECT DESIGNATION: Encrusted Materials from 200-BP-5 Wells - Other Solid
SAF NO.: F14-009
AIR QUALITY: ☐

ICE CHEST NO.: (N/A)
FIELD LOGBOOK NO.: HNF-N-507-24, -89
ACTUAL SAMPLE DEPTH: (N/A)
COA: 2039965510
METHOD OF SHIPMENT: GOVERNMENT VEHICLE

ORIGINAL

SHIPPED TO: Waste Sampling & Characterization
OFFSITE PROPERTY NO.: N/A
BILL OF LADING/AIR BILL NO.: N/A

MATRIX*: A=Air, D=Drum Liquids, Ds=Drum Solids, L=Liquid, O=Oil, S=Soil, Se=Sediment, T=Tissue, V=Vegetation, W=Water, Wi=Wipe, X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS: Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR/IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

SPECIAL HANDLING AND/OR STORAGE: 140435

SAMPLE NO.	MATRIX*	PRESERVATION	HOLDING TIME	TYPE OF CONTAINER	NO. OF CONTAINER(S)	VOLUME	SAMPLE ANALYSIS	SAMPLE DATE	SAMPLE TIME
R2W596	OTHER SOLID	Cool-4C	6 Months	G/P	1	60mL	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	APR 07 2014	1000

CHAIN OF POSSESSION

SIGN/ PRINT NAMES

	RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
1	FM Hall CHPRC	APR 07 2014 1350	SJ Trent	APR 07 2014 1350
2	SJ Trent	APR 08 2014 1000	L.D. Johnson	APR 08 2014 1000
3	L.D. Johnson	APR 08 2014 1050	K Fisher	APR 08 2014 1050
	RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
	RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
	RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

SPECIAL INSTRUCTIONS

** The CACN for WSCF Analytical has not been established at this time. The SAF will be revised when the CACN is finalized.** The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis CKT applies to this SAF.
(1) 6010_METALS_ICP: COMMON (Calcium, Chromium, Cobalt, Copper, Iron, Magnesium, Manganese, Nickel, Potassium);

TRK 14- 067

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

PRINTED ON 3/26/2014

A-6001-618 (REV. 7)