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FLUOR

Memorandum

M4W41-SLF-08-866

To: H. Hampt E6-35 Date: August 20, 2008

From: S. L. Fitzgerald, Manager
WSCF Analytical Lab

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 WSCF20081276 – SAF NUMBER F08-093

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 WSCF20081276:

- Cover Sheet (Attachment 1)
- Narrative (Attachment 2)
- Issue Resolution Form (Attachment 3)
- Analytical Results (Attachment 4)

SLF/grf

Attachments 4

M4W41-SLF-08-866

ATTACHMENT 1

COVER SHEET

Consisting of 2 pages
Including cover page

WSCF SAF NUMBER CROSS REFERENCE

	Group#:	WSCF20081276	
	Data Deliverable Date:	11-aug-2008	
	Data Deliverable:	Cover Sheet	
SAF#	Sample ID	WSCF#	Matrix
F08-093	B1VHM0	W08GR01844	SOIL

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ATTACHMENT 2

NARRATIVE

Consisting of 4 pages
Including cover page

Introduction

One S&GRP sample was received at the WSCF Laboratory on June 17, 2008. With the exception of Americium-241 analysis, sample was 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,* pages 12 through 13, for a complete listing of approved analytical methods.

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 per GRP Letter of Instruction. See pages 16 through 17 for QC details. Analytical Note(s):

- Sample results were D flagged if dilution(s) were required.
- Sample results that were less than the reportable limit, however greater than the method detection limit were B flagged.
- Sulfate and Nitrate - Duplicate Relative Percent Difference (RPD) slightly exceeded established laboratory limits. Analyte concentration is below the calibration range. No flag issued.
- Phosphate – The Phosphate recovery in the MS/MSD was low, therefore, the result was N flagged.

All other QC controls are within the established limits.

Cyanide – 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 GRP Letter of Instruction. See page 18 for QC details. Analytical Note(s):

- Matrix Spikes and Matrix Spike Duplicates were analyzed on samples B1TTT4 (SDG# 20081265, SAF# F08-049).

All 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 per the GRP Letter of Instruction. See pages 19 through 21 for QC details. Analytical Note(s):

- Sample results were D flagged if dilution(s) were required.
- Matrix Spikes and Matrix Spike Duplicates were analyzed on samples B1VHL8 (SDG# 20081141, SAF# F08-093) and B1V9M1 (SDG# 20081183, SAF# F08-045).
- Lithium – LCS recovery slightly exceeded established laboratory limits. Lithium has no certified value. Value is taken from multiple analyses. Sample result was X flagged.

Batch QC - B1VHL8

- Calcium and Boron contamination detected in the Blank was evaluated and there was no affect on sample results.
- Aluminum, Calcium, Iron, Magnesium and Titanium – Sample concentrations exceeded the spiking levels by a factor of 4. Spike recoveries are not valid. Check and high standards were analyzed to ensure linearity because sample results are greater than the calibration standard.
- Barium and Strontium – Matrix Spike recoveries exceeded established laboratory limits. Affected sample results were N flagged.
- Sodium – Matrix Spike and Matrix Spike Duplicate recoveries exceeded established laboratory limits. Affected sample result was N flagged.
- Bismuth – Laboratory Control Sample (LCS) used for soil samples does not contain Bismuth, and thus no Bismuth value or percent recovery is possible for the LCS. The instrument quality control for Bismuth is acceptable. Due to a LABCORE problem, the following QC is offered
  - Preparation Blank for Bismuth < 0.035 ppm
  - Matrix Spike Recovery = 92.7%
  - Matrix Spike Duplicate Recovery = 93.7%
  - Spike Relative Percent Difference (RPD) = 1.1%

All other 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 per the GRP Letter of Instruction. See pages 22 through 24 for QC details. Analytical Note(s):

- Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1V522 (SDG# 20081279, SAF# F08-101).

- Cadmium and Thallium – Laboratory Control Sample recoveries were less than established laboratory limits. The Cadmium recovery is 94% and the Thallium recovery was 88% of the established value. Affected sample was E flagged.

All other QC controls are within the established limits.

Radiochemistry Comments

Rad Chem – There are no hold times associated with WSCF's radiochemical methods. A Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 29 through 32 for QC details. Analytical Note(s):

- Americium-241 – Due to a Laboratory error, the Americium-241 was inadvertently analyzed by the Gamma Energy Analysis. (GEA) method instead of the requested Alpha Energy Analysis (AEA) method. All QC controls (Blank and Laboratory Control Sample) were within established laboratory limits.

- Matrix Spikes and Matrix Spike Duplicates were analyzed on samples B1TTT4 (SDG# 20081265, SAF# F08-049).

- Uranium-Duplicate – The duplicate RPD values did not meet the laboratory limits. We attributed the elevated RPD values to the non-homogeneous nature of soil and flagged the duplicate results.

All other 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 J. Kopriva
WSCF Client Services

M4W41-SLF-08-866

ATTACHMENT 3

ANALYTICAL RESULTS

Consisting of 27 pages
Including cover page

WSCF
ANALYTICAL RESULTS REPORT

for

Groundwater Remediation Program

Richland, WA 99354

Attention: Steve Trent

Analytical: S. Fitzgerald 8/20/08

Client Services: A. Kopesva 8/20/08

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

Contract#: FH-EIS-2003-MEM-001
Report#: WSCF20081276
Report Date: 19-aug-2008
Report WGPP/ver. 5.2
Groundwater Remediation Program

w13qlog v4.2 19-aug-2008 07:15:04

Department: Inorganic

W13q Worklist/Batch/QC Report for Group# WSCF20081276

WL#	S#	Batch	QC#	Tray Type	Sample#	Test
36901	1	37322	41667	BLANK		ICP-200.8 MS All possible meta
36901	2	37322	41667	LCS		ICP-200.8 MS All possible meta
36901	6	37322	41667	SAMPLE	W08GR01844	ICP-200.8 MS All possible meta
36901	4	37322	41667	MS	W08GR01845	ICP-200.8 MS All possible meta
36901	5	37322	41667	MSD	W08GR01845	ICP-200.8 MS All possible meta
36901	5	37322	41667	SPK-RPD	W08GR01845	ICP-200.8 MS All possible meta
36934	1	37356	41763	BLANK		Cyanide by Midi/Spectrophotom
36934	2	37356	41763	LCS		Cyanide by Midi/Spectrophotom
36934	4	37356	41763	MS	W08GR01837	Cyanide by Midi/Spectrophotom
36934	5	37356	41763	MSD	W08GR01837	Cyanide by Midi/Spectrophotom
36934	5	37356	41763	SPK-RPD	W08GR01837	Cyanide by Midi/Spectrophotom
36934	7	37356	41763	SAMPLE	W08GR01844	Cyanide by Midi/Spectrophotom
37430	2	37861	42175	BLANK		Anions by Ion Chromatography
37430	17	37861	42175	BLANK		Anions by Ion Chromatography
37430	3	37861	42175	LCS		Anions by Ion Chromatography
37430	5	37861	42175	DUP	W08GR01844	Anions by Ion Chromatography
37430	6	37861	42175	MS	W08GR01844	Anions by Ion Chromatography
37430	7	37861	42175	MSD	W08GR01844	Anions by Ion Chromatography
37430	4	37861	42175	SAMPLE	W08GR01844	Anions by Ion Chromatography
37430	7	37861	42175	SPK-RPD	W08GR01844	Anions by Ion Chromatography
37254	1	37682	42420	BLANK		ICP Metals Analysis, Grd H20 P
37254	2	37682	42420	LCS		ICP Metals Analysis, Grd H20 P
37254	4	37682	42420	MS	W08GR01494	ICP Metals Analysis, Grd H20 P
37254	5	37682	42420	MSD	W08GR01494	ICP Metals Analysis, Grd H20 P
37254	5	37682	42420	SPK-RPD	W08GR01494	ICP Metals Analysis, Grd H20 P
37254	20	37682	42420	MS	W08GR01660	ICP Metals Analysis, Grd H20 P
37254	21	37682	42420	MSD	W08GR01660	ICP Metals Analysis, Grd H20 P
37254	21	37682	42420	SPK-RPD	W08GR01660	ICP Metals Analysis, Grd H20 P
37254	11	37682	42420	SAMPLE	W08GR01844	ICP Metals Analysis, Grd H20 P

w13qlog v4.2 19-aug-2008 07:15:04

Department: Radiochemistry

W13q Worklist/Batch/QC Report for Group# WSCF20081276

WL#	S#	Batch	QC#	Tray Type	Sample#	Test
36991	1	37413	41813	BLANK		Gamma Energy Analysis-grd H2O
36991	2	37413	41813	LCS		Gamma Energy Analysis-grd H2O
36991	3	37413	41813	DUP	W08GR01837	Gamma Energy Analysis-grd H2O
36991	5	37413	41813	SAMPLE	W08GR01844	Gamma Energy Analysis-grd H2O
37075	1	37502	41917	BLANK		Strontium 89/90
37075	2	37502	41917	LCS		Strontium 89/90
37075	3	37502	41917	DUP	W08GR01837	Strontium 89/90
37075	6	37502	41917	SAMPLE	W08GR01844	Strontium 89/90
37075	7	37502	41917	SURR	W08GR01844	Strontium 89/90
37523	1	37963	42321	BLANK		Plutonium Isotopics by AEA
37523	2	37963	42321	LCS		Plutonium Isotopics by AEA
37523	3	37963	42321	DUP	W08GR01837	Plutonium Isotopics by AEA
37523	6	37963	42321	SAMPLE	W08GR01844	Plutonium Isotopics by AEA
37523	7	37963	42321	SURR	W08GR01844	Plutonium Isotopics by AEA
37522	1	37962	42347	BLANK		Uranium Isotopics by AEA
37522	2	37962	42347	LCS		Uranium Isotopics by AEA
37522	3	37962	42347	DUP	W08GR01837	Uranium Isotopics by AEA
37522	6	37962	42347	SAMPLE	W08GR01844	Uranium Isotopics by AEA
37522	7	37962	42347	SURR	W08GR01844	Uranium Isotopics by AEA

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.

LA-505-411	LA-505-411: ELEMENTAL ANALYSIS BY INDUCTIVELY COUPLED PLASMA ATOMIC EMISSION SPE	
	HEIS 6010_METALS_ICP	Inductively Coupled Plasma-Atomic Emmision Spectrometry
LA-505-412	LA-505-412: DETERMINATION OF TRACE ELEMENTS IN WATERS AND WASTES BY INDUCTIVELY	
	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
LA-533-410	LA-533-410: 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
LA-695-402	LA-695-402: DETERMINATION OF CYANIDE BY MIDIDISTILLATION AND SPECTROPHOTOMETRIC	
	EPA-600/4-79-020 335.2	Cyanide, Total
	HEIS 335.2_CYANIDE	Cyanide, Total

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.

WSCF
METHOD REFERENCES REPORT

Department: Radiochemistry

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.

LA-508-415	LA-508-415: OPERATION OF THE PROTEAN 2-INCH ALPHA/BETA COUNTING SYSTEM FOR GROSS	
	HEIS ALPHA_GPC	GROSS ALPHA GPC
	HEIS BETA_GPC	GROSS BETA GPC
	HEIS SRTOT_SEP_PRECIP_GPC	Strontium 89/90
LA-508-471	LA-508-471: ALPHA ENERGY ANALYZER DATA ACQUISITION AND SYSTEM CHECKOUT USING ALP	
	HEIS PUISO_IE_PRECIP_AEA	Plutonium by Alpha Energy Analysis
	HEIS RAISO_AEA	Radium-226
LA-508-481	LA-508-481: GAMMA ENERGY ANALYSIS USING PROCOUNT SOFTWARE	
	HEIS GAMMA_GS	Gamma Emmision Spectrometry

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.

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F08-093
Sample # W08GR01844
Client ID: B1VHM0 TRENT WSCF
Matrix: SOIL

Group #: WSCF20081276
Department: Inorganic
Sampled: 06/23/08
Received: 06/26/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Anions by Ion Chromatography Prep											**08/04/08**
Anions by Ion Chromatography											
Fluoride	16984-48-8	LA-533-410	DU	< 0.300	mg/kg			50.00	0.30		08/04/08
Chloride	16887-00-6	LA-533-410	BD	2.01	mg/kg			50.00	1.5		08/04/08
Nitrogen in Nitrite	NO2-N	LA-533-410	DU	< 0.500	mg/kg			50.00	0.50		08/04/08
Bromide	24959-67-9	LA-533-410	DU	< 1.50	mg/kg			50.00	1.5		08/04/08
Nitrogen in Nitrate	NO3-N	LA-533-410	BD	0.951	mg/kg			50.00	0.25		08/04/08
Phosphate (P) by IC	PO4-P	LA-533-410	DNU	< 2.00	mg/kg			50.00	2.0		08/04/08
Sulfate	14808-79-8	LA-533-410	BD	5.68	mg/kg			50.00	3.5		08/04/08
Cyanide											
Cyanide	57-12-5	LA-695-402	U	< 0.175	mg/kg			0.88	0.18		07/02/08
ICP Metals Analysis, Grd H20 P Prep											**07/24/08**
ICP Metals Analysis, Grd H20 P											
Aluminum	7429-90-5	LA-505-411		8.51e+03	mg/kg			86.49	4.5		08/15/08
Iron	7439-89-6	LA-505-411		1.49e+04	mg/kg			86.49	2.2		08/15/08
Magnesium	7439-95-4	LA-505-411		5.58e+03	mg/kg			86.49	4.3		08/15/08
Potassium	7440-09-7	LA-505-411		1.47e+03	mg/kg			86.49	15		08/15/08
Sodium	7440-23-5	LA-505-411	N	196	mg/kg			86.49	4.4		08/15/08
Barium	7440-39-3	LA-505-411	N	79.0	mg/kg			86.49	0.35		08/15/08
Calcium	7440-70-2	LA-505-411		1.46e+04	mg/kg			86.49	6.3		08/15/08
Lithium	7439-93-2	LA-505-411	X	11.9	mg/kg			86.49	0.35		08/15/08
Molybdenum	7439-98-7	LA-505-411	U	< 0.432	mg/kg			86.49	0.43		08/15/08
Strontium	7440-24-6	LA-505-411	N	49.9	mg/kg			86.49	0.35		08/15/08
Titanium	7440-32-6	LA-505-411	D	671	mg/kg			86.49	0.35		08/15/08
Arsenic	7440-38-2	LA-505-411		7.26	mg/kg			86.49	6.7		08/15/08

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)
E - Analyte is an estimate, has potentially larger errors(inorg)
U - Analyzed for but not detected above limiting criteria(inorg)
X - Other flags/notes described in the comments/narrative(inorg)
D - Analyte was identified at a secondary dilution factor(inorg)
N - Spike sample recovery is outside control limits.(inorg)
U - Analyzed for but not detected above limiting criteria.

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F08-093
Sample # W08GR01844
Client ID: B1VHM0 TRENT WSCF
Matrix: SOIL

Group #: WSCF20081276
Department: Inorganic
Sampled: 06/23/08
Received: 06/26/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Beryllium	7440-41-7	LA-505-411	U	< 0.346	mg/kg			86.49	0.35		08/15/08
Boron	7440-42-8	LA-505-411	U	< 1.73	mg/kg			86.49	1.7		08/15/08
Bismuth	7440-69-9	LA-505-411	U	< 3.03	mg/kg			86.49	3.0		08/15/08
ICP-200.8 MS All possible meta Prep											**06/30/08**
ICP-200.8 MS All possible meta											
Manganese	7439-96-5	LA-505-412		324	mg/kg			0.93	0.0926		07/01/08
Nickel	7440-02-0	LA-505-412		15.0	mg/kg			0.93	0.185		07/01/08
Silver	7440-22-4	LA-505-412	U	< 0.0926	mg/kg			0.93	0.0926		07/01/08
Antimony	7440-36-0	LA-505-412	U	< 0.278	mg/kg			0.93	0.278		07/01/08
Cadmium	7440-43-9	LA-505-412	E	0.120	mg/kg			0.93	0.0926		07/01/08
Chromium	7440-47-3	LA-505-412		14.5	mg/kg			0.93	0.463		07/01/08
Cobalt	7440-48-4	LA-505-412		6.05	mg/kg			0.93	0.0463		07/01/08
Copper	7440-50-8	LA-505-412		13.0	mg/kg			0.93	0.0926		07/01/08
Vanadium	7440-62-2	LA-505-412		26.5	mg/kg			0.93	0.185		07/01/08
Zinc	7440-66-6	LA-505-412		30.6	mg/kg			0.93	0.741		07/01/08
Lead	7439-92-1	LA-505-412		4.82	mg/kg			0.93	0.0926		07/01/08
Mercury	7439-97-6	LA-505-412	U	< 0.0463	mg/kg			0.93	0.0463		07/01/08
Uranium	7440-61-1	LA-505-412		1.71	mg/kg			0.93	0.0463		07/01/08
Selenium	7782-49-2	LA-505-412		0.370	mg/kg			0.93	0.278		07/01/08
Thallium	7440-28-0	LA-505-412	E	0.210	mg/kg			0.93	0.0926		07/01/08

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)
E - Analyte is an estimate, has potentially larger errors(inorg)
U - Analyzed for but not detected above limiting criteria(inorg)
X - Other flags/notes described in the comments/narrative(inorg)

D - Analyte was identified at a secondary dilution factor(inorg)
N - Spike sample recovery is outside control limits.(inorg)
U - Analyzed for but not detected above limiting criteria.

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081276
Matrix: SOLID
Test: Anions by Ion Chromatography

Sample Date: 06/23/08
Receive Date:06/26/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W08GR01844											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Bromide	24959-67-9	<1.5		RPD			n/a	20.000	U	08/04/08
DUP	Chloride	16887-00-6	<1.5		RPD			n/a	20.000	U	08/04/08
DUP	Fluoride	16984-48-8	<0.3		RPD			n/a	20.000	U	08/04/08
DUP	Nitrogen in Nitrite	NO2-N	<0.5		RPD			n/a	20.000	U	08/04/08
DUP	Nitrogen in Nitrate	NO3-N	0.7245		RPD			27.068	20.000 *		08/04/08
DUP	Phosphate (P) by IC	PO4-P	<2		RPD			n/a	20.000	U	08/04/08
DUP	Sulfate	14808-79-8	4.6301		RPD			20.283	20.000 *		08/04/08
MS	Bromide	24959-67-9	1.961346	97.096	% Recov	80.000	120.000				08/04/08
MS	Chloride	16887-00-6	1.00111	100.111	% Recov	80.000	120.000				08/04/08
MS	Fluoride	16984-48-8	0.439406	88.234	% Recov	80.000	120.000				08/04/08
MS	Nitrogen in Nitrite	NO2-N	0.47114	94.797	% Recov	80.000	120.000				08/04/08
MS	Nitrogen in Nitrate	NO3-N	0.435858	96.857	% Recov	80.000	120.000				08/04/08
MS	Phosphate (P) by IC	PO4-P	0.621722	64.294	% Recov	80.000	120.000		*		08/04/08
MS	Sulfate	14808-79-8	1.761728	88.976	% Recov	80.000	120.000				08/04/08
MSD	Bromide	24959-67-9	1.811608	89.684	% Recov	80.000	120.000				08/04/08
MSD	Chloride	16887-00-6	0.896248	89.625	% Recov	80.000	120.000				08/04/08
MSD	Fluoride	16984-48-8	0.421842	84.707	% Recov	80.000	120.000				08/04/08
MSD	Nitrogen in Nitrite	NO2-N	0.441128	88.758	% Recov	80.000	120.000				08/04/08
MSD	Nitrogen in Nitrate	NO3-N	0.41529	92.287	% Recov	80.000	120.000				08/04/08
MSD	Phosphate (P) by IC	PO4-P	0.585786	60.578	% Recov	80.000	120.000		*		08/04/08
MSD	Sulfate	14808-79-8	1.716028	86.668	% Recov	80.000	120.000				08/04/08
SPK-RPD	Bromide	24959-67-9	89.684		RPD			7.937	20.000		08/04/08
SPK-RPD	Chloride	16887-00-6	89.625		RPD			11.053	20.000		08/04/08
SPK-RPD	Fluoride	16984-48-8	84.707		RPD			4.079	20.000		08/04/08
SPK-RPD	Nitrogen in Nitrite	NO2-N	88.758		RPD			6.580	20.000		08/04/08
SPK-RPD	Nitrogen in Nitrate	NO3-N	92.287		RPD			4.832	20.000		08/04/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Inorganic**

SDG Number: WSCF20081276
Matrix: SOLID
Test: Anions by Ion Chromatography

Sample Date: 06/23/08
Receive Date:06/26/08

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	60.578		RPD			5.952	20.000		08/04/08
SPK-RPD	Sulfate	14808-79-8	86.668		RPD			2.628	20.000		08/04/08
BATCH QC											
BLANK	Bromide	24959-67-9	<3e-2	n/a	mg/L	0.000	0.100			U	08/04/08
BLANK	Bromide	24959-67-9	<3e-2	n/a	mg/L	0.000	0.100			U	08/04/08
BLANK	Chloride	16887-00-6	<3e-2	n/a	mg/L	0.000	0.030			U	08/04/08
BLANK	Chloride	16887-00-6	<3e-2	n/a	mg/L	0.000	0.030			U	08/04/08
BLANK	Fluoride	16984-48-8	<6e-3	n/a	mg/L	0.000	0.030			U	08/04/08
BLANK	Fluoride	16984-48-8	<6e-3	n/a	mg/L	0.000	0.030			U	08/04/08
BLANK	Nitrogen in Nitrite	NO2-N	<1e-2	n/a	mg/L	0.000	0.020			U	08/04/08
BLANK	Nitrogen in Nitrite	NO2-N	<1e-2	n/a	mg/L	0.000	0.020			U	08/04/08
BLANK	Nitrogen in Nitrate	NO3-N	<5e-3	n/a	mg/L	0.000	0.040			U	08/04/08
BLANK	Nitrogen in Nitrate	NO3-N	<5e-3	n/a	mg/L	0.000	0.040			U	08/04/08
BLANK	Phosphate (P) by IC	PO4-P	<4e-2	n/a	mg/L	0.000	0.200			U	08/04/08
BLANK	Phosphate (P) by IC	PO4-P	<4e-2	n/a	mg/L	0.000	0.200			U	08/04/08
BLANK	Sulfate	14808-79-8	<7e-2	n/a	mg/L	0.000	0.200			U	08/04/08
BLANK	Sulfate	14808-79-8	<7e-2	n/a	mg/L	0.000	0.200			U	08/04/08
LCS	Bromide	24959-67-9	415.5288	103.109	% Recov	80.000	120.000				08/04/08
LCS	Chloride	16887-00-6	199.4403	99.224	% Recov	80.000	120.000				08/04/08
LCS	Fluoride	16984-48-8	107.0049	107.435	% Recov	80.000	120.000				08/04/08
LCS	Nitrogen in Nitrite	NO2-N	103.2504	103.874	% Recov	80.000	120.000				08/04/08
LCS	Nitrogen in Nitrate	NO3-N	94.8425	105.264	% Recov	80.000	120.000				08/04/08
LCS	Phosphate (P) by IC	PO4-P	193.5884	100.097	% Recov	80.000	120.000				08/04/08
LCS	Sulfate	14808-79-8	391.7178	98.919	% Recov	80.000	120.000				08/04/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081276
Matrix: SOLID
Test: Cyanide by Midi/Spectrophotom

Sample Date: 06/24/08
Receive Date:06/24/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W08GR01837											
BATCH QC ASSOCIATED WITH SAMPLE											
MS	Cyanide by Midi/Spectrophotom	57-12-5	1.86	95.876	% Recov	75.000	125.000				07/02/08
MSD	Cyanide by Midi/Spectrophotom	57-12-5	2.03	98.544	% Recov	75.000	125.000				07/02/08
SPK-RPD	Cyanide by Midi/Spectrophotom	57-12-5	98.544		RPD			2.745	20.000		07/02/08
BATCH QC											
BLANK	Cyanide by Midi/Spectrophotom	57-12-5	< 4	n/a	ug/L	-4.000	4.000			U	07/02/08
LCS	Cyanide by Midi/Spectrophotom	57-12-5	45.7	91.400	% Recov	85.000	115.000				07/02/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081276
Matrix: SOLID
Test: ICP Metals Analysis, Grd H20 P

Sample Date: 06/04/08
Receive Date:06/05/08

Lab ID: W08GR01494
BATCH QC ASSOCIATED WITH SAMPLE

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
MS	Aluminum	7429-90-5	3358	1907.955	% Recov	75.000	125.000		•		08/15/08
MS	Arsenic	7440-38-2	169	96.023	% Recov	75.000	125.000				08/15/08
MS	Boron	7440-42-8	165.1	93.807	% Recov	75.000	125.000				08/15/08
MS	Barium	7440-39-3	123.9	140.795	% Recov	75.000	125.000		•		08/15/08
MS	Beryllium	7440-41-7	87.5269	99.462	% Recov	75.000	125.000				08/15/08
MS	Calcium	7440-70-2	2409	1368.750	% Recov	75.000	125.000		•		08/15/08
MS	Iron	7439-89-6	90	51.136	% Recov	75.000	125.000		•		08/15/08
MS	Potassium	7440-09-7	1855.1	105.403	% Recov	75.000	125.000				08/15/08
MS	Lithium	7439-93-2	83.032	94.355	% Recov	70.000	130.000				08/15/08
MS	Magnesium	7439-95-4	251	142.614	% Recov	75.000	125.000		•		08/15/08
MS	Molybdenum	7439-98-7	160.4431	91.161	% Recov	75.000	125.000				08/15/08
MS	Sodium	7440-23-5	740.3	420.625	% Recov	75.000	125.000		•		08/15/08
MS	Strontium	7440-24-6	114.63	130.261	% Recov	75.000	125.000		•		08/15/08
MS	Titanium	7440-32-6	-70	-39.773	% Recov	75.000	125.000		•		08/15/08
MSD	Aluminum	7429-90-5	1313	729.444	% Recov	75.000	125.000		•		08/15/08
MSD	Arsenic	7440-38-2	172	95.556	% Recov	75.000	125.000				08/15/08
MSD	Boron	7440-42-8	165.9	92.167	% Recov	75.000	125.000				08/15/08
MSD	Barium	7440-39-3	90.9	101.000	% Recov	75.000	125.000				08/15/08
MSD	Beryllium	7440-41-7	88.8769	98.752	% Recov	75.000	125.000				08/15/08
MSD	Calcium	7440-70-2	1719	955.000	% Recov	75.000	125.000		•		08/15/08
MSD	Iron	7439-89-6	-1270	-705.556	% Recov	75.000	125.000		•		08/15/08
MSD	Potassium	7440-09-7	1808.1	100.450	% Recov	75.000	125.000				08/15/08
MSD	Lithium	7439-93-2	82.742	91.936	% Recov	75.000	125.000				08/15/08
MSD	Magnesium	7439-95-4	46	25.556	% Recov	75.000	125.000		•		08/15/08
MSD	Molybdenum	7439-98-7	164.7431	91.524	% Recov	75.000	125.000				08/15/08
MSD	Sodium	7440-23-5	344.1	191.167	% Recov	75.000	125.000		•		08/15/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081276
Matrix: SOLID
Test: ICP Metals Analysis, Grd H20 P

Sample Date: 06/04/08
Receive Date:06/05/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
MSD	Strontium	7440-24-6	94.03	104.478	% Recov	75.000	125.000				08/15/08
MSD	Titanium	7440-32-6	-689	-382.778	% Recov	75.000	125.000		*		08/15/08
SPK-RPD	Aluminum	7429-90-5	729.444		RPD			89.369	20.000 *		08/16/08
SPK-RPD	Arsenic	7440-38-2	95.556		RPD			0.488	20.000		08/16/08
SPK-RPD	Boron	7440-42-8	92.167		RPD			1.764	20.000		08/16/08
SPK-RPD	Barium	7440-39-3	101.000		RPD			32.916	20.000 *		08/16/08
SPK-RPD	Beryllium	7440-41-7	98.752		RPD			0.716	20.000		08/16/08
SPK-RPD	Calcium	7440-70-2	955.000		RPD			35.611	20.000 *		08/16/08
SPK-RPD	Iron	7439-89-6	-705.556		RPD			-231.256	20.000 *		08/16/08
SPK-RPD	Potassium	7440-09-7	100.450		RPD			4.812	20.000		08/16/08
SPK-RPD	Lithium	7439-93-2	91.936		RPD			2.597	20.000		08/16/08
SPK-RPD	Magnesium	7439-95-4	25.556		RPD			139.214	20.000 *		08/16/08
SPK-RPD	Molybdenum	7439-98-7	91.524		RPD			0.397	20.000		08/16/08
SPK-RPD	Sodium	7440-23-5	191.167		RPD			75.012	20.000 *		08/16/08
SPK-RPD	Strontium	7440-24-6	104.478		RPD			21.967	20.000 *		08/16/08
SPK-RPD	Titanium	7440-32-6	-382.778		RPD			-162.350	20.000 *		08/16/08
Lab ID: W08GR01660											
BATCH QC ASSOCIATED WITH SAMPLE											
MS	Lithium	7439-93-2	82.148	91.276	% Recov	70.000	130.000				08/15/08
MSD	Lithium	7439-93-2	85.648	91.115	% Recov	75.000	125.000				08/16/08
SPK-RPD	Lithium	7439-93-2	91.115		RPD			0.177	20.000		08/16/08
BATCH QC											
BLANK	Aluminum	7429-90-5	<5.2e-2	n/a	ug/mL					U	08/15/08
BLANK	Arsenic	7440-38-2	<7.8e-2	n/a	ug/mL					U	08/15/08
BLANK	Boron	7440-42-8	7.16e-2	0.072	ug/mL						08/15/08
BLANK	Barium	7440-39-3	<4e-3	n/a	ug/mL					U	08/15/08
BLANK	Beryllium	7440-41-7	<4e-3	n/a	ug/mL					U	08/15/08
BLANK	Calcium	7440-70-2	0.2408	0.241	ug/mL						08/15/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081276
Matrix: SOLID
Test: ICP Metals Analysis, Grd H20 P

Sample Date:
Receive Date:

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
BLANK	Iron	7439-89-6	<2.5e-2	n/a	ug/mL					U	08/15/08
BLANK	Potassium	7440-09-7	<0.17	n/a	ug/mL					U	08/15/08
BLANK	Lithium	7439-93-2	<4e-3	n/a	ug/mL					U	08/15/08
BLANK	Magnesium	7439-95-4	<5e-2	n/a	ug/mL					U	08/15/08
BLANK	Molybdenum	7439-98-7	<5e-3	n/a	ug/mL					U	08/15/08
BLANK	Sodium	7440-23-5	<5.1e-2	n/a	ug/mL					U	08/15/08
BLANK	Strontium	7440-24-6	<4e-3	n/a	ug/mL					U	08/15/08
BLANK	Titanium	7440-32-6	<4e-3	n/a	ug/mL					U	08/15/08
LCS	Aluminum	7429-90-5	9273	112.264	% Recov	44.000	157.000				08/15/08
LCS	Arsenic	7440-38-2	130	98.485	% Recov	79.000	121.000				08/15/08
LCS	Boron	7440-42-8	119.7	104.087	% Recov	45.000	156.000				08/15/08
LCS	Barium	7440-39-3	306	95.925	% Recov	80.000	120.000				08/15/08
LCS	Beryllium	7440-41-7	90.25	100.838	% Recov	81.000	119.000				08/15/08
LCS	Calcium	7440-70-2	3918	99.949	% Recov	76.000	124.000				08/15/08
LCS	Iron	7439-89-6	17130	127.836	% Recov	47.000	152.000				08/15/08
LCS	Potassium	7440-09-7	3491	100.896	% Recov	64.000	136.000				08/15/08
LCS	Lithium	7439-93-2	7.588	127.315	% Recov	80.000	120.000				08/15/08
LCS	Magnesium	7439-95-4	2587	99.119	% Recov	71.000	129.000				08/15/08
LCS	Molybdenum	7439-98-7	48.29	99.158	% Recov	79.000	121.000				08/15/08
LCS	Sodium	7440-23-5	550	93.537	% Recov	51.000	149.000				08/15/08
LCS	Strontium	7440-24-6	57.75	106.158	% Recov	74.000	126.000				08/15/08
LCS	Titanium	7440-32-6	371.4	139.624	% Recov	9.000	191.000				08/15/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081276
Matrix: SOLID
Test: ICP-200.8 MS All possible meta

Sample Date: 06/25/08
Receive Date:06/26/08

Lab ID: W08GR01845
BATCH QC ASSOCIATED WITH SAMPLE

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
MS	Silver	7440-22-4	159.4	90.568	% Recov	70.000	130.000				07/01/08
MS	Cadmium	7440-43-9	164	93.182	% Recov	70.000	130.000				07/01/08
MS	Cobalt	7440-48-4	147.37	83.733	% Recov	70.000	130.000				07/01/08
MS	Chromium	7440-47-3	150.54	85.534	% Recov	70.000	130.000				07/01/08
MS	Copper	7440-50-8	146	82.955	% Recov	70.000	130.000				07/01/08
MS	Mercury	7439-97-6	1.7	96.591	% Recov	70.000	130.000				07/01/08
MS	Manganese	7439-96-5	144.1	81.875	% Recov	70.000	130.000				07/01/08
MS	Nickel	7440-02-0	148.02	84.102	% Recov	70.000	130.000				07/01/08
MS	Lead	7439-92-1	162.16	92.136	% Recov	70.000	130.000				07/01/08
MS	Antimony	7440-36-0	153.3	87.102	% Recov	70.000	130.000				07/01/08
MS	Selenium	7782-49-2	164.68	93.568	% Recov	70.000	130.000				07/01/08
MS	Thallium	7440-28-0	152.5	86.648	% Recov	70.000	130.000				07/01/08
MS	Uranium	7440-61-1	167.24	95.023	% Recov	70.000	130.000				07/01/08
MS	Vanadium	7440-62-2	142.12	80.750	% Recov	70.000	130.000				07/01/08
MS	Zinc	7440-66-6	151.97	86.347	% Recov	70.000	130.000				07/01/08
MSD	Silver	7440-22-4	155.4	89.310	% Recov	70.000	130.000				07/01/08
MSD	Cadmium	7440-43-9	158.7	91.207	% Recov	70.000	130.000				07/01/08
MSD	Cobalt	7440-48-4	147.67	84.868	% Recov	70.000	130.000				07/01/08
MSD	Chromium	7440-47-3	150.14	86.287	% Recov	70.000	130.000				07/01/08
MSD	Copper	7440-50-8	146.5	84.195	% Recov	70.000	130.000				07/01/08
MSD	Mercury	7439-97-6	1.69	97.126	% Recov	70.000	130.000				07/01/08
MSD	Manganese	7439-96-5	142.5	81.897	% Recov	70.000	130.000				07/01/08
MSD	Nickel	7440-02-0	148.32	85.241	% Recov	70.000	130.000				07/01/08
MSD	Lead	7439-92-1	160.86	92.448	% Recov	70.000	130.000				07/01/08
MSD	Antimony	7440-36-0	147.4	84.713	% Recov	70.000	130.000				07/01/08
MSD	Selenium	7782-49-2	161.78	92.977	% Recov	70.000	130.000				07/01/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081276
Matrix: SOLID
Test: ICP-200.8 MS All possible meta

Sample Date: 06/25/08
Receive Date:06/26/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
MSD	Thallium	7440-28-0	151.7	87.184	% Recov	70.000	130.000				07/01/08
MSD	Uranium	7440-61-1	164.54	94.563	% Recov	70.000	130.000				07/01/08
MSD	Vanadium	7440-62-2	139.92	80.414	% Recov	70.000	130.000				07/01/08
MSD	Zinc	7440-66-6	150.17	86.305	% Recov	70.000	130.000				07/01/08
SPK-RPD	Silver	7440-22-4	89.310		RPD			1.399	20.000		07/01/08
SPK-RPD	Cadmium	7440-43-9	91.207		RPD			2.142	20.000		07/01/08
SPK-RPD	Cobalt	7440-48-4	84.868		RPD			1.346	20.000		07/01/08
SPK-RPD	Chromium	7440-47-3	86.287		RPD			0.876	20.000		07/01/08
SPK-RPD	Copper	7440-50-8	84.195		RPD			1.484	20.000		07/01/08
SPK-RPD	Mercury	7439-97-6	97.126		RPD			0.552	20.000		07/01/08
SPK-RPD	Manganese	7439-96-5	81.897		RPD			0.027	20.000		07/01/08
SPK-RPD	Nickel	7440-02-0	85.241		RPD			1.345	20.000		07/01/08
SPK-RPD	Lead	7439-92-1	92.448		RPD			0.338	20.000		07/01/08
SPK-RPD	Antimony	7440-36-0	84.713		RPD			2.781	20.000		07/01/08
SPK-RPD	Selenium	7782-49-2	92.977		RPD			0.634	20.000		07/01/08
SPK-RPD	Thallium	7440-28-0	87.184		RPD			0.617	20.000		07/01/08
SPK-RPD	Uranium	7440-61-1	94.563		RPD			0.485	20.000		07/01/08
SPK-RPD	Vanadium	7440-62-2	80.414		RPD			0.417	20.000		07/01/08
SPK-RPD	Zinc	7440-66-6	86.305		RPD			0.049	20.000		07/01/08
BATCH QC											
BLANK	Silver	7440-22-4	<0.1	n/a	ug/L					U	07/01/08
BLANK	Cadmium	7440-43-9	<0.1	n/a	ug/L					U	07/01/08
BLANK	Cobalt	7440-48-4	<5e-2	n/a	ug/L					U	07/01/08
BLANK	Chromium	7440-47-3	<0.5	n/a	ug/L					U	07/01/08
BLANK	Copper	7440-50-8	<0.1	n/a	ug/L					U	07/01/08
BLANK	Mercury	7439-97-6	<5e-2	n/a	ug/L					U	07/01/08
BLANK	Manganese	7439-96-5	<0.1	n/a	ug/L					U	07/01/08
BLANK	Nickel	7440-02-0	<0.2	n/a	ug/L					U	07/01/08
BLANK	Lead	7439-92-1	<0.1	n/a	ug/L					U	07/01/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081276
Matrix: SOLID
Test: ICP-200.8 MS All possible meta

Sample Date:
Receive Date:

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
BLANK	Antimony	7440-36-0	<0.3	n/a	ug/L					U	07/01/08
BLANK	Selenium	7782-49-2	<0.3	n/a	ug/L					U	07/01/08
BLANK	Thallium	7440-28-0	<0.1	n/a	ug/L					U	07/01/08
BLANK	Uranium	7440-61-1	<5e-2	n/a	ug/L					U	07/01/08
BLANK	Vanadium	7440-62-2	<0.2	n/a	ug/L					U	07/01/08
BLANK	Zinc	7440-66-6	<0.8	n/a	ug/L					U	07/01/08
LCS	Silver	7440-22-4	99.4	98.416	% Recov	98.000	134.000				07/01/08
LCS	Cadmium	7440-43-9	62.58	94.105	% Recov	95.000	124.000			*	07/01/08
LCS	Cobalt	7440-48-4	66.19	90.547	% Recov	88.000	119.000				07/01/08
LCS	Chromium	7440-47-3	64.64	88.669	% Recov	77.000	125.000				07/01/08
LCS	Copper	7440-50-8	58.81	85.854	% Recov	84.000	122.000				07/01/08
LCS	Mercury	7439-97-6	7.16	86.473	% Recov	71.000	132.000				07/01/08
LCS	Manganese	7439-96-5	405.5	89.514	% Recov	83.000	118.000				07/01/08
LCS	Nickel	7440-02-0	50.23	90.342	% Recov	90.000	121.000				07/01/08
LCS	Lead	7439-92-1	122.8	94.462	% Recov	92.000	123.000				07/01/08
LCS	Antimony	7440-36-0	126.7	140.486	% Recov	114.000	260.000				07/01/08
LCS	Selenium	7782-49-2	161	100.000	% Recov	52.000	157.000				07/01/08
LCS	Thallium	7440-28-0	118.7	89.248	% Recov	92.000	123.000			*	07/01/08
LCS	Uranium	7440-61-1	362.7	90.675	% Recov	81.000	125.000				07/01/08
LCS	Vanadium	7440-62-2	72.95	87.892	% Recov	81.000	122.000				07/01/08
LCS	Zinc	7440-66-6	163.1	92.147	% Recov	85.000	130.000				07/01/08

WSCF
ANALYTICAL COMMENT REPORT

Attention: Steve Trent
Project Number F08-093

Group #: WSCF20081276
Department: Inorganic

Sample #	Client ID	Lab Area	Test	Comment
		VALGROUP		ICP-MS: LCS for Cadmium and thallium below statistical limit but Cadmium recovery is 94% and Thallium recovery 88% of established value. Data accetpted with "E" flag IC Anion - Sample dup RPD out of limits for nitrate and sulfate in sample W08GR01844; Analyte concentrations below calibration range. DTS IC Anion - MS/MSD recoveries low for phosphate in sample W08GR01844; Data N-flagged. DTS U-ISO dup is flagged due to inhomogeneity of the sample. lmh ICP-AES: High calcium and boron preparation blank results; "C" flag if applicable. High lithium and chromium LCS recoveries; "X" flag. Lithium has no certified value. It's value was taken from multiple analyses. Aluminum, iron, magnesium, calcium, and titanium sample results exceed spiking level by a factor of 4 so spike recoveries are not valid. High strontium and barium MS and sodium MS and MSD recoveries; "N" flag. Check and high standards used to ensure aluminum, calcium, iron, magnesium, and sodium linearity because sample results

Lab Areas: VALGROUP - Group Validation
LOGSAMP - Login for Sample
VALTEST - Test Validation
LOGTEST - Login for Tests
TESTDATA - Test Data Entry

WSCF
ANALYTICAL COMMENT REPORT

Attention: Steve Trent
Project Number F08-093

Group #: WSCF20081276
Department: Inorganic

Sample #	Client ID	Lab Area	Test	Comment
				are greater than the calibration standard. Bismuth preparation blank result is <0.035 ppm, no bismuth is present in the LCS, and the MS and MSD recoveries are 92.7% and 93.7%, respectively.

Lab Areas: VALGROUP - Group Validation
LOGSAMP - Login for Sample
VALTEST - Test Validation
LOGTEST - Login for Tests
TESTDATA - Test Data Entry

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent
SAF Number: F08-093
Sample # W08GR01844
Client ID: B1VHM0 TRENT WSCF
Matrix: SOIL

Group #: WSCF20081276
Department: Radiochemistry
Sampled: 06/23/08
Received: 06/26/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Gamma Energy Analysis-grd H2O											
Americium-241	14596-10-2	LA-508-481	U	-0.0607	pCi/g	+-0.0607	pCi/g	1.00	0.088		07/08/08
Cesium-137	10045-97-3	LA-508-481	U	3.85e-03	pCi/g	+-7.57e-03	pCi/g	1.00	0.011		07/08/08
Europium-154	15585-10-1	LA-508-481	U	7.97e-03	pCi/g	+-0.0223	pCi/g	1.00	0.034		07/08/08
Plutonium Isotopics by AEA											
Plutonium-238	13981-16-3	LA-508-471	U	0.0210	pCi/g	+-0.0326	pCi/g	1.00	0.053		08/11/08
Pu-239/240 by AEA	PU-239/240	LA-508-471	U	1.90e-03	pCi/g	+-8.51e-03	pCi/g	1.00	0.018		08/11/08
Pu-242 tracer by AEA	PU242	LA-508-471		6.00	pCi/g			1.00	0.018		08/11/08
Strontium 89/90											
Strontium-89/90	SR-RAD	LA-508-415	U	0.530	pCi/g	+-0.583	pCi/g	1.00	0.37		07/15/08
Sr-85 Tracer by Beta Counting	SR85	LA-508-415		92.3	Percent			1.00	0.0		07/15/08
Uranium Isotopics by AEA											
Uranium-233/234	U-233/234	LA-508-471		0.530	pCi/g	+-0.148	pCi/g	1.00	4.4e-03		08/11/08
Uranium-235	15117-96-1	LA-508-471		0.0430	pCi/g	+-0.0215	pCi/g	1.00	0.013		08/11/08
Uranium-238	U-238	LA-508-471		0.650	pCi/g	+-0.182	pCi/g	1.00	0.015		08/11/08
U-232 tracer by AEA	U232	LA-508-471		3.90	pCi/g			1.00	0.026		08/11/08

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)
E - Analyte is an estimate, has potentially larger errors(inorg)
U - Analyzed for but not detected above limiting criteria(inorg)
X - Other flags/notes described in the comments/narrative(inorg)

D - Analyte was identified at a secondary dilution factor(inorg)
N - Spike sample recovery is outside control limits.(inorg)
U - Analyzed for but not detected above limiting criteria.

* - Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

WSCF
TENTATIVELY IDENTIFIED PEAK REPORT

Attention: Steve Trent
Project Number F08-093 :F08-093

Group #: WSCF20081276
Department: Radiochemistry

Sample #	Client ID		Test Name	Peak Name	CAS#	RT	RQ	Result	Units
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	AC-228				0.99	pCi/g
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	AC-228 Count Error				16	%
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	BI-212				0.70	pCi/g
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	BI-212 Count Error				19	%
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	BI-214				0.87	pCi/g
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	BI-214 Count Error				11	%
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	CS-134				0.056	pCi/g
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	CS-134 Count Error				27	%
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	K-40				13	pCi/g
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	K-40 Count Error				13	%
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	PB-212				1.2	pCi/g
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	PB-212 Count Error				9.6	%
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	PB-214				1.5	pCi/g
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	PB-214 Count Error				18	%
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	RA-226				0.77	pCi/g
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	RA-226 Count Error				16	%
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	RA-228				1.1	pCi/g
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	RA-228 Count Error				15	%
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	SN-126				0.22	pCi/g
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	SN-126 Count Error				20	%
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	TH-234				1.4	pCi/g
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	TH-234 Count Error				21	%
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	TL-208				0.33	pCi/g
W08GR01844	B1VHM0	TRENT	Gamma Energy Analysis-grd H2O	TL-208 Count Error				13	%

RQ=Result Qualifier

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20081276
Matrix: SOLID
Test: Gamma Energy Analysis-grd H2O

Sample Date: 06/24/08
Receive Date:06/24/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W08GR01837											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Cesium-137	10045-97-3	U3.091e-3		RPD			n/a	20.000		07/10/08
BATCH QC											
BLANK	Americium-241	14596-10-2	U-2.814e-3	n/a	pCi/g	-10.000	1000.000				07/09/08
BLANK	Cesium-137	10045-97-3	U-3.509e-3	n/a	pCi/g	-10.000	1000.000				07/09/08
BLANK	Europium-154	15585-10-1	U-7.18e-4	n/a	pCi/g	-10.000	1000.000				07/09/08
LCS	Americium-241	14596-10-2	15830	96.524	% Recov	80.000	120.000				07/09/08
LCS	Cesium-137	10045-97-3	6281	103.990	% Recov	80.000	120.000				07/09/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20081276
Matrix: SOLID
Test: Plutonium Isotopics by AEA

Sample Date: 06/24/08
Receive Date:06/24/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W08GR01837											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Plutonium-238	13981-16-3	U-1.8e-2		RPD			n/a	20.000		08/11/08
DUP	Pu-239/240 by AEA	PU-239/240	U4e-3		RPD			n/a	20.000		08/11/08
DUP	Pu-242 tracer by AEA	PU242	6.019	80.460	% Recov	30.000	105.000				08/11/08
Lab ID: W08GR01844											
BATCH QC ASSOCIATED WITH SAMPLE											
SURR	Pu-242 tracer by AEA	PU242	5.973	79.440	% Recov	30.000	105.000				08/11/08
BATCH QC											
BLANK	Plutonium-238	13981-16-3	U-2.6e-3	n/a	pCi/g	-10.000	1000.000				08/11/08
BLANK	Pu-239/240 by AEA	PU-239/240	U5.3e-3	n/a	pCi/g	-10.000	1000.000				08/11/08
BLANK	Pu-242 tracer by AEA	PU242	6.236	61.710	% Recov	30.000	105.000				08/11/08
LCS	Pu-239/240 by AEA	PU-239/240	12.33	95.991	% Recov	80.000	120.000				08/11/08
LCS	Pu-242 tracer by AEA	PU242	17.3	75.300	% Recov	30.000	105.000				08/11/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20081276
Matrix: SOLID
Test: Strontium 89/90

Sample Date: 06/24/08
Receive Date:06/24/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W08GR01837											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Sr-85 Tracer by Beta Counting	SR85	101	101.000	% Recov	30.000	105.000				07/15/08
DUP	Strontium-89/90	SR-RAD	U-2.4E-01		RPD			n/a	20.000		07/15/08
Lab ID: W08GR01844											
BATCH QC ASSOCIATED WITH SAMPLE											
SURR	Sr-85 Tracer by Beta Counting	SR85	92.8	92.800	% Recov	30.000	105.000				07/15/08
BATCH QC											
BLANK	Sr-85 Tracer by Beta Counting	SR85	91.6	91.600	% Recov	30.000	105.000				07/15/08
BLANK	Strontium-89/90	10098-97-2	U4.8E-02	n/a	pCi/g	-10.000	300.000				07/15/08
LCS	Sr-85 Tracer by Beta Counting	SR85	95.3	95.300	% Recov	30.000	105.000				07/15/08
LCS	Strontium-89/90	10098-97-2	72.1	103.876	% Recov	80.000	120.000				07/15/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20081276
Matrix: SOLID
Test: Uranium Isotopics by AEA

Sample Date: 06/24/08
Receive Date:06/24/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W08GR01837											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	U-232 tracer by AEA	U232	3.95	90.200	% Recov	30.000	105.000				08/12/08
DUP	Uranium-233/234	U-233/234	0.6944		RPD			71.144	20.000 •		08/12/08
DUP	Uranium-235	15117-96-1	4.7e-2		RPD			32.099	20.000 •		08/12/08
DUP	Uranium-238	U-238	0.86		RPD			81.967	20.000 •		08/12/08
Lab ID: W08GR01844											
BATCH QC ASSOCIATED WITH SAMPLE											
SURR	U-232 tracer by AEA	U232	3.92	103.080	% Recov	30.000	105.000				08/11/08
BATCH QC											
BLANK	U-232 tracer by AEA	U232	4.092	87.530	% Recov	30.000	105.000				08/11/08
BLANK	Uranium-233/234	13966-29-5	1.5e-2	0.015	pCi/g	-10.000	1000.000				08/11/08
BLANK	Uranium-235	15117-96-1	U8.1e-3	n/a	pCi/g	-10.000	1000.000				08/11/08
BLANK	Uranium-238	24678-82-8	U1.9e-3	n/a	pCi/g	-10.000	1000.000				08/11/08
LCS	U-232 tracer by AEA	U232	11.36	95.000	% Recov	30.000	105.000				08/11/08
LCS	Uranium-233/234	13966-29-5	N/A	n/a	% Recov	75.000	125.000				08/11/08
LCS	Uranium-235	15117-96-1	N/A	n/a	% Recov	75.000	125.000				08/11/08
LCS	Uranium-238	24678-82-8	20.28	106.990	% Recov	80.000	120.000				08/11/08

WSCF
ANALYTICAL COMMENT REPORT

Attention: Steve Trent
Project Number F08-093

Group #: WSCF20081276
Department: Radiochemistry

Sample #	Client ID	Lab Area	Test	Comment
		VALGROUP		ICP-MS: LCS for Cadmium and thallium below statistical limit but Cadmium recovery is 94% and Thallium recovery 88% of established value. Data accetpted with "E" flag IC Anion - Sample dup RPD out of limits for nitrate and sulfate in sample W08GR01844; Analyte concentrations below calibration range. DTS IC Anion - MS/MSD recoveries low for phosphate in sample W08GR01844; Data N-flagged. DTS U-ISO dup is flagged due to inhomogeneity of the sample. lmh ICP-AES: High calcium and boron preparation blank results; "C" flag if applicable. High lithium and chromium LCS recoveries; "X" flag. Lithium has no certified value. It's value was taken from multiple analyses. Aluminum, iron, magnesium, calcium, and titanium sample results exceed spiking level by a factor of 4 so spike recoveries are not valid. High strontium and barium MS and sodium MS and MSD recoveries; "N" flag. Check and high standards used to ensure aluminum, calcium, iron, magnesium, and sodium linearity because sample results

Lab Areas: VALGROUP - Group Validation
LOGSAMP - Login for Sample
VALTEST - Test Validation
LOGTEST - Login for Tests
TESTDATA - Test Data Entry

WSCF
ANALYTICAL COMMENT REPORT

Attention: Steve Trent
Project Number F08-093

Group #: WSCF20081276
Department: Radiochemistry

Sample #	Client ID	Lab Area	Test	Comment
				are greater than the calibration standard. Bismuth preparation blank result is <0.035 ppm, no bismuth is present in the LCS, and the MS and MSD recoveries are 92.7% and 93.7%, respectively.

Lab Areas: VALGROUP - Group Validation
LOGSAMP - Login for Sample
VALTEST - Test Validation
LOGTEST - Login for Tests
TESTDATA - Test Data Entry

M4W41-SLF-08-866

ATTACHMENT 4

SAMPLE RECEIPT INFORMATION

Consisting of 3 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
08/11/08
tf

ACKNOWLEDGMENT OF SAMPLES RECEIVED

Groundwater Remediation Program
Richland, WA 99354
Attn: Steve Trent

Customer Code: GPP
PO#: 123123ES10
Group#: 20081276
Project#: F08-093
Proj Mgr: Steve Trent
Phone: 373-5869

The following samples were received from you on 06/26/08. 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	Matrix / Tests Scheduled					Sample Date
W08GR01844	B1VHM0	TRENT		Solid, or handle as if solid			06/23/0
		@2008	@AEA-30	@AEA-32	@GEA-GPP	@GPP6010	
		@IC-30	@SR89_90	CN-02			

Test Acronym Description

Test Acronym	Description
@2008	ICP-200.8 MS All possible meta
@AEA-30	Plutonium Isotopics by AEA
@AEA-32	Uranium Isotopics by AEA
@GEA-GPP	Gamma Energy Analysis-grd H2O
@GPP6010	ICP Metals Analysis, Grd H20 P
@IC-30	Anions by Ion Chromatography
@SR89_90	Strontium 89/90
CN-02	Cyanide by Midi/Spectrophotom

Page 01/11/08

COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	PRICE CODE 8N	DATA TURNAROUND
Dale, Rich, Jubal	TRENT, SJ	373-5869	WIDRIG, DL	AIR QUALITY ☐	45 Days / 45 Days
SAMPLING LOCATION	**PROJECT DESIGNATION**		**SAF NO.**		
C5854 I-003	200-CW-1 Model Group 5 Sampling - Large Ponds and Waste Sites		F08-093		
ICE CHEST NO.	**FIELD LOGBOOK NO.**	**ACTUAL SAMPLE DEPTH**	**COA**	**METHOD OF SHIPMENT**	
~~SAWS 002~~	HNF-N-575 4	135.5 - 137	123123ES10	GOVERNMENT VEHICLE	
SHIPPED TO	**OFFSITE PROPERTY NO.**		**BILL OF LADING/AIR BILL NO.**		
Waste Sampling & Characterization 20082276					

MATRIX*
A=Air
DL=Drum Liquids
DS=Drum Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegitation
W=Water
WI=Wipe
X=Other

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 HANDLING AND/OR STORAGE
Radioactive Tie to B1VHM3

PRESERVATION	Cool~4C	None
TYPE OF CONTAINER	G/P	Square Bottle - Poly
NO. OF CONTAINER(S)	1	1
VOLUME	250mL	500mL
SAMPLE ANALYSIS	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME										
B1VHM0 W0806R01844	SOIL	6-23-08	1050	028938	377548								

CHAIN OF POSSESSION

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
R. PFISTER/	6/23/08 1230	U-10 SITE FRIG# GW-RMA-065	1230
U-10 SITE FRIG#	6/26/08 7:30		6/26/08 7:30
	6/26/08 0755	TA TRAILER	6/26/08 0755

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

(1)ICP/MS - 200.8 (TAL) {Antimony, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Silver, Vanadium, Zinc} ICP/MS - 200.8 (Add-on) {Lead, Selenium, Thallium, Uranium} ICP Metals - 6010B (TAL) {Aluminum, Barium, Calcium, Iron, Magnesium, Potassium, Sodium} ICP Metals - 6010B (Add-On) {Arsenic, Beryllium, Bismuth, Boron, Lithium, Molybdenum, Strontium, Titanium} 200.8_HG - ICPMS {Mercury} IC Anions - 300.0 {Chloride, Fluoride, Nitrogen in Nitrate, Nitrogen in Nitrite, Phosphorus in phosphate, Sulfate} Cyanide (Total) - 335.2;
(2)Gamma Spectroscopy {Cesium-137, Europium-154} Americium-241 {Americium-241} Isotopic Plutonium {Plutonium-239/240} Isotopic Uranium {Uranium-238} Strontium-89,90 -- Total Sr;

ICED

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

A-6003-618(01/06)