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RECEIVED SEPTEMBER 2, 2008

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WSCF Analytical Lab
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FLUOR

Memorandum

M4W41-SLF-08-933

To:	H. Hampt	E6-35	Date:	September 2, 2008
From:	S. L. Fitzgerald, Manager WSCF Analytical Lab			

cc: w/Attachments

T. F. Dale	S3-30	P. D. Mix	S3-30
D. Felmy (PNNL)	K6-75	J. E. Trechter	S3-30
A. J. Kopriva	S3-30	S. J. Trent	E6-35
H. K. Meznarich	S3-30	File/LB	

Subject: FINAL RESULTS FOR SAMPLE DELIVERY GROUP WSCF20081570

Reference:
1) Letter of Instruction for Analytical Services for the Groundwater Performance Assessment Project and Analytical Laboratory Transition Plan, FH-0602422, September 19, 2006
2) HNF-SD-CD-QAPP-017, Rev. 9, Waste Sampling & Characterization Facility Quality Assurance Plan

This transmittal contains the following information for sample delivery group WSCF20081570:

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

SLF/grf

Attachments 4

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ATTACHMENT 1

COVER SHEET

Consisting of 2 pages
Including cover page

WSCF SAF NUMBER CROSS REFERENCE

Group#: WSCF20081570
Data Deliverable Date: 27-aug-2008
Data Deliverable: Cover Sheet

SAF#	Sample ID	WSCF#	Matrix
I08-040	B1VK30	W08P003574	WATER
	B1VK31	W08P003576	WATER
	B1VK32	W08P003575	WATER
	B1VK33	W08P003577	WATER
	B1VK38	W08P003572	WATER
	B1VK39	W08P003573	WATER

M4W41-SLF-08-933

ATTACHMENT 2

NARRATIVE

Consisting of 3 pages
Including cover page

Introduction

Six groundwater samples were received at the WSCF Laboratory on July 28, 2008. 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 4) 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 5.

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 11 through 12, 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 22 through 24 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.

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 25 through 28 for QC details. Analytical Note(s):

- Iron contamination detected in the Blank was evaluated and affected sample result was C flagged.
- Calcium, Magnesium and Sodium sample concentration exceeded spiking levels by a factor of 4. Spike recoveries are not valid. Check and high standards were analyzed to ensure Sodium and Calcium linearity because sample results are greater than the calibration standard. No flags issued.

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, Matrix Spike, Blank and Laboratory Control Sample were analyzed with this delivery group. See pages 33 through 35 for QC details. Analytical Note(s):

- Gross Alpha/Gross Beta – Duplicate QC was analyzed on sample# B1W238 (SDG# 20081513).
- Tritium – Duplicate and Matrix Spike were analyzed on sample# B1V8X1 (SDG# 20081487).

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

Pauline D. Mix
WSCF Client Services

M4W41-SLF-08-933

ATTACHMENT 3

ANALYTICAL RESULTS

Consisting of 29 pages
Including cover page

WSCF
ANALYTICAL RESULTS REPORT

for

GPAP
Richland, WA 99352

Attention: Steve Trent E6-35

Analytical: S. Fitzgerald 9/2/08

Client Services: P.D.Mix 9/2/2008

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

This information is intended for the use of the addressee only. If the reader of this report is not the intended recipient or is not authorized by the recipient to receive the report, you are hereby notified that any dissemination, distribution or copying of this report is strictly prohibited. If you have received this report in error, please notify WSCF Laboratory immediately by telephone at (509) 373-7020 or (509) 531-8004. Information designation of this report is the responsibility of the customer.

Report#: WSCF20081570
Report Date: 2-sep-2008
Report WGPP/ver. 5.2
GPAP

w13qlog v4.2 02-sep-2008 08:07:39

Department: Inorganic

W13q Worklist/Batch/QC Report for Group# WSCF20081570

WL#	S#	Batch	QC#	Tray Type	Sample#	Test
37328	2	37753	42093	BLANK		Anions by Ion Chromatography
37328	12	37753	42093	BLANK		Anions by Ion Chromatography
37328	3	37753	42093	LCS		Anions by Ion Chromatography
37328	5	37753	42093	DUP	W08P003576	Anions by Ion Chromatography
37328	6	37753	42093	MS	W08P003576	Anions by Ion Chromatography
37328	7	37753	42093	MSD	W08P003576	Anions by Ion Chromatography
37328	4	37753	42093	SAMPLE	W08P003576	Anions by Ion Chromatography
37328	7	37753	42093	SPK-RPD	W08P003576	Anions by Ion Chromatography
37327	2	37755	42099	BLANK		Anions by Ion Chromatography
37327	16	37755	42099	BLANK		Anions by Ion Chromatography
37327	3	37755	42099	LCS		Anions by Ion Chromatography
37327	11	37755	42099	SAMPLE	W08P003573	Anions by Ion Chromatography
37327	5	37755	42099	DUP	W08P003577	Anions by Ion Chromatography
37327	6	37755	42099	MS	W08P003577	Anions by Ion Chromatography
37327	7	37755	42099	MSD	W08P003577	Anions by Ion Chromatography
37327	4	37755	42099	SAMPLE	W08P003577	Anions by Ion Chromatography
37327	7	37755	42099	SPK-RPD	W08P003577	Anions by Ion Chromatography
37786	1	38111	42637	BLANK		ICP Metals Analysis, Grd H20 P
37786	2	38111	42637	LCS		ICP Metals Analysis, Grd H20 P
37786	4	38111	42637	MS	W08P003572	ICP Metals Analysis, Grd H20 P
37786	5	38111	42637	MSD	W08P003572	ICP Metals Analysis, Grd H20 P
37786	3	38111	42637	SAMPLE	W08P003572	ICP Metals Analysis, Grd H20 P
37786	5	38111	42637	SPK-RPD	W08P003572	ICP Metals Analysis, Grd H20 P
37786	6	38111	42637	SAMPLE	W08P003573	ICP Metals Analysis, Grd H20 P
37786	7	38111	42637	SAMPLE	W08P003574	ICP Metals Analysis, Grd H20 P
37786	8	38111	42637	SAMPLE	W08P003575	ICP Metals Analysis, Grd H20 P
37786	9	38111	42637	SAMPLE	W08P003576	ICP Metals Analysis, Grd H20 P
37786	10	38111	42637	SAMPLE	W08P003577	ICP Metals Analysis, Grd H20 P

w13qlog v4.2 02-sep-2008 08:07:39

Department: Radiochemistry

W13q Worklist/Batch/QC Report for Group# WSCF20081570

WL#	S#	Batch	QC#	Tray Type	Sample#	Test
37363	1	37790	42250	BLANK		Tritium by Liq Sct column prep
37363	2	37790	42250	LCS		Tritium by Liq Sct column prep
37363	3	37790	42250	DUP	W08P003543	Tritium by Liq Sct column prep
37363	4	37790	42250	MS	W08P003543	Tritium by Liq Sct column prep
37363	12	37790	42250	SAMPLE	W08P003573	Tritium by Liq Sct column prep
37363	13	37790	42250	SAMPLE	W08P003576	Tritium by Liq Sct column prep
37363	14	37790	42250	SAMPLE	W08P003577	Tritium by Liq Sct column prep
37649	1	38080	42555	BLANK		Gross Alpha/Gross Beta (AB32)
37649	2	38080	42555	LCS		Gross Alpha/Gross Beta (AB32)
37649	3	38080	42555	DUP	W08P003551	Gross Alpha/Gross Beta (AB32)
37649	12	38080	42555	SAMPLE	W08P003573	Gross Alpha/Gross Beta (AB32)
37649	13	38080	42555	SAMPLE	W08P003576	Gross Alpha/Gross Beta (AB32)
37649	14	38080	42555	SAMPLE	W08P003577	Gross Alpha/Gross Beta (AB32)
37729	1	38163	42556	BLANK		Gross Alpha on Alpha Plateau
37729	2	38163	42556	LCS		Gross Alpha on Alpha Plateau
37729	3	38163	42556	DUP	W08P003551	Gross Alpha on Alpha Plateau
37729	12	38163	42556	SAMPLE	W08P003573	Gross Alpha on Alpha Plateau
37729	13	38163	42556	SAMPLE	W08P003576	Gross Alpha on Alpha Plateau
37729	14	38163	42556	SAMPLE	W08P003577	Gross Alpha on Alpha Plateau

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-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

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-508-421 LA-508-421: OPERATION OF THE TRI-CARB MODEL 2500TR LIQUID SCINTILLATION ANALYZER

HEIS	**ALPHA_LSC**	A/B Liquid Scintilillation
HEIS	**BETA_LSC**	A/B Liquid Scintilallation
HEIS	**TC99_3MDSK_LSC**	TC99 by Liquid Scintillation
HEIS	**TRITIUM_EIE_LSC**	Tritium Liquid Scintillation

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 E6-35
SAF Number: I08-040
Sample # W08P003572
Client ID: B1VK38 PNNL-GPP WSCF

Matrix: WATER

Group #: WSCF20081570
Department: Inorganic
Sampled: 07/28/08
Received: 07/28/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
ICP Metals Analysis, Grd H20 P Prep											**08/24/08**
ICP Metals Analysis, Grd H20 P											
Iron	7439-89-6	LA-505-411	U	< 25.0	ug/L			1.00	25		08/28/08
Magnesium	7439-95-4	LA-505-411		1.35e+04	ug/L			1.00	50		08/28/08
Manganese	7439-96-5	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Nickel	7440-02-0	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Potassium	7440-09-7	LA-505-411		6.17e+03	ug/L			1.00	1.7e+02		08/28/08
Silver	7440-22-4	LA-505-411	U	< 5.00	ug/L			1.00	5.0		08/28/08
Sodium	7440-23-5	LA-505-411		2.97e+04	ug/L			1.00	51		08/28/08
Antimony	7440-36-0	LA-505-411	U	< 56.0	ug/L			1.00	56		08/28/08
Barium	7440-39-3	LA-505-411		30.0	ug/L			1.00	4.0		08/28/08
Cadmium	7440-43-9	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Chromium	7440-47-3	LA-505-411		15.0	ug/L			1.00	13		08/28/08
Cobalt	7440-48-4	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Copper	7440-50-8	LA-505-411	U	< 6.00	ug/L			1.00	6.0		08/28/08
Vanadium	7440-62-2	LA-505-411	U	< 12.0	ug/L			1.00	12		08/28/08
Zinc	7440-66-6	LA-505-411	U	< 9.00	ug/L			1.00	9.0		08/28/08
Calcium	7440-70-2	LA-505-411		4.28e+04	ug/L			1.00	73		08/28/08
Strontium	7440-24-6	LA-505-411		361	ug/L			1.00	4.0		08/28/08
Beryllium	7440-41-7	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08

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)
D - Analyte was identified at a secondary dilution factor
U - Analyzed for but not detected above limiting criteria(inorg)

C - The Analyte was found in the Associated Blank.(inorg)
D - Analyte was identified at a secondary dilution factor(inorg)

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

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent E6-35
SAF Number: I08-040
Sample # W08P003573
Client ID: B1VK39 PNNL-GPP WSCF

Matrix: WATER

Group #: WSCF20081570
Department: Inorganic
Sampled: 07/28/08
Received: 07/28/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Anions by Ion Chromatography											
Fluoride	16984-48-8	LA-533-410	D	0.304	mg/L			2.00	0.046		07/29/08
Chloride	16887-00-6	LA-533-410	D	11.6	mg/L			2.00	0.094		07/29/08
Nitrogen in Nitrite	NO2-N	LA-533-410	DU	< 0.0256	mg/L			2.00	0.026		07/29/08
Nitrogen in Nitrate	NO3-N	LA-533-410	D	4.84	mg/L			2.00	0.024		07/29/08
Sulfate	14808-79-8	LA-533-410	D	60.9	mg/L			2.00	0.26		07/29/08
ICP Metals Analysis, Grd H20 P Prep											**08/24/08**
ICP Metals Analysis, Grd H20 P											
Iron	7439-89-6	LA-505-411	C	63.3	ug/L			1.00	25		08/28/08
Magnesium	7439-95-4	LA-505-411		1.32e+04	ug/L			1.00	50		08/28/08
Manganese	7439-96-5	LA-505-411		6.50	ug/L			1.00	4.0		08/28/08
Nickel	7440-02-0	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Potassium	7440-09-7	LA-505-411		6.14e+03	ug/L			1.00	1.7e+02		08/28/08
Silver	7440-22-4	LA-505-411	U	< 5.00	ug/L			1.00	5.0		08/28/08
Sodium	7440-23-5	LA-505-411		2.89e+04	ug/L			1.00	51		08/28/08
Antimony	7440-36-0	LA-505-411	U	< 56.0	ug/L			1.00	56		08/28/08
Barium	7440-39-3	LA-505-411		31.5	ug/L			1.00	4.0		08/28/08
Cadmium	7440-43-9	LA-505-411		6.00	ug/L			1.00	4.0		08/28/08
Chromium	7440-47-3	LA-505-411		21.0	ug/L			1.00	13		08/28/08
Cobalt	7440-48-4	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Copper	7440-50-8	LA-505-411	U	< 6.00	ug/L			1.00	6.0		08/28/08
Vanadium	7440-62-2	LA-505-411		13.1	ug/L			1.00	12		08/28/08
Zinc	7440-66-6	LA-505-411		9.50	ug/L			1.00	9.0		08/28/08
Calcium	7440-70-2	LA-505-411		4.33e+04	ug/L			1.00	73		08/28/08
Strontium	7440-24-6	LA-505-411		362	ug/L			1.00	4.0		08/28/08

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)
D - Analyte was identified at a secondary dilution factor
U - Analyzed for but not detected above limiting criteria(inorg)

C - The Analyte was found in the Associated Blank.(inorg)
D - Analyte was identified at a secondary dilution factor(inorg)

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

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent E6-35
SAF Number: I08-040
Sample # W08P003573
Client ID: B1VK39 PNNL-GPP WSCF

Matrix: WATER

Group #: WSCF20081570
Department: Inorganic
Sampled: 07/28/08
Received: 07/28/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Beryllium	7440-41-7	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08

MDL=Minimum Detection Limit
RQ=Result Qualifier
TP Err=Total Propagated Error
DF=Dilution Factor

B - The analyte < the RDL but > = the MDL/MDL (inorg)
D - Analyte was identified at a secondary dilution factor
U - Analyzed for but not detected above limiting criteria(inorg)

C - The Analyte was found in the Associated Blank.(inorg)
D - Analyte was identified at a secondary dilution factor(inorg)

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

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent E6-35
SAF Number: I08-040
Sample # W08P003574
Client ID: B1VK30 PNNL-GPP WSCF

Matrix: WATER

Group #: WSCF20081570
Department: Inorganic
Sampled: 07/28/08
Received: 07/28/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
ICP Metals Analysis, Grd H20 P Prep											**08/24/08**
ICP Metals Analysis, Grd H20 P											
Iron	7439-89-6	LA-505-411	U	< 25.0	ug/L			1.00	25		08/28/08
Magnesium	7439-95-4	LA-505-411		6.51e+03	ug/L			1.00	50		08/28/08
Manganese	7439-96-5	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Nickel	7440-02-0	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Potassium	7440-09-7	LA-505-411		1.84e+03	ug/L			1.00	1.7e+02		08/28/08
Silver	7440-22-4	LA-505-411	U	< 5.00	ug/L			1.00	5.0		08/28/08
Sodium	7440-23-5	LA-505-411		5.07e+03	ug/L			1.00	51		08/28/08
Antimony	7440-36-0	LA-505-411	U	< 56.0	ug/L			1.00	56		08/28/08
Barium	7440-39-3	LA-505-411		29.7	ug/L			1.00	4.0		08/28/08
Cadmium	7440-43-9	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Chromium	7440-47-3	LA-505-411		17.1	ug/L			1.00	13		08/28/08
Cobalt	7440-48-4	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Copper	7440-50-8	LA-505-411	U	< 6.00	ug/L			1.00	6.0		08/28/08
Vanadium	7440-62-2	LA-505-411	U	< 12.0	ug/L			1.00	12		08/28/08
Zinc	7440-66-6	LA-505-411	U	< 9.00	ug/L			1.00	9.0		08/28/08
Calcium	7440-70-2	LA-505-411		2.92e+04	ug/L			1.00	73		08/28/08
Strontium	7440-24-6	LA-505-411		185	ug/L			1.00	4.0		08/28/08
Beryllium	7440-41-7	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08

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

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

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent E6-35
SAF Number: I08-040
Sample # W08P003575
Client ID: B1VK32 PNNL-GPP WSCF

Matrix: WATER

Group #: WSCF20081570
Department: Inorganic
Sampled: 07/28/08
Received: 07/28/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
ICP Metals Analysis, Grd H20 P Prep											**08/24/08**
ICP Metals Analysis, Grd H20 P											
Iron	7439-89-6	LA-505-411	U	< 25.0	ug/L			1.00	25		08/28/08
Magnesium	7439-95-4	LA-505-411		6.52e+03	ug/L			1.00	50		08/28/08
Manganese	7439-96-5	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Nickel	7440-02-0	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Potassium	7440-09-7	LA-505-411		1.83e+03	ug/L			1.00	1.7e+02		08/28/08
Silver	7440-22-4	LA-505-411	U	< 5.00	ug/L			1.00	5.0		08/28/08
Sodium	7440-23-5	LA-505-411		5.03e+03	ug/L			1.00	51		08/28/08
Antimony	7440-36-0	LA-505-411	U	< 56.0	ug/L			1.00	56		08/28/08
Barium	7440-39-3	LA-505-411		29.5	ug/L			1.00	4.0		08/28/08
Cadmium	7440-43-9	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Chromium	7440-47-3	LA-505-411		18.6	ug/L			1.00	13		08/28/08
Cobalt	7440-48-4	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Copper	7440-50-8	LA-505-411	U	< 6.00	ug/L			1.00	6.0		08/28/08
Vanadium	7440-62-2	LA-505-411	U	< 12.0	ug/L			1.00	12		08/28/08
Zinc	7440-66-6	LA-505-411	U	< 9.00	ug/L			1.00	9.0		08/28/08
Calcium	7440-70-2	LA-505-411		2.92e+04	ug/L			1.00	73		08/28/08
Strontium	7440-24-6	LA-505-411		184	ug/L			1.00	4.0		08/28/08
Beryllium	7440-41-7	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08

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)
D - Analyte was identified at a secondary dilution factor
U - Analyzed for but not detected above limiting criteria(inorg)

C - The Analyte was found in the Associated Blank.(inorg)
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- Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent E6-35
SAF Number: I08-040
Sample # W08P003576
Client ID: B1VK31 PNNL-GPP WSCF

Matrix: WATER

Group #: WSCF20081570
Department: Inorganic
Sampled: 07/28/08
Received: 07/28/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Anions by Ion Chromatography											
Fluoride	16984-48-8	LA-533-410	BD	0.0547	mg/L			2.00	0.046		07/29/08
Chloride	16887-00-6	LA-533-410	D	5.01	mg/L			2.00	0.094		07/29/08
Nitrogen in Nitrite	NO2-N	LA-533-410	DU	< 0.0256	mg/L			2.00	0.026		07/29/08
Nitrogen in Nitrate	NO3-N	LA-533-410	D	1.62	mg/L			2.00	0.024		07/29/08
Sulfate	14808-79-8	LA-533-410	D	24.9	mg/L			2.00	0.26		07/29/08
ICP Metals Analysis, Grd H20 P Prep											**08/24/08**
ICP Metals Analysis, Grd H20 P											
Iron	7439-89-6	LA-505-411	U	< 25.0	ug/L			1.00	25		08/28/08
Magnesium	7439-95-4	LA-505-411		6.26e+03	ug/L			1.00	50		08/28/08
Manganese	7439-96-5	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Nickel	7440-02-0	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Potassium	7440-09-7	LA-505-411		1.73e+03	ug/L			1.00	1.7e+02		08/28/08
Silver	7440-22-4	LA-505-411	U	< 5.00	ug/L			1.00	5.0		08/28/08
Sodium	7440-23-5	LA-505-411		4.66e+03	ug/L			1.00	51		08/28/08
Antimony	7440-36-0	LA-505-411	U	< 56.0	ug/L			1.00	56		08/28/08
Barium	7440-39-3	LA-505-411		28.7	ug/L			1.00	4.0		08/28/08
Cadmium	7440-43-9	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Chromium	7440-47-3	LA-505-411		13.7	ug/L			1.00	13		08/28/08
Cobalt	7440-48-4	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Copper	7440-50-8	LA-505-411	U	< 6.00	ug/L			1.00	6.0		08/28/08
Vanadium	7440-62-2	LA-505-411	U	< 12.0	ug/L			1.00	12		08/28/08
Zinc	7440-66-6	LA-505-411	U	< 9.00	ug/L			1.00	9.0		08/28/08
Calcium	7440-70-2	LA-505-411		2.99e+04	ug/L			1.00	73		08/28/08
Strontium	7440-24-6	LA-505-411		181	ug/L			1.00	4.0		08/28/08

MDL=Minimum Detection Limit
RQ=Result Qualifier
TP Err=Total Propagated Error
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- Indicates results that have NOT been validated; + - Indicates more than six qualifier symbols

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent E6-35
SAF Number: I08-040
Sample # W08P003576
Client ID: B1VK31 PNNL-GPP WSCF

Matrix: WATER

Group #: WSCF20081570
Department: Inorganic
Sampled: 07/28/08
Received: 07/28/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Beryllium	7440-41-7	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08

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)
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WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent E6-35
SAF Number: I08-040
Sample # W08P003577
Client ID: B1VK33 PNNL-GPP WSCF

Matrix: WATER

Group #: WSCF20081570
Department: Inorganic
Sampled: 07/28/08
Received: 07/28/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Anions by Ion Chromatography											
Fluoride	16984-48-8	LA-533-410	DU	< 0.0464	mg/L			2.00	0.046		07/29/08
Chloride	16887-00-6	LA-533-410	D	4.90	mg/L			2.00	0.094		07/29/08
Nitrogen in Nitrite	NO2-N	LA-533-410	DU	< 0.0256	mg/L			2.00	0.026		07/29/08
Nitrogen in Nitrate	NO3-N	LA-533-410	D	1.63	mg/L			2.00	0.024		07/29/08
Sulfate	14808-79-8	LA-533-410	D	25.0	mg/L			2.00	0.26		07/29/08
ICP Metals Analysis, Grd H20 P Prep											**08/24/08**
ICP Metals Analysis, Grd H20 P											
Iron	7439-89-6	LA-505-411	U	< 25.0	ug/L			1.00	25		08/28/08
Magnesium	7439-95-4	LA-505-411		6.73e+03	ug/L			1.00	50		08/28/08
Manganese	7439-96-5	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Nickel	7440-02-0	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Potassium	7440-09-7	LA-505-411		1.90e+03	ug/L			1.00	1.7e+02		08/28/08
Silver	7440-22-4	LA-505-411	U	< 5.00	ug/L			1.00	5.0		08/28/08
Sodium	7440-23-5	LA-505-411		5.21e+03	ug/L			1.00	51		08/28/08
Antimony	7440-36-0	LA-505-411	U	< 56.0	ug/L			1.00	56		08/28/08
Barium	7440-39-3	LA-505-411		30.9	ug/L			1.00	4.0		08/28/08
Cadmium	7440-43-9	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Chromium	7440-47-3	LA-505-411		13.6	ug/L			1.00	13		08/28/08
Cobalt	7440-48-4	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08
Copper	7440-50-8	LA-505-411	U	< 6.00	ug/L			1.00	6.0		08/28/08
Vanadium	7440-62-2	LA-505-411	U	< 12.0	ug/L			1.00	12		08/28/08
Zinc	7440-66-6	LA-505-411	U	< 9.00	ug/L			1.00	9.0		08/28/08
Calcium	7440-70-2	LA-505-411		3.01e+04	ug/L			1.00	73		08/28/08
Strontium	7440-24-6	LA-505-411		190	ug/L			1.00	4.0		08/28/08

MDL=Minimum Detection Limit
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WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent E6-35
SAF Number: I08-040
Sample # W08P003577
Client ID: B1VK33 PNNL-GPP WSCF

Matrix: WATER

Group #: WSCF20081570
Department: Inorganic
Sampled: 07/28/08
Received: 07/28/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Beryllium	7440-41-7	LA-505-411	U	< 4.00	ug/L			1.00	4.0		08/28/08

MDL=Minimum Detection Limit
RQ=Result Qualifier
TP Err=Total Propagated Error
DF=Dilution Factor

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WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081570
Matrix: WATER
Test: Anions by Ion Chromatography

Sample Date: 07/28/08
Receive Date:07/28/08

Lab ID: W08P003576

BATCH QC ASSOCIATED WITH SAMPLE

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
DUP	Chloride	16887-00-6	4.8328		RPD			3.547	20.000		07/29/08
DUP	Fluoride	16984-48-8	<4.64e-2		RPD			n/a	20.000	U	07/29/08
DUP	Nitrogen in Nitrite	NO2-N	<2.56e-2		RPD			n/a	20.000	U	07/29/08
DUP	Nitrogen in Nitrate	NO3-N	1.615		RPD			0.099	20.000		07/29/08
DUP	Sulfate	14808-79-8	25.2302		RPD			1.209	20.000		07/29/08
MS	Chloride	16887-00-6	0.8838	88.824	% Recov	80.000	120.000				07/29/08
MS	Fluoride	16984-48-8	0.4539	92.069	% Recov	80.000	120.000				07/29/08
MS	Nitrogen in Nitrite	NO2-N	0.4368	88.780	% Recov	80.000	120.000				07/29/08
MS	Nitrogen in Nitrate	NO3-N	0.43015	96.446	% Recov	80.000	120.000				07/29/08
MS	Sulfate	14808-79-8	2.09795	107.038	% Recov	80.000	120.000				07/29/08
MSD	Chloride	16887-00-6	0.8922	89.668	% Recov	80.000	120.000				07/29/08
MSD	Fluoride	16984-48-8	0.4646	94.239	% Recov	80.000	120.000				07/29/08
MSD	Nitrogen in Nitrite	NO2-N	0.44905	91.270	% Recov	80.000	120.000				07/29/08
MSD	Nitrogen in Nitrate	NO3-N	0.46005	103.150	% Recov	80.000	120.000				07/29/08
MSD	Sulfate	14808-79-8	2.06975	105.599	% Recov	80.000	120.000				07/29/08
SPK-RPD	Chloride	16887-00-6	89.668		RPD			0.946	20.000		07/29/08
SPK-RPD	Fluoride	16984-48-8	94.239		RPD			2.329	20.000		07/29/08
SPK-RPD	Nitrogen in Nitrite	NO2-N	91.270		RPD			2.766	20.000		07/29/08
SPK-RPD	Nitrogen in Nitrate	NO3-N	103.150		RPD			6.718	20.000		07/29/08
SPK-RPD	Sulfate	14808-79-8	105.599		RPD			1.353	20.000		07/29/08

BATCH QC

BLANK	Chloride	16887-00-6	<4.69e-2	n/a	mg/L	0.000	0.030			U	07/29/08
BLANK	Chloride	16887-00-6	<4.69e-2	n/a	mg/L	0.000	0.030			U	07/29/08
BLANK	Fluoride	16984-48-8	<2.32e-2	n/a	mg/L	0.000	0.030			U	07/29/08
BLANK	Fluoride	16984-48-8	<2.32e-2	n/a	mg/L	0.000	0.030			U	07/29/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081570
Matrix: WATER
Test: Anions by Ion Chromatography

Sample Date:
Receive Date:

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
BLANK	Nitrogen in Nitrite	NO2-N	<1.28e-2	n/a	mg/L	0.000	0.020			U	07/29/08
BLANK	Nitrogen in Nitrite	NO2-N	<1.28e-2	n/a	mg/L	0.000	0.020			U	07/29/08
BLANK	Nitrogen in Nitrate	NO3-N	<1.21e-2	n/a	mg/L	0.000	0.040			U	07/29/08
BLANK	Nitrogen in Nitrate	NO3-N	<1.21e-2	n/a	mg/L	0.000	0.040			U	07/29/08
BLANK	Sulfate	14808-79-8	<0.132	n/a	mg/L	0.000	0.200			U	07/29/08
BLANK	Sulfate	14808-79-8	<0.132	n/a	mg/L	0.000	0.200			U	07/29/08
LCS	Chloride	16887-00-6	199.3142	99.161	% Recov	80.000	120.000				07/29/08
LCS	Fluoride	16984-48-8	103.4967	103.912	% Recov	80.000	120.000				07/29/08
LCS	Nitrogen in Nitrite	NO2-N	101.5542	102.167	% Recov	80.000	120.000				07/29/08
LCS	Nitrogen in Nitrate	NO3-N	94.8021	105.219	% Recov	80.000	120.000				07/29/08
LCS	Sulfate	14808-79-8	395.0468	99.759	% Recov	80.000	120.000				07/29/08

Lab ID: W08P003577
BATCH QC ASSOCIATED WITH SAMPLE

DUP	Chloride	16887-00-6	4.9129		RPD			0.302	20.000		07/29/08
DUP	Fluoride	16984-48-8	4.69e-2		RPD			n/a	20.000		07/29/08
DUP	Nitrogen in Nitrite	NO2-N	<2.56e-2		RPD			n/a	20.000	U	07/29/08
DUP	Nitrogen in Nitrate	NO3-N	1.6172		RPD			0.770	20.000		07/29/08
DUP	Sulfate	14808-79-8	24.9032		RPD			0.459	20.000		07/29/08
MS	Chloride	16887-00-6	0.92705	93.171	% Recov	80.000	120.000				07/29/08
MS	Fluoride	16984-48-8	0.48935	99.260	% Recov	80.000	120.000				07/29/08
MS	Nitrogen in Nitrite	NO2-N	0.4456	90.569	% Recov	80.000	120.000				07/29/08
MS	Nitrogen in Nitrate	NO3-N	0.42465	95.213	% Recov	80.000	120.000				07/29/08
MS	Sulfate	14808-79-8	1.9045	97.168	% Recov	80.000	120.000				07/29/08
MSD	Chloride	16887-00-6	1.0253	103.045	% Recov	80.000	120.000				07/29/08
MSD	Fluoride	16984-48-8	0.5009	101.602	% Recov	80.000	120.000				07/29/08
MSD	Nitrogen in Nitrite	NO2-N	0.47455	96.453	% Recov	80.000	120.000				07/29/08
MSD	Nitrogen in Nitrate	NO3-N	0.4635	103.924	% Recov	80.000	120.000				07/29/08
MSD	Sulfate	14808-79-8	2.02955	103.548	% Recov	80.000	120.000				07/29/08
SPK-RPD	Chloride	16887-00-6	103.045		RPD			10.064	20.000		07/29/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081570
Matrix: WATER
Test: Anions by Ion Chromatography

Sample Date: 07/28/08
Receive Date:07/28/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
SPK-RPD	Fluoride	16984-48-8	101.602		RPD			2.332	20.000		07/29/08
SPK-RPD	Nitrogen in Nitrite	NO2-N	96.453		RPD			6.292	20.000		07/29/08
SPK-RPD	Nitrogen in Nitrate	NO3-N	103.924		RPD			8.749	20.000		07/29/08
SPK-RPD	Sulfate	14808-79-8	103.548		RPD			6.357	20.000		07/29/08

BATCH QC

BLANK	Chloride	16887-00-6	<4.69e-2	n/a	mg/L	0.000	0.030			U	07/29/08
BLANK	Chloride	16887-00-6	<4.69e-2	n/a	mg/L	0.000	0.030			U	07/29/08
BLANK	Fluoride	16984-48-8	<2.32e-2	n/a	mg/L	0.000	0.030			U	07/29/08
BLANK	Fluoride	16984-48-8	<2.32e-2	n/a	mg/L	0.000	0.030			U	07/29/08
BLANK	Nitrogen in Nitrite	NO2-N	<1.28e-2	n/a	mg/L	0.000	0.020			U	07/29/08
BLANK	Nitrogen in Nitrite	NO2-N	<1.28e-2	n/a	mg/L	0.000	0.020			U	07/29/08
BLANK	Nitrogen in Nitrate	NO3-N	<1.21e-2	n/a	mg/L	0.000	0.040			U	07/29/08
BLANK	Nitrogen in Nitrate	NO3-N	<1.21e-2	n/a	mg/L	0.000	0.040			U	07/29/08
BLANK	Sulfate	14808-79-8	<0.132	n/a	mg/L	0.000	0.200			U	07/29/08
BLANK	Sulfate	14808-79-8	<0.132	n/a	mg/L	0.000	0.200			U	07/29/08
LCS	Chloride	16887-00-6	198.2942	98.654	% Recov	80.000	120.000				07/29/08
LCS	Fluoride	16984-48-8	103.5292	103.945	% Recov	80.000	120.000				07/29/08
LCS	Nitrogen in Nitrite	NO2-N	100.9598	101.569	% Recov	80.000	120.000				07/29/08
LCS	Nitrogen in Nitrate	NO3-N	94.2158	104.568	% Recov	80.000	120.000				07/29/08
LCS	Sulfate	14808-79-8	392.4012	99.091	% Recov	80.000	120.000				07/29/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081570
Matrix: WATER
Test: ICP Metals Analysis, Grd H20 P

Sample Date: 07/28/08
Receive Date:07/28/08

Lab ID: W08P003572
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	998.2	99.820	% Recov	75.000	125.000				08/28/08
MS	Barium	7440-39-3	498	99.600	% Recov	75.000	125.000				08/28/08
MS	Beryllium	7440-41-7	524.1	104.820	% Recov	75.000	125.000				08/28/08
MS	Calcium	7440-70-2	-1000	-100.000	% Recov	75.000	125.000			*	08/28/08
MS	Cadmium	7440-43-9	1026	102.600	% Recov	75.000	125.000				08/28/08
MS	Cobalt	7440-48-4	1007	100.700	% Recov	75.000	125.000				08/28/08
MS	Chromium	7440-47-3	1014	101.400	% Recov	75.000	125.000				08/28/08
MS	Copper	7440-50-8	1002	100.200	% Recov	75.000	125.000				08/28/08
MS	Iron	7439-89-6	1012	101.200	% Recov	75.000	125.000				08/28/08
MS	Potassium	7440-09-7	10286	102.860	% Recov	75.000	125.000				08/28/08
MS	Magnesium	7439-95-4	460	46.000	% Recov	75.000	125.000			*	08/28/08
MS	Manganese	7439-96-5	1015	101.500	% Recov	75.000	125.000				08/28/08
MS	Sodium	7440-23-5	80	8.000	% Recov	75.000	125.000			*	08/28/08
MS	Nickel	7440-02-0	1006	100.600	% Recov	75.000	125.000				08/28/08
MS	Antimony	7440-36-0	1055	105.500	% Recov	75.000	125.000				08/28/08
MS	Strontium	7440-24-6	486.9	97.380	% Recov	75.000	125.000				08/28/08
MS	Vanadium	7440-62-2	1010	101.000	% Recov	75.000	125.000				08/28/08
MS	Zinc	7440-66-6	1015	101.500	% Recov	75.000	125.000				08/28/08
MSD	Silver	7440-22-4	970.1	97.010	% Recov	75.000	125.000				08/28/08
MSD	Barium	7440-39-3	480.4	96.080	% Recov	75.000	125.000				08/28/08
MSD	Beryllium	7440-41-7	513.6	102.720	% Recov	75.000	125.000				08/28/08
MSD	Calcium	7440-70-2	-800	-80.000	% Recov	75.000	125.000			*	08/28/08
MSD	Cadmium	7440-43-9	1006	100.600	% Recov	75.000	125.000				08/28/08
MSD	Cobalt	7440-48-4	1007	100.700	% Recov	75.000	125.000				08/28/08
MSD	Chromium	7440-47-3	1020	102.000	% Recov	75.000	125.000				08/28/08
MSD	Copper	7440-50-8	946.8	94.680	% Recov	75.000	125.000				08/28/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081570
Matrix: WATER
Test: ICP Metals Analysis, Grd H20 P

Sample Date: 07/28/08
Receive Date:07/28/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
MSD	Iron	7439-89-6	994.7	99.470	% Recov	75.000	125.000				08/28/08
MSD	Potassium	7440-09-7	9296	92.960	% Recov	75.000	125.000				08/28/08
MSD	Magnesium	7439-95-4	-360	-36.000	% Recov	75.000	125.000			•	08/28/08
MSD	Manganese	7439-96-5	1013	101.300	% Recov	75.000	125.000				08/28/08
MSD	Sodium	7440-23-5	-2240	-224.000	% Recov	75.000	125.000			•	08/28/08
MSD	Nickel	7440-02-0	1004	100.400	% Recov	75.000	125.000				08/28/08
MSD	Antimony	7440-36-0	1001	100.100	% Recov	75.000	125.000				08/28/08
MSD	Strontium	7440-24-6	465	93.000	% Recov	75.000	125.000				08/28/08
MSD	Vanadium	7440-62-2	998.8	99.880	% Recov	75.000	125.000				08/28/08
MSD	Zinc	7440-66-6	988.2	98.820	% Recov	75.000	125.000				08/28/08
SPK-RPD	Silver	7440-22-4	97.010		RPD			2.855	20.000		08/28/08
SPK-RPD	Barium	7440-39-3	96.080		RPD			3.598	20.000		08/28/08
SPK-RPD	Beryllium	7440-41-7	102.720		RPD			2.024	20.000		08/28/08
SPK-RPD	Calcium	7440-70-2	-80.000		RPD			-22.222	20.000	•	08/28/08
SPK-RPD	Cadmium	7440-43-9	100.600		RPD			1.969	20.000		08/28/08
SPK-RPD	Cobalt	7440-48-4	100.700		RPD			0.000	20.000		08/28/08
SPK-RPD	Chromium	7440-47-3	102.000		RPD			0.590	20.000		08/28/08
SPK-RPD	Copper	7440-50-8	94.680		RPD			5.665	20.000		08/28/08
SPK-RPD	Iron	7439-89-6	99.470		RPD			1.724	20.000		08/28/08
SPK-RPD	Potassium	7440-09-7	92.960		RPD			10.111	20.000		08/28/08
SPK-RPD	Magnesium	7439-95-4	-36.000		RPD			1640.000	20.000	•	08/28/08
SPK-RPD	Manganese	7439-96-5	101.300		RPD			0.197	20.000		08/28/08
SPK-RPD	Sodium	7440-23-5	-224.000		RPD			-214.815	20.000	•	08/28/08
SPK-RPD	Nickel	7440-02-0	100.400		RPD			0.199	20.000		08/28/08
SPK-RPD	Antimony	7440-36-0	100.100		RPD			5.253	20.000		08/28/08
SPK-RPD	Strontium	7440-24-6	93.000		RPD			4.601	20.000		08/28/08
SPK-RPD	Vanadium	7440-62-2	99.880		RPD			1.115	20.000		08/28/08
SPK-RPD	Zinc	7440-66-6	98.820		RPD			2.676	20.000		08/28/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081570
Matrix: WATER
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
BATCH QC											
BLANK	Silver	7440-22-4	<5	n/a	ug/L					U	08/28/08
BLANK	Barium	7440-39-3	<4	n/a	ug/L					U	08/28/08
BLANK	Beryllium	7440-41-7	<4	n/a	ug/L					U	08/28/08
BLANK	Calcium	7440-70-2	<73	n/a	ug/L					U	08/28/08
BLANK	Cadmium	7440-43-9	<4	n/a	ug/L					U	08/28/08
BLANK	Cobalt	7440-48-4	<4	n/a	ug/L					U	08/28/08
BLANK	Chromium	7440-47-3	<13	n/a	ug/L					U	08/28/08
BLANK	Copper	7440-50-8	<6	n/a	ug/L					U	08/28/08
BLANK	Iron	7439-89-6	66.5	66.500	ug/L						08/28/08
BLANK	Potassium	7440-09-7	<170	n/a	ug/L					U	08/28/08
BLANK	Magnesium	7439-95-4	<50	n/a	ug/L					U	08/28/08
BLANK	Manganese	7439-96-5	<4	n/a	ug/L					U	08/28/08
BLANK	Sodium	7440-23-5	<51	n/a	ug/L					U	08/28/08
BLANK	Nickel	7440-02-0	<4	n/a	ug/L					U	08/28/08
BLANK	Antimony	7440-36-0	<56	n/a	ug/L					U	08/28/08
BLANK	Strontium	7440-24-6	<4	n/a	ug/L					U	08/28/08
BLANK	Vanadium	7440-62-2	<12	n/a	ug/L					U	08/28/08
BLANK	Zinc	7440-66-6	<9	n/a	ug/L					U	08/28/08
LCS	Silver	7440-22-4	987.1	98.710	% Recov	80.000	120.000				08/28/08
LCS	Barium	7440-39-3	480.6	96.120	% Recov	80.000	120.000				08/28/08
LCS	Beryllium	7440-41-7	535.5	107.100	% Recov	80.000	120.000				08/28/08
LCS	Calcium	7440-70-2	1037	103.700	% Recov	80.000	120.000				08/28/08
LCS	Cadmium	7440-43-9	1045	104.500	% Recov	80.000	120.000				08/28/08
LCS	Cobalt	7440-48-4	1043	104.300	% Recov	80.000	120.000				08/28/08
LCS	Chromium	7440-47-3	1029	102.900	% Recov	80.000	120.000				08/28/08
LCS	Copper	7440-50-8	982.1	98.210	% Recov	80.000	120.000				08/28/08
LCS	Iron	7439-89-6	1019	101.900	% Recov	80.000	120.000				08/28/08
LCS	Potassium	7440-09-7	10160	101.600	% Recov	80.000	120.000				08/28/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Inorganic**

SDG Number: WSCF20081570
Matrix: WATER
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
LCS	Magnesium	7439-95-4	971.1	97.110	% Recov	80.000	120.000				08/28/08
LCS	Manganese	7439-96-5	1024	102.400	% Recov	80.000	120.000				08/28/08
LCS	Sodium	7440-23-5	995.9	99.590	% Recov	80.000	120.000				08/28/08
LCS	Nickel	7440-02-0	1050	105.000	% Recov	80.000	120.000				08/28/08
LCS	Antimony	7440-36-0	1062	106.200	% Recov	80.000	120.000				08/28/08
LCS	Strontium	7440-24-6	485.1	97.020	% Recov	80.000	120.000				08/28/08
LCS	Vanadium	7440-62-2	1011	101.100	% Recov	80.000	120.000				08/28/08
LCS	Zinc	7440-66-6	1025	102.500	% Recov	80.000	120.000				08/28/08

WSCF
ANALYTICAL COMMENT REPORT

Attention: Steve Trent E6-35

Group #: WSCF20081570
Department: Inorganic

Sample #	Client ID	Lab Area	Test	Comment
		VALGROUP		ICP-AES: [Samples W08P3572-3577] High iron preparation blank result; "C" flag if applicable. No zirconium present in the LCS standard. Magnesium, sodium, and calcium sample results exceed spiking level by a factor of 4 so spike recoveries are not valid. Check standard used to ensure magnesium, sodium, and calcium linearity because sample results are greater than the calibration standard.

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

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WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent E6-35
SAF Number: I08-040
Sample # W08P003573
Client ID: B1VK39 PNNL-GPP WSCF

Matrix: WATER

Group #: WSCF20081570
Department: Radiochemistry
Sampled: 07/28/08
Received: 07/28/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Gross Alpha on Alpha Plateau											
Gross alpha on alpha plateau	12587-46-1	LA-508-415	U	1.40	pCi/L	+-1.15	pCi/L	1.00	1.7		08/22/08
Gross Alpha/Gross Beta (AB32)											
Gross beta	12587-47-2	LA-508-415		8.40	pCi/L	+-1.68	pCi/L	1.00	1.7		08/19/08
Tritium by Liq Sct column prep											
Tritium	10028-17-8	LA-508-421		2.10e+03	pCi/L	+-462	pCi/L	1.00	2.2e+02		08/04/08

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)
D - Analyte was identified at a secondary dilution factor
U - Analyzed for but not detected above limiting criteria(inorg)

C - The Analyte was found in the Associated Blank.(inorg)
D - Analyte was identified at a secondary dilution factor(inorg)

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

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent E6-35
SAF Number: I08-040
Sample # W08P003576
Client ID: B1VK31 PNNL-GPP WSCF

Matrix: WATER

Group #: WSCF20081570
Department: Radiochemistry
Sampled: 07/28/08
Received: 07/28/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Gross Alpha on Alpha Plateau											
Gross alpha on alpha plateau	12587-46-1	LA-508-415	U	0.910	pCi/L	+-0.956	pCi/L	1.00	1.5		08/22/08
Gross Alpha/Gross Beta (AB32)											
Gross beta	12587-47-2	LA-508-415		1.70	pCi/L	+-1.09	pCi/L	1.00	1.6		08/19/08
Tritium by Liq Sct column prep											
Tritium	10028-17-8	LA-508-421		490	pCi/L	+-176	pCi/L	1.00	2.2e+02		08/04/08

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)
D - Analyte was identified at a secondary dilution factor
U - Analyzed for but not detected above limiting criteria(inorg)

C - The Analyte was found in the Associated Blank.(inorg)
D - Analyte was identified at a secondary dilution factor(inorg)

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

WSCF
ANALYTICAL RESULTS REPORT

Attention: Steve Trent E6-35
SAF Number: I08-040
Sample # W08P003577
Client ID: B1VK33 PNNL-GPP WSCF

Matrix: WATER

Group #: WSCF20081570
Department: Radiochemistry
Sampled: 07/28/08
Received: 07/28/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Gross Alpha on Alpha Plateau											
Gross alpha on alpha plateau	12587-46-1	LA-508-415	U	0.500	pCi/L	+-0.700	pCi/L	1.00	1.1		08/22/08
Gross Alpha/Gross Beta (AB32)											
Gross beta	12587-47-2	LA-508-415		2.40	pCi/L	+-1.06	pCi/L	1.00	1.5		08/19/08
Tritium by Liq Sct column prep											
Tritium	10028-17-8	LA-508-421		490	pCi/L	+-176	pCi/L	1.00	2.2e+02		08/04/08

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)
D - Analyte was identified at a secondary dilution factor
U - Analyzed for but not detected above limiting criteria(inorg)

C - The Analyte was found in the Associated Blank.(inorg)
D - Analyte was identified at a secondary dilution factor(inorg)

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

WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20081570
Matrix: WATER
Test: Gross Alpha on Alpha Plateau

Sample Date: 07/21/08
Receive Date:07/21/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W08P003551											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Gross alpha on alpha plateau	12587-46-1	1.8		RPD			0.000	20.000		08/22/08
BATCH QC											
BLANK	Gross alpha on alpha plateau	12587-46-1-ap	U-2.7E-01	n/a	pCi/L	-100.000	100.000				08/22/08
LCS	Gross alpha on alpha plateau	12587-46-1-ap	32.4	83.634	% Recov	80.000	120.000				08/22/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Radiochemistry**

SDG Number: WSCF20081570
Matrix: WATER
Test: Gross Alpha/Gross Beta (AB32)

Sample Date: 07/21/08
Receive Date:07/21/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W08P003551											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Gross beta	12587-47-2	1.3e+01		RPD			16.667	20.000		08/19/08
BATCH QC											
BLANK	Gross beta	12587-47-2	U2.7E-02	n/a	pCi/L	-10.000	10.000				08/19/08
LCS	Gross beta	12587-47-2	122	108.734	% Recov	80.000	120.000				08/19/08

WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Radiochemistry**

SDG Number: WSCF20081570
Matrix: WATER
Test: Tritium by Liq Sct column prep

Sample Date: 07/17/08
Receive Date:07/17/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W08P003543											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Tritium	10028-17-8	2.0E+03		RPD			0.000	20.000		08/04/08
MS	Tritium	10028-17-8	24510	95.318	% Recov	75.000	125.000				08/04/08
BATCH QC											
BLANK	Tritium	10028-17-8	U-2.7E+01	n/a	pCi/L	-10.000	1000.000				08/04/08
LCS	Tritium	10028-17-8	2870.0	84.204	% Recov	80.000	120.000				08/04/08

M4W41-SLF-08-933

ATTACHMENT 4

SAMPLE RECEIPT INFORMATION

Consisting of 5 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
08/27/08

ACKNOWLEDGMENT OF SAMPLES RECEIVED

GPAP

Richland, WA 99352
Attn: Steve Trent E6-35

Customer Code: PNNL-GPP
PO#: 122543
Group#: 20081570

The following samples were received from you on 07/28/08. 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
W08P003572	B1VK38	PNNL-GPP @GPP6010	Water	07/28/08
W08P003573	B1VK39	PNNL-GPP @AB-32 @ALPHA @GPP6010 @H3-33 @IC-30	Water	07/28/08
W08P003574	B1VK30	PNNL-GPP @GPP6010	Water	07/28/08
W08P003575	B1VK32	PNNL-GPP @GPP6010	Water	07/28/08
W08P003576	B1VK31	PNNL-GPP @AB-32 @ALPHA @GPP6010 @H3-33 @IC-30	Water	07/28/08
W08P003577	B1VK33	PNNL-GPP @AB-32 @ALPHA @GPP6010 @H3-33 @IC-30	Water	07/28/08

Test Acronym Description

Test Acronym	Description
@AB-32	Gross Alpha/Gross Beta (AB32)
@ALPHA	Gross Alpha on Alpha Plateau
@GPP6010	ICP Metals Analysis, Grd H20 P
@H3-33	Tritium by Liq Sct column prep
@IC-30	Anions by Ion Chromatography

FLUOR HANFORD

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

08/27/08 20081569 20081570

I08-040-60

Collector: R. D. Julien	Contact/Requester: Steve Trent	Telephone No.: 509-373-5869 MSIN FAX
SAF No.: I08-040	Sampling Origin: Hanford Site	Purchase Order/Charge Code
Project Title: 100HR3IAM(1/2) JUNE 2008	HNF-N-506-14/47	Ice Chest No. GWS-031 Temp.
Shipped To (Lab): Waste Sampling & Characterization	Method of Shipment: Govt. Vehicle	Bill of Lading/Air Bill No.
Protocol: CERCLA	Priority: 45 Days	Offsite Property No.

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☑ No ☐
100 Area Generator Knowledge Information Form applies.

Sample No.	Lab ID	*	Date	Time	No/Type Container	Sample Analysis	Preservative
B1VK38 (F)	WOR P003572	W	7/28/08	1236	1x500-mL G/P	6010_METALS_ICP: List-3 (18)	HNO3 to pH <2
B1VK39	3573	W			1x500-mL G/P	6010_METALS_ICP: List-3 (18)	HNO3 to pH <2
B1VK39		W			1x500-mL P	300.0_ANIONS_IC: List-1 (5)	Cool~4C
B1VK39		W			1x500-mL G/P	ALPHABETA_GPC: Alpha discrete + Beta (2); ALPHABETA_GPC: Alpha discrete + Beta (2)	HNO3 to pH <2
B1VK39		W			1x250-mL G	TRITIUM_EIE_LSC: Tritium (1)	None

ICED

Relinquished By (Print / Sign)	Date/Time	Received By (Print / Sign)	Date/Time
R. D. Julien	JUL 28 2008 1515	TA Pnazim	JUL 28 2008 1515

Matrix *

S = Soil		DS = Drum Solid	
SE = Sediment		DL = Drum Liquid	
SO = Solid		T = Tissue	
SL = Sludge		WI = Wine	
W = Water		L = Liquid	
O = Oil		V = Vegetation	
A = Air		X = Other	

FINAL SAMPLE DISPOSITION: Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time

30 of 40

FLUOR HANFORD

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

I08-040-52

Collector: R. D. Julian	Contact/Requester: Steve Trent	Telephone No.: 509-373-5869 MSIN FAX
SAF No.: I08-040	Sampling Origin: Hanford Site	Purchase Order/Charge Code
Project Title: 100HR3IAM(1/2) JUNE 2008	HNF-N-506-14/48	Ice Chest No: GWS-031 Temp.
Shipped To (Lab): Waste Sampling & Characterization	Method of Shipment: Govt. Vehicle	Bill of Lading/Air Bill No.
Protocol: CERCLA	Priority: 45 Days	Offsite Property No.

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS **Hold Time**
100 Area Generator Knowledge Information Form applies.

Total Activity Exemption: Yes ☑ No ☐

Sample No.	Lab ID	*	Date	Time	No/Type Container	Sample Analysis	Preservative
B1VK30 (F)	3574	W	7/28/08	1424	1x500-mL G/P	6010_METALS_ICP: List-3 (18)	HNO3 to pH <2
B1VK31	3576	W			1x500-mL G/P	6010_METALS_ICP: List-3 (18)	HNO3 to pH <2
B1VK31		W			1x500-mL P	300.0_ANIONS_IC: List-1 (5)	Cool~4C
B1VK31		W			1x500-mL G/P	ALPHABETA_GPC: Alpha discrete + Beta (2); ALPHABETA_GPC: Alpha discrete + Beta (2)	HNO3 to pH <2
B1VK31		W			1x250-mL G	TRITIUM_EIE_LSC: Tritium (1)	None

ICED

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
R. D. Julian			JUL 28 2008 1515	TA Rozim			JUL 28 2008 1515
Relinquished By			Date/Time	Received By			Date/Time
Relinquished By			Date/Time	Received By			Date/Time
Relinquished By			Date/Time	Received By			Date/Time

Matrix *

S	= Soil	DS	= Drum Solid
SE	= Sediment	DL	= Drum Liquid
SO	= Solid	T	= Tissue
SL	= Sludge	WI	= Wipe
W	= Water	L	= Liquid
O	= Oil	V	= Vegetation
A	= Air	X	= Other

FINAL SAMPLE DISPOSITION

Disposal Method (e.g., Return to customer, per lab procedure, used in process) | Disposed By | Date/Time

FLUOR HANFORD

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

108-040-53

Collector R.D. Julian	**Contact/Requester** Steve Trent	**Telephone No.** 509-373-5869 **MSIN** **FAX**
SAF No. 108-040	**Sampling Origin** Hanford Site	**Purchase Order/Charge Code**
Project Title 100HR3IAM(1/2), JUNE 2008		**Ice Chest No.** GW5-031 **Temp.**
Shipped To (Lab) Waste Sampling & Characterization	**Method of Shipment** Govt. Vehicle	**Bill of Lading/Air Bill No.**
Protocol CERCLA	**Priority:** 45 Days	**Offsite Property No.**

POSSIBLE SAMPLE HAZARDS/REMARKS
** **

SPECIAL INSTRUCTIONS **Hold Time**
100 Area Generator Knowledge Information Form applies.

Total Activity Exemption: Yes ☑ No ☐

Sample No.	Lab ID	*	Date	Time	No/Type Container	Sample Analysis	Preservative
B1VK32 (F)	3575	W	7/28/08	1424	1x500-mL G/P	6010_METALS_ICP: List-3 (18)	HNO3 to pH <2
B1VK33	3577	W			1x500-mL G/P	6010_METALS_ICP: List-3 (18)	HNO3 to pH <2
B1VK33		W			1x500-mL P	300.0_ANIONS_IC: List-1 (5)	Cool~4C
B1VK33		W			1x500-mL G/P	ALPHABETA_GPC: Alpha discrete + Beta (2); ALPHABETA_GPC: Alpha discrete + Beta (2)	HNO3 to pH <2
B1VK33		W			1x250-mL G	TRITIUM_EIE_LSC: Tritium (1)	None

ICED

Relinquished By	Received By
Print: R.D. Julian Sign: [signature] Date/Time: JUL 28 2008 1515	Print: TA FNAZIM Sign: [signature] Date/Time: JUL 28 2008 1515
Relinquished By Date/Time	Received By Date/Time
Relinquished By Date/Time	Received By Date/Time
Relinquished By Date/Time	Received By Date/Time

Matrix *

S	= Soil	DS	= Drum Solid
SE	= Sediment	DL	= Drum Liqui
SO	= Solid	T	= Tissue
SL	= Sludge	WI	= Wine
W	= Water	L	= Liquid
O	= Oil	V	= Vegetation
A	= Air	X	= Other

FINAL SAMPLE DISPOSITION Disposal Method (e.g., Return to customer, per lab procedure, used in process) Disposed By Date/Time