

RECEIVED SEPTEMBER 17, 2008

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**FLUOR**

**Memorandum**

M4W41-SLF-08-1024

To: H. Hampt E6-35 Date: September 17, 2008

From: S. L. Fitzgerald, Manager  
WSCF Analytical Lab *[Handwritten Signature]*

cc: w/Attachments  
T. F. Dale S3-30 J. E. Trechter S3-30  
A. J. Kopriva S3-30 S. J. Trent E6-35  
H. K. Meznarich S3-30 File/LB  
P. D. Mix S3-30

Subject: FINAL RESULTS FOR SAMPLE DELIVERY GROUP WSCF20081783 – SAF NUMBER F08-155

Reference: (1) Groundwater Protection Program-Letter of Instruction, FH-EIS-2003-MEM-001, October 31, 2002  
(2) HNF-SD-CD-QAPP-017, Rev. 9, Waste Sampling & Characterization Facility Quality Assurance Plan

This letter contains the following information for sample delivery group WSCF20081783:

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

SLF/grf

Attachments 4

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# WSCF SAF NUMBER CROSS REFERENCE

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Group#: WSCF20081783  
Data Deliverable Date: 03-sep-2008  
Data Deliverable: Cover Sheet

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SAF#	Sample ID	WSCF#	Matrix
F08-155	B1WPX7	W08GR03413	WATER
	B1WR01	W08GR03412	WATER

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M4W41-SLF-08-1024

ATTACHMENT 2

**NARRATIVE**

Consisting of 3 pages  
Including cover page

### **Introduction**

Two (2) S&GRP samples were received at the WSCF Laboratory on August 19, 2008. These samples were analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Groundwater Remediation Program – Letter of Instruction*, referenced in the cover letter.

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 stamped “ICED” by the WSCF Laboratory Sample Custodian during sample receiving, indicating the presence of ice in the sample container.

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

Refer to *WSCF Method References Report*, page 10, for a complete listing of approved analytical methods.

### **Inorganic Comments**

**Ammonia** – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per GRP Letter of Instruction. See page 13 for QC details. Analytical Note(s):

- Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1WR01 of this SDG and B1X1X9 (SDG# 20081807, SAF# F08-155).
- The Duplicate RPD value in QC sample B1X1X9 did not meet the established limit of the laboratory. The RPD value in the MS/MSD for this sample was acceptable. In addition, the Duplicate and MS/MSD RPD value in QC sample B1WR01 met the established limits for the laboratory.

All other QC controls are within the established limits.

**Anions** – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per GRP Letter of Instruction. See pages 14 through 15 for QC details.

All QC controls are within the established limits.

**ICP-AES Metals** – 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 per the GRP Letter of Instruction. See page 16 for QC details. Analytical Note(s):

- Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1WPX4 (SDG 20081775, SAF# F08-155).
- Iron sample result exceeded the spiking levels by a factor of four. Spike recoveries are not valid. Check standard was analyzed to ensure Iron linearity because sample results were greater than the calibration standard.

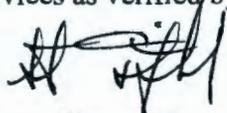
All QC controls are within the established limits.

**ICP-MS Metals** – 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 per the GRP Letter of Instruction. See pages 17 through 18 for QC details. Analytical Note(s):

- Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1WR23 (SDG# 20081793, SAF# F08-155).
- Zinc sample result exceeded the spiking levels by a factor of four. Spike recovery is not valid. The variability of the Zinc result in the sample and MS/MSD indicate that the Zinc is not well distributed in the sample; therefore, the Zinc sample result in these two samples was given an X flag.

All QC controls are within the established limits.

I certify that this data package is in compliance with the LOI, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Analytical Manager and Client Services as verified by the following signatures.



Scot L. Fitzgerald  
WSCF Analytical Laboratory Manager



Andrew Kopriva  
WSCF Client Services

M4W41-SLF-08-1024

ATTACHMENT 3

**ANALYTICAL RESULTS**

Consisting of 13 pages  
Including cover page

**WSCF**  
**ANALYTICAL RESULTS REPORT**

for

**Groundwater Remediation Program**

**Richland, WA 99354**

**Attention: Steve Trent**

Analytical:

*S. Fitzgerald 9-17-08*

Client Services:

*A. Kopriva 9-17-08*

*All results are reported on an "as received" basis unless otherwise noted in the comment section.*

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Contract#: FH-EIS-2003-MEM-001

Report#: WSCF20081783

Report Date: 17-sep-2008

Report WGPP/ver. 5.2

Groundwater Remediation Program

Page 1

Department: Inorganic

## W13q Worklist/Batch/QC Report for Group# WSCF20081783

WL#	S#	Batch	QC#	Tray Type	Sample#	Test
37687	2	38120	42483	BLANK		Anions by Ion Chromatography
37687	9	38120	42483	BLANK		Anions by Ion Chromatography
37687	3	38120	42483	LCS		Anions by Ion Chromatography
37687	5	38120	42483	DUP	W08GR03412	Anions by Ion Chromatography
37687	6	38120	42483	MS	W08GR03412	Anions by Ion Chromatography
37687	7	38120	42483	MSD	W08GR03412	Anions by Ion Chromatography
37687	4	38120	42483	SAMPLE	W08GR03412	Anions by Ion Chromatography
37687	7	38120	42483	SPK-RPD	W08GR03412	Anions by Ion Chromatography
37687	8	38120	42483	SAMPLE	W08GR03413	Anions by Ion Chromatography
37780	3	38215	42584	BLANK		Ammonia (N) by IC
37780	18	38215	42584	BLANK		Ammonia (N) by IC
37780	28	38215	42584	BLANK		Ammonia (N) by IC
37780	1	38215	42584	LCS		Ammonia (N) by IC
37780	19	38215	42584	LCS		Ammonia (N) by IC
37780	5	38215	42584	DUP	W08GR03412	Ammonia (N) by IC
37780	6	38215	42584	MS	W08GR03412	Ammonia (N) by IC
37780	7	38215	42584	MSD	W08GR03412	Ammonia (N) by IC
37780	4	38215	42584	SAMPLE	W08GR03412	Ammonia (N) by IC
37780	7	38215	42584	SPK-RPD	W08GR03412	Ammonia (N) by IC
37780	8	38215	42584	SAMPLE	W08GR03413	Ammonia (N) by IC
37780	21	38215	42584	DUP	W08GR03439	Ammonia (N) by IC
37780	22	38215	42584	MS	W08GR03439	Ammonia (N) by IC
37780	23	38215	42584	MSD	W08GR03439	Ammonia (N) by IC
37780	23	38215	42584	SPK-RPD	W08GR03439	Ammonia (N) by IC
37815	1	38240	42613	BLANK		ICP-200.8 MS All possible meta
37815	2	38240	42613	LCS		ICP-200.8 MS All possible meta
37815	9	38240	42613	SAMPLE	W08GR03412	ICP-200.8 MS All possible meta
37815	10	38240	42613	SAMPLE	W08GR03413	ICP-200.8 MS All possible meta
37815	4	38240	42613	MS	W08GR03426	ICP-200.8 MS All possible meta
37815	5	38240	42613	MSD	W08GR03426	ICP-200.8 MS All possible meta
37815	5	38240	42613	SPK-RPD	W08GR03426	ICP-200.8 MS All possible meta
37981	1	38335	42843	BLANK		ICP Metals Analysis, Grd H20 P
37981	2	38335	42843	LCS		ICP Metals Analysis, Grd H20 P
37981	4	38335	42843	MS	W08GR03395	ICP Metals Analysis, Grd H20 P
37981	5	38335	42843	MSD	W08GR03395	ICP Metals Analysis, Grd H20 P
37981	5	38335	42843	SPK-RPD	W08GR03395	ICP Metals Analysis, Grd H20 P
37981	10	38335	42843	SAMPLE	W08GR03412	ICP Metals Analysis, Grd H20 P
37981	11	38335	42843	SAMPLE	W08GR03413	ICP Metals Analysis, Grd H20 P

# WSCF

## METHOD REFERENCES REPORT

Department: Inorganic

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 or industry 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 the 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-503-401</b>	<b>LA-503-401: ANALYSIS OF CATIONS BY ION CHROMATOGRAPHY</b> EPA-600/4-86-024 300.7 Dissolved Sodium, Ammonium, Potassium, and Calcium in Wet Deposition by Chemical HEIS 300.7_CATIONS_IC Determination of Ammonium by Ion Chromatography
<b>LA-505-411</b>	<b>LA-505-411: ELEMENTAL ANALYSIS BY INDUCTIVELY COUPLED PLASMA ATOMIC EMISSION SPE</b> HEIS 6010_METALS_ICP Inductively Coupled Plasma-Atomic Emmision Spectrometry
<b>LA-505-412</b>	<b>LA-505-412: DETERMINATION OF TRACE ELEMENTS IN WATERS AND WASTES BY INDUCTIVELY</b> EPA-600/R-94-111 200.8 DETERMINATION OF TRACE ELEMENTS IN WATERS AND WASTES BY INDUCTIVELY COUPLED PLAS HEIS 200.8_METALS_ICPMS Inductively Coupled Plasma - Mass Spectrometry HEIS RADISOTOPES_ICPMS Radioisotopes by ICP/MS
<b>LA-533-410</b>	<b>LA-533-410: ANION ANALYSIS BY ION CHROMATOGRAPHY</b> 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 referenced regulatory or industry methods is available online at <http://www2.rl.gov/phmc/as-dol>.

Report Date: 17-sep-2008

Report#: WSCF20081783

Report WGPPM/5.2

# WSCF ANALYTICAL RESULTS REPORT

**Attention:** Steve Trent  
**SAF Number:** F08-155  
**Sample #** W08GR03412  
**Client ID:** B1WR01

**TRENT  
WSCF**

**Matrix:** WATER

**Group #:** WSCF20081783  
**Department:** Inorganic  
**Sampled:** 08/19/08  
**Received:** 08/19/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
<b>Anions by Ion Chromatography</b>											
Fluoride	16984-48-8	LA-533-410	DU	< 1.18	mg/L			51.00	1.2		08/19/08
Chloride	16887-00-6	LA-533-410	BD	2.43	mg/L			51.00	2.4		08/19/08
Nitrogen in Nitrite	NO2-N	LA-533-410	DU	< 0.653	mg/L			51.00	0.65		08/19/08
Bromide	24959-67-9	LA-533-410	DU	< 2.32	mg/L			51.00	2.3		08/19/08
Nitrogen in Nitrate	NO3-N	LA-533-410	DU	< 0.617	mg/L			51.00	0.62		08/19/08
Phosphate (P) by IC	PO4-P	LA-533-410	DU	< 3.09	mg/L			51.00	3.1		08/19/08
Sulfate	14808-79-8	LA-533-410	BD	14.7	mg/L			51.00	6.7		08/19/08
<b>ICP Metals Analysis, Grd H20 P Prep</b>											<b>09/09/08</b>
<b>ICP Metals Analysis, Grd H20 P</b>											
Iron	7439-89-6	LA-505-411	D	2.97e+05	ug/L			10.00	2.5e+02		09/15/08
<b>ICP-200.8 MS All possible meta Prep</b>											<b>08/26/08</b>
<b>ICP-200.8 MS All possible meta</b>											
Manganese	7439-96-5	LA-505-412		1.20e+03	ug/L			1.00	0.100		08/28/08
Nickel	7440-02-0	LA-505-412		31.0	ug/L			1.00	0.200		08/28/08
Cadmium	7440-43-9	LA-505-412		0.180	ug/L			1.00	0.100		08/28/08
Chromium	7440-47-3	LA-505-412		196	ug/L			1.00	0.500		08/28/08
Copper	7440-50-8	LA-505-412		30.7	ug/L			1.00	0.100		08/28/08
Zinc	7440-66-6	LA-505-412	X	121	ug/L			1.00	0.800		08/28/08
Lead	7439-92-1	LA-505-412		6.37	ug/L			1.00	0.100		08/28/08
Molybdenum	7439-98-7	LA-505-412		31.6	ug/L			1.00	0.0500		08/28/08
Arsenic	7440-38-2	LA-505-412		5.71	ug/L			1.00	0.400		08/28/08
<b>Nitrogen in ammonium</b>											
Nitrogen in ammonium	NH4-N	LA-503-401	BD	0.692	mg/L			51.00	0.48		08/26/08

**MDL = Minimum Detection Limit**

**RQ = Result Qualifier**

**TP Err = Total Propagated Error**

**DF = Dilution Factor**

B - The analyte < the RDL but > = the IDL/MDL (inorg)

U - Analyzed for but not detected above limiting criteria (inorg)

D - Analyte was identified at a secondary dilution factor (inorg)

X - Other flags/notes described in the comments/narrative (inorg)

\* - Indicates results that have NOT been validated;

+ - Indicates more than six qualifier symbols

Report WGPP/ver. 5.2

Groundwater Remediation Program

# WSCF ANALYTICAL RESULTS REPORT

**Attention:** Steve Trent  
**SAF Number:** F08-155  
**Sample #** W08GR03413  
**Client ID:** B1WPX7

**TRENT  
WSCF**

**Matrix:** WATER

**Group #:** WSCF20081783  
**Department:** Inorganic  
**Sampled:** 08/19/08  
**Received:** 08/19/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
<b>Anions by Ion Chromatography</b>											
Fluoride	16984-48-8	LA-533-410	DU	< 1.18	mg/L			51.00	1.2		08/19/08
Chloride	16887-00-6	LA-533-410	BD	2.67	mg/L			51.00	2.4		08/19/08
Nitrogen in Nitrite	NO2-N	LA-533-410	DU	< 0.653	mg/L			51.00	0.65		08/19/08
Bromide	24959-67-9	LA-533-410	DU	< 2.32	mg/L			51.00	2.3		08/19/08
Nitrogen in Nitrate	NO3-N	LA-533-410	DU	< 0.617	mg/L			51.00	0.62		08/19/08
Phosphate (P) by IC	PO4-P	LA-533-410	DU	< 3.09	mg/L			51.00	3.1		08/19/08
Sulfate	14808-79-8	LA-533-410	BD	11.7	mg/L			51.00	6.7		08/19/08
<b>ICP Metals Analysis, Grd H20 P Prep</b>											<b>09/09/08</b>
<b>ICP Metals Analysis, Grd H20 P</b>											<b>08/26/08</b>
Iron	7439-89-6	LA-505-411	D	6.28e+05	ug/L			10.00	2.5e+02		09/11/08
<b>ICP-200.8 MS All possible meta Prep</b>											<b>08/26/08</b>
<b>ICP-200.8 MS All possible meta</b>											
Manganese	7439-96-5	LA-505-412		2.07e+03	ug/L			1.00	0.100		08/28/08
Nickel	7440-02-0	LA-505-412		59.3	ug/L			1.00	0.200		08/28/08
Cadmium	7440-43-9	LA-505-412		0.190	ug/L			1.00	0.100		08/28/08
Chromium	7440-47-3	LA-505-412		228	ug/L			1.00	0.500		08/28/08
Copper	7440-50-8	LA-505-412		24.0	ug/L			1.00	0.100		08/28/08
Zinc	7440-66-6	LA-505-412	X	427	ug/L			1.00	0.800		08/28/08
Lead	7439-92-1	LA-505-412		14.9	ug/L			1.00	0.100		08/28/08
Molybdenum	7439-98-7	LA-505-412		16.5	ug/L			1.00	0.0500		08/28/08
Arsenic	7440-38-2	LA-505-412		4.44	ug/L			1.00	0.400		08/28/08
<b>Nitrogen in ammonium</b>											
Nitrogen in ammonium	NH4-N	LA-503-401	BD	0.793	mg/L			51.00	0.48		08/26/08

**MDL=Minimum Detection Limit**

**RQ=Result Qualifier**

**TP Err=Total Propagated Error**

**DF=Dilution Factor**

B - The analyte < the RDL but > = the IDL/MDL (inorg)

U - Analyzed for but not detected above limiting criteria(inorg)

D - Analyte was identified at a secondary dilution factor(inorg)

X - Other flags/notes described in the comments/narrative(inorg)

\* - Indicates results that have NOT been validated;

+ - Indicates more than six qualifier symbols

Report WGPP/ver. 5.2

Groundwater Remediation Program

Page 3

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081783  
 Matrix: WATER  
 Test: Ammonia (N) by IC

Sample Date: 08/19/08  
 Receive Date: 08/19/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
<b>Lab ID: W08GR03412</b>											
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>											
DUP	Ammonia (N) by IC	7664-41-7	0.6774		RPD			2.089	20.000		08/26/08
MS	Ammonia (N) by IC	7664-41-7	0.494025	99.202	% Recov	80.000	120.000				08/26/08
MSD	Ammonia (N) by IC	7664-41-7	0.485196	97.429	% Recov	80.000	120.000				08/26/08
SPK-RPD	Ammonia (N) by IC	7664-41-7	97.429		RPD			1.803	20.000		08/27/08
<b>Lab ID: W08GR03439</b>											
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>											
DUP	Ammonia (N) by IC	7664-41-7	0.736		RPD			21.749	20.000		08/27/08
MS	Ammonia (N) by IC	7664-41-7	0.500555	100.513	% Recov	80.000	120.000				08/27/08
MSD	Ammonia (N) by IC	7664-41-7	0.498669	100.134	% Recov	80.000	120.000				08/27/08
SPK-RPD	Ammonia (N) by IC	7664-41-7	100.134		RPD			0.378	20.000		08/27/08
<b>BATCH QC</b>											
BLANK	Ammonia (N) by IC	7664-41-7	<9.32e-3	n/a	mg/L	0.000	0.002			U	08/26/08
BLANK	Ammonia (N) by IC	7664-41-7	<9.32e-3	n/a	mg/L	0.000	0.002			U	08/26/08
BLANK	Ammonia (N) by IC	7664-41-7	<9.32e-3	n/a	mg/L	0.000	0.002			U	08/27/08
LCS	Ammonia (N) by IC	7664-41-7	98.7788	98.779	% Recov	80.000	120.000				08/26/08
LCS	Ammonia (N) by IC	7664-41-7	99.0581	99.058	% Recov	80.000	120.000				08/26/08

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081783  
 Matrix: WATER  
 Test: Anions by Ion Chromatography

Sample Date: 08/19/08  
 Receive Date: 08/19/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W08GR03412 BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Bromide	24959-67-9	< 2.3205		RPD			n/a	20.000	U	08/19/08
DUP	Chloride	16887-00-6	2.9474		RPD			19.101	20.000		08/19/08
DUP	Fluoride	16984-48-8	< 1.1832		RPD			n/a	20.000	U	08/19/08
DUP	Nitrogen in Nitrite	NO2-N	< 0.6528		RPD			n/a	20.000	U	08/19/08
DUP	Nitrogen in Nitrate	NO3-N	< 0.6171		RPD			n/a	20.000	U	08/19/08
DUP	Phosphate (P) by IC	PO4-P	< 3.0906		RPD			n/a	20.000	U	08/19/08
DUP	Sulfate	14808-79-8	14.9888		RPD			1.621	20.000		08/19/08
MS	Bromide	24959-67-9	1.931641	96.582	% Recov	80.000	120.000				08/19/08
MS	Chloride	16887-00-6	0.853504	85.779	% Recov	80.000	120.000				08/19/08
MS	Fluoride	16984-48-8	0.460339	93.375	% Recov	80.000	120.000				08/19/08
MS	Nitrogen in Nitrite	NO2-N	0.462324	93.968	% Recov	80.000	120.000				08/19/08
MS	Nitrogen in Nitrate	NO3-N	0.44721	100.271	% Recov	80.000	120.000				08/19/08
MS	Phosphate (P) by IC	PO4-P	0.909837	95.072	% Recov	80.000	120.000				08/19/08
MS	Sulfate	14808-79-8	1.84568	94.167	% Recov	80.000	120.000				08/19/08
MSD	Bromide	24959-67-9	1.934561	96.728	% Recov	80.000	120.000				08/19/08
MSD	Chloride	16887-00-6	0.852327	85.861	% Recov	80.000	120.000				08/19/08
MSD	Fluoride	16984-48-8	0.460957	93.500	% Recov	80.000	120.000				08/19/08
MSD	Nitrogen in Nitrite	NO2-N	0.459041	93.301	% Recov	80.000	120.000				08/19/08
MSD	Nitrogen in Nitrate	NO3-N	0.446241	100.054	% Recov	80.000	120.000				08/19/08
MSD	Phosphate (P) by IC	PO4-P	0.912465	95.346	% Recov	80.000	120.000				08/19/08
MSD	Sulfate	14808-79-8	1.841516	93.955	% Recov	80.000	120.000				08/19/08
SPK-RPD	Bromide	24959-67-9	96.728		RPD			0.151	20.000		08/19/08
SPK-RPD	Chloride	16887-00-6	85.861		RPD			0.138	20.000		08/19/08
SPK-RPD	Fluoride	16984-48-8	93.500		RPD			0.134	20.000		08/19/08
SPK-RPD	Nitrogen in Nitrite	NO2-N	93.301		RPD			0.712	20.000		08/19/08
SPK-RPD	Nitrogen in Nitrate	NO3-N	100.054		RPD			0.217	20.000		08/19/08

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081783  
 Matrix: WATER  
 Test: Anions by Ion Chromatography

Sample Date: 08/19/08  
 Receive Date: 08/19/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
SPK-RPD	Phosphate (P) by IC	PO4-P	95.346		RPD			0.288	20.000		08/19/08
SPK-RPD	Sulfate	14808-79-8	93.955		RPD			0.225	20.000		08/19/08
<b>BATCH QC</b>											
BLANK	Bromide	24959-67-9	<4.55e-2	n/a	mg/L	0.000	0.100			U	08/19/08
BLANK	Bromide	24959-67-9	<4.55e-2	n/a	mg/L	0.000	0.100			U	08/19/08
BLANK	Chloride	16887-00-6	<4.69e-2	n/a	mg/L	0.000	0.030			U	08/19/08
BLANK	Chloride	16887-00-6	<4.69e-2	n/a	mg/L	0.000	0.030			U	08/19/08
BLANK	Fluoride	16984-48-8	<2.32e-2	n/a	mg/L	0.000	0.030			U	08/19/08
BLANK	Fluoride	16984-48-8	<2.32e-2	n/a	mg/L	0.000	0.030			U	08/19/08
BLANK	Nitrogen in Nitrite	NO2-N	<1.28e-2	n/a	mg/L	0.000	0.020			U	08/19/08
BLANK	Nitrogen in Nitrite	NO2-N	<1.28e-2	n/a	mg/L	0.000	0.020			U	08/19/08
BLANK	Nitrogen in Nitrate	NO3-N	<1.21e-2	n/a	mg/L	0.000	0.040			U	08/19/08
BLANK	Nitrogen in Nitrate	NO3-N	<1.21e-2	n/a	mg/L	0.000	0.040			U	08/19/08
BLANK	Phosphate (P) by IC	PO4-P	<6.06e-2	n/a	mg/L	0.000	0.200			U	08/19/08
BLANK	Phosphate (P) by IC	PO4-P	<6.06e-2	n/a	mg/L	0.000	0.200			U	08/19/08
BLANK	Sulfate	14808-79-8	<0.132	n/a	mg/L	0.000	0.200			U	08/19/08
BLANK	Sulfate	14808-79-8	<0.132	n/a	mg/L	0.000	0.200			U	08/19/08
LCS	Bromide	24959-67-9	408.0099	101.243	% Recov	80.000	120.000				08/19/08
LCS	Chloride	16887-00-6	190.7114	94.881	% Recov	80.000	120.000				08/19/08
LCS	Fluoride	16984-48-8	108.0962	108.530	% Recov	80.000	120.000				08/19/08
LCS	Nitrogen in Nitrite	NO2-N	98.8371	99.434	% Recov	80.000	120.000				08/19/08
LCS	Nitrogen in Nitrate	NO3-N	93.4499	103.718	% Recov	80.000	120.000				08/19/08
LCS	Phosphate (P) by IC	PO4-P	199.6439	103.228	% Recov	80.000	120.000				08/19/08
LCS	Sulfate	14808-79-8	386.8314	97.685	% Recov	80.000	120.000				08/19/08

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081783  
 Matrix: WATER  
 Test: ICP Metals Analysis, Grd H2O P

Sample Date: 08/16/08  
 Receive Date: 08/18/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
<b>Lab ID: W08GR03395</b>											
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>											
MS	Iron	7439-89-6	-195800	-19580.000	% Recov	75.000	125.000				09/11/08
MSD	Iron	7439-89-6	-191000	-19100.000	% Recov	75.000	125.000				09/11/08
SPK-RPD	Iron	7439-89-6	-19100.000		RPD			-2.482	20.000		09/11/08
<b>BATCH QC</b>											
BLANK	Iron	7439-89-6	< 25	n/a	ug/L					U	09/11/08
LCS	Iron	7439-89-6	1002	100.200	% Recov	80.000	120.000				09/11/08

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081783  
 Matrix: WATER  
 Test: ICP-200.8 MS All possible meta

Sample Date: 08/20/08  
 Receive Date: 08/20/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W08GR03426 BATCH QC ASSOCIATED WITH SAMPLE											
MS	Arsenic	7440-38-2	39.97	99.925	% Recov	70.000	130.000				08/28/08
MS	Cadmium	7440-43-9	37.12	92.800	% Recov	70.000	130.000				08/28/08
MS	Chromium	7440-47-3	34.99	87.475	% Recov	70.000	130.000				08/28/08
MS	Copper	7440-50-8	32.25	80.625	% Recov	70.000	130.000				08/28/08
MS	Manganese	7439-98-5	36.21	90.525	% Recov	70.000	130.000				08/28/08
MS	Molybdenum	7439-98-7	38.78	96.950	% Recov	70.000	130.000				08/28/08
MS	Nickel	7440-02-0	35.75	89.375	% Recov	70.000	130.000				08/28/08
MS	Lead	7439-92-1	39.41	98.525	% Recov	70.000	130.000				08/28/08
MS	Zinc	7440-66-6	-373.2	-933.000	% Recov	70.000	130.000				08/28/08
MSD	Arsenic	7440-38-2	39.26	98.150	% Recov	70.000	130.000				08/28/08
MSD	Cadmium	7440-43-9	36.78	91.950	% Recov	70.000	130.000				08/28/08
MSD	Chromium	7440-47-3	33.89	84.725	% Recov	70.000	130.000				08/28/08
MSD	Copper	7440-50-8	33.89	84.725	% Recov	70.000	130.000				08/28/08
MSD	Manganese	7439-98-5	35.79	89.475	% Recov	70.000	130.000				08/28/08
MSD	Molybdenum	7439-98-7	38.29	95.725	% Recov	70.000	130.000				08/28/08
MSD	Nickel	7440-02-0	35.22	88.050	% Recov	70.000	130.000				08/28/08
MSD	Lead	7439-92-1	39.23	98.075	% Recov	70.000	130.000				08/28/08
MSD	Zinc	7440-66-6	264.5	661.250	% Recov	70.000	130.000				08/28/08
SPK-RPD	Arsenic	7440-38-2	98.150		RPD			1.792	20.000		08/28/08
SPK-RPD	Cadmium	7440-43-9	91.950		RPD			0.920	20.000		08/28/08
SPK-RPD	Chromium	7440-47-3	84.725		RPD			3.194	20.000		08/28/08
SPK-RPD	Copper	7440-50-8	84.725		RPD			4.959	20.000		08/28/08
SPK-RPD	Manganese	7439-98-5	89.475		RPD			1.167	20.000		08/28/08
SPK-RPD	Molybdenum	7439-98-7	95.725		RPD			1.272	20.000		08/28/08
SPK-RPD	Nickel	7440-02-0	88.050		RPD			1.494	20.000		08/28/08
SPK-RPD	Lead	7439-92-1	98.075		RPD			0.458	20.000		08/28/08

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081783  
 Matrix: WATER  
 Test: ICP-200.8 MS All possible meta

Sample Date: 08/20/08  
 Receive Date: 08/20/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
SPK-RPD	Zinc	7440-66-6	661.250		RPD			-1173.321	20.000 *		08/28/08
<b>BATCH QC</b>											
BLANK	Arsenic	7440-38-2	<0.4	n/a	ug/L					U	08/28/08
BLANK	Cadmium	7440-43-9	<0.1	n/a	ug/L					U	08/28/08
BLANK	Chromium	7440-47-3	<0.5	n/a	ug/L					U	08/28/08
BLANK	Copper	7440-50-8	<0.1	n/a	ug/L					U	08/28/08
BLANK	Manganese	7439-96-5	<0.1	n/a	ug/L					U	08/28/08
BLANK	Molybdenum	7439-98-7	<5e-2	n/a	ug/L					U	08/28/08
BLANK	Nickel	7440-02-0	<0.2	n/a	ug/L					U	08/28/08
BLANK	Lead	7439-92-1	<0.1	n/a	ug/L					U	08/28/08
BLANK	Zinc	7440-66-6	<0.8	n/a	ug/L					U	08/28/08
LCS	Arsenic	7440-38-2	37.21	93.025	% Recov	85.000	115.000				08/28/08
LCS	Cadmium	7440-43-9	37.22	93.050	% Recov	85.000	115.000				08/28/08
LCS	Chromium	7440-47-3	39.55	98.875	% Recov	85.000	115.000				08/28/08
LCS	Copper	7440-50-8	38.8	97.000	% Recov	85.000	115.000				08/28/08
LCS	Manganese	7439-96-5	39.02	97.550	% Recov	85.000	115.000				08/28/08
LCS	Molybdenum	7439-98-7	37.28	93.200	% Recov	85.000	115.000				08/28/08
LCS	Nickel	7440-02-0	39.06	97.650	% Recov	85.000	115.000				08/28/08
LCS	Lead	7439-92-1	38.92	97.300	% Recov	85.000	115.000				08/28/08
LCS	Zinc	7440-66-6	36.99	92.475	% Recov	85.000	115.000				08/28/08

# WSCF ANALYTICAL COMMENT REPORT

Attention: Steve Trent  
Project Number F08-155

Group #: WSCF20081783  
Department: Inorganic

Sample #	Client ID	Lab Area	Test	Comment
		VALGROUP		<p>ICP-MS: Zinc sample result more than 4 times spike amount. spike recovery data not valid. Also the variability of the zinc result (Sample 513, MS 139, MSD 778) indicate that zinc is not well distributed in the sample.</p> <p>ICP-AES: [Samples W08GR3412-3413] Iron sample result exceeds spiking level by a factor of 4 so spike recoveries are not valid. High and check standards used to ensure iron linearity because sample results are greater than the calibration standard.</p>

Lab Areas: VALGROUP - Group Validation  
LOGSAMP - Login for Sample

VALTEST - Test Validation  
LOGTEST - Login for Tests

TESTDATA - Test Data Entry

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M4W41-SLF-08-1024

ATTACHMENT 4

**SAMPLE RECEIPT INFORMATION**

Consisting of 4 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

File

ACKNOWLEDGMENT OF SAMPLES RECEIVED

09/03/08  
*[Handwritten signature]*

Groundwater Remediation Program

Richland, WA 99354  
Attn: Steve Trent

Customer Code: GPP  
PO#: 122616/ES10  
Group#: 20081783  
Project#: F08-155  
Proj Mgr: Steve Trent E6-35  
Phone: 373-5869

The following samples were received from you on 08/19/08. 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	Tests Scheduled	Matrix	Sample Date
W08GR03412	B1WR01	TRENT @2008	Water @GPP6010 @IC-30	08/19/08
W08GR03413	B1WPX7	TRENT @2008	Water @GPP6010 @IC-30	08/19/08

Test Acronym Description

Test Acronym	Description
@2008	ICP-200.8 MS All possible meta
@GPP6010	ICP Metals Analysis, Grd H2O P
@IC-30	Anions by Ion Chromatography
NH4-IC	Ammonia (N) by IC

<b>COLLECTOR</b> Alan Lopez	<b>COMPANY CONTACT</b> TRENT, SJ	<b>TELEPHONE NO.</b> 373-5869	<b>PROJECT COORDINATOR</b> WIDRIG, DL	<b>PRICE CODE</b> 7C	<b>DATA TURNAROUND</b> 15 Days / 15 Days
<b>SAMPLING LOCATION</b> C4689, I-012	<b>PROJECT DESIGNATION</b> ISRM - Zero Valent Iron Injection Sampling		<b>SAF NO.</b> F08-155	<b>AIR QUALITY</b> <input type="checkbox"/>	
<b>ICE CHEST NO.</b>	<b>FIELD LOGBOOK NO.</b> MSE - Monitoring Wells	<b>ACTUAL SAMPLE DEPTH</b>	<b>COA</b> 122616ES10	<b>METHOD OF SHIPMENT</b> GOVERNMENT VEHICLE	
<b>SHIPPED TO</b> Waste Sampling & Characterization 20081783			<b>OFFSITE PROPERTY NO.</b> N/A		
			<b>BILL OF LADING/AIR BILL NO.</b> N/A		

<b>MATRIX*</b> A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WL=Wipe X=Other	<b>POSSIBLE SAMPLE HAZARDS/ REMARKS</b> 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 5400.5 (1990/1993)	<b>PRESERVATION</b>	HNO3 to pH <2	H2SO4 to pH <2	Cool~4C
		<b>TYPE OF CONTAINER</b>	G/P	G/P	P
		<b>NO. OF CONTAINER(S)</b>	1	1	1
		<b>VOLUME</b>	500mL	250mL	500mL
		<b>SPECIAL HANDLING AND/OR STORAGE</b>	N/A		
	<b>SAMPLE ANALYSIS</b>	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	Cations (IC) - 300.7 (Nitrogen in ammonium)	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME			
B1WR01 W08GR03412	WATER	8/19/08	AL 0902	X	X	X

CHAIN OF POSSESSION	SIGN/ PRINT NAMES		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Alan Lopez	8/19/08 0915	ISRM Fridge	8/19/08 0915
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
ISRM Fridge	8/19/08 1045	R. Hermann	8/19/08 1045
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
R. Hermann	8/19/08 1225	TA P1721m	8/19/08 1225
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 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.

(1)ICP/MS - 200.8 (TAL) {Cadmium, Chromium, Copper, Manganese, Nickel, Zinc} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Molybdenum} ICP Metals - 6010B (TAL) {Iron}

(2)IC Anions - 300.0 {Bromide, Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphorus in phosphate, Sulfate}

**ICED**

22 of 23	<b>LABORATORY SECTION</b>	RECEIVED BY	TITLE	DATE/TIME
	<b>FINAL SAMPLE DISPOSITION</b>	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

<b>COLLECTOR</b> Adam Lopez		<b>COMPANY CONTACT</b> TRENT, SJ	<b>TELEPHONE NO.</b> 373-5869	<b>PROJECT COORDINATOR</b> WIDRIG, DL	<b>PRICE CODE</b> 7C	<b>DATA TURNAROUND</b> 15 Days / 15 Days
<b>SAMPLING LOCATION</b> C4688, I-013		<b>PROJECT DESIGNATION</b> ISRM - Zero Valent Iron Injection Sampling		<b>SAF NO.</b> F08-155	<b>AIR QUALITY</b> <input type="checkbox"/>	
<b>ICE CHEST NO.</b>		<b>FIELD LOGBOOK NO.</b> MSE - Monitoring Wells	<b>ACTUAL SAMPLE DEPTH</b>	<b>COA</b> 122616ES10	<b>METHOD OF SHIPMENT</b> GOVERNMENT VEHICLE	
<b>SHIPPED TO</b> Waste Sampling & Characterization		<b>OFFSITE PROPERTY NO.</b> N/A		<b>BILL OF LADING/AIR BILL NO.</b> N/A		

<b>MATRIX*</b> A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	<b>POSSIBLE SAMPLE HAZARDS/ REMARKS</b> 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 5400.5 (1990/1993)	<b>PRESERVATION</b>	HNO3 to pH <2	H2SO4 to pH <2	Cool~4C																
		<b>TYPE OF CONTAINER</b>	G/P	G/P	P																
		<b>NO. OF CONTAINER(S)</b>	1	1	1																
		<b>VOLUME</b>	500mL	250mL	500mL																
		<b>SPECIAL HANDLING AND/OR STORAGE</b>	N/A	<b>SAMPLE ANALYSIS</b>	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	Carbons (C) - 300.7 (Nitrogen in ammonium)	SEE ITEM (2) IN SPECIAL INSTRUCTIONS														

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME																
B1WPX7	3413 WATER	8/19/08	0900	X	X	X													

CHAIN OF POSSESSION		SIGN/ PRINT NAMES		SPECIAL INSTRUCTIONS	
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME		
Adam Lopez	8/19/08 0915	ISRM Fridge	8/19/08 0915	** The 100 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF. (1)ICP/MS - 200.8 (TAL) {Cadmium, Chromium, Copper, Manganese, Nickel, Zinc} ICP/MS - 200.8 (Add-on) {Arsenic, Lead, Molybdenum} ICP Metals - 6010B (TAL) {Iron} (2)IC Anions - 300.0 {Bromide, Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphorus in phosphate, Sulfate}	
ISRM Fridge	8/17/08 1045	R. Hermann	8/17/08 1045		
R. Hermann	8/17/08 1125	TA MAZIM	8/19/08 1125		

**ICED**

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

23 of 23