

RECEIVED OCTOBER 27, 2008

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**FLUOR****Memorandum**

M4W41-SLF-08-1193

To: M. A. Neely B6-06 Date: October 27, 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 WSCF20082062; SAF NUMBER F08-154

Reference: (1) Memorandum of Agreement #MOA-FH-CHPRC-2008, Rev. 0, for the Performance & Payment of Services, dated October 1, 2008

(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 WSCF20082062:

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

SLF/grf

Attachments 4

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**M4W41-SLF-08-1193**

**ATTACHMENT 1**

**COVER SHEET**

**Consisting of 2 pages  
Including cover page**

# WSCF SAF NUMBER CROSS REFERENCE

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Group#: WSCF20082062  
Data Deliverable Date: 06-nov-2008  
Data Deliverable: Cover Sheet

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SAF#	Sample ID	WSCF#	Matrix
F08-154	B1WPV6	W08GR03864	WATER

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M4W41-SLF-08-1193

ATTACHMENT 2

**NARRATIVE**

Consisting of 4 pages  
Including cover page

### Introduction

One S&GRP sample was received at the WSCF Laboratory on September 24, 2008. Sample was analyzed for the analytes indicated on the attached copy of the chain of custody (COC) form in accordance with the *Memorandum of Agreement (MOA-FH-CHPRC-2008, Rev.0)*, 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 13 through 15, for a complete listing of approved analytical methods.

### Inorganic Comments

**Ammonia** – The hold time requirement for this analysis was met. A Duplicate, Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group. See page 17 for QC details. Analytical Note(s):

- Sample result was D flagged (dilution).
- Duplicate, Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1WPV4 (SDG# 20082055, SAF# F08-154).

All QC controls are within the established limits.

**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. See pages 18 through 20 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.
- Duplicate, Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1WWY9 (SDG# 20082066, SAF# F06-027).

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. See pages 21 through 22 for QC details. Analytical Note(s):

- Matrix Spikes and Matrix Spike Duplicates were analyzed on samples B1TR48 (SDG# 20082037, SAF# F08-083) and B1TRD4 (SDG# 20082053, SAF# F08-086).
- Sample results that were less than the reportable limit, however greater than the method detection limit, were B flagged.
- Calcium and Sodium concentrations exceeded spiking levels by a factor of 4. Spike recoveries are not valid. Check standard was analyzed to ensure linearity, because the sample results were greater than the calibration standard.

All other QC controls are within the established limits.

**pH** – The hold time requirement for this analysis was met. A Duplicate and Laboratory Control Sample were analyzed with this delivery group. See page 23 for QC details. Analytical Note(s):

- Duplicate QC was analyzed on a non-GRP sample.

All QC controls are within the established limits.

**Total Alkalinity** – The hold time requirement for this analysis was met. A Duplicate and Laboratory Control Sample were analyzed with this delivery group. See page 24 for QC details. Analytical Note(s):

- Duplicates were analyzed on samples B1WPV4 (SDG# 20082055, SAF# F08-154) and B1X0V7 (SDG# 20082025).

All QC controls are within the established limits.

**Total Dissolved Solids** – The hold time requirement for this analysis was met. A Duplicate, Blank and Laboratory Control Sample were analyzed for this sample delivery group. See page 25 for QC details. Analytical Note(s):

- Duplicate QC was analyzed on sample# B1X6N8 (SDG# 20082012, SAF# F08-039).

All QC controls are within the established limits.

**Total Organic Carbon** – The hold time requirement for this analysis was met. A Matrix Spike, Matrix Spike Duplicate, Blank and Method Spike were analyzed with this delivery group. See page 26 for QC details. Analytical Note(s):

- Matrix Spike and Matrix Spike Duplicate were analyzed on sample# B1X1K4 (SDG# 20082013, SAF# F08-157).

- Sample result was D flagged (dilution).

All QC controls are within the established limits.

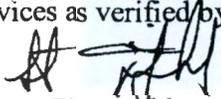
**Radiochemistry Comments**

**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 29 through 31 for QC details. Analytical Note(s):

- Gross Alpha/Gross Beta – Duplicate QC was analyzed on sample# B1TR41 (SDG# 20082036, SAF# F08-083).

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-08-1193

ATTACHMENT 3

**ANALYTICAL RESULTS**

Consisting of 24 pages  
Including cover page

**WSCF  
ANALYTICAL RESULTS REPORT**

**for**

**Groundwater Remediation Program**

**Richland, WA 99354**

**Attention: Steve Trent**

Analytical: *S. Fitzgerald* 10/27/08  
Client Services: *P.D. Mix* 10/27/2008

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

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Contract#: FH-EIS-2003-MEM-001  
Report#: WSCF20082062  
Report Date: 23-oct-2008  
Report WGPP/ver. 5.2  
Groundwater Remediation Program

Department: Inorganic

W13q Worklist/Batch/QC Report for Group# WSCF20082062

WL#	S#	Batch	QC#	Tray Type	Sample#	Test
38157	4	38585	43006	LCS		pH Direct Measurement
38157	7	38585	43006	SAMPLE	W08GR03864	pH Direct Measurement
38157	6	38585	43006	DUP	W08W000247	pH Direct Measurement
38163	2	38590	43020	BLANK		Tot Dissolved Solids 180C Dry
38163	1	38590	43020	LCS		Tot Dissolved Solids 180C Dry
38163	4	38590	43020	DUP	W08GR03782	Tot Dissolved Solids 180C Dry
38163	7	38590	43020	SAMPLE	W08GR03864	Tot Dissolved Solids 180C Dry
38204	2	38630	43065	BLANK		Anions by Ion Chromatography
38204	17	38630	43065	BLANK		Anions by Ion Chromatography
38204	29	38630	43065	BLANK		Anions by Ion Chromatography
38204	3	38630	43065	LCS		Anions by Ion Chromatography
38204	18	38630	43065	LCS		Anions by Ion Chromatography
38204	8	38630	43065	SAMPLE	W08GR03864	Anions by Ion Chromatography
38204	5	38630	43065	DUP	W08GR03882	Anions by Ion Chromatography
38204	6	38630	43065	MS	W08GR03882	Anions by Ion Chromatography
38204	7	38630	43065	MSD	W08GR03882	Anions by Ion Chromatography
38204	7	38630	43065	SPK-RPD	W08GR03882	Anions by Ion Chromatography
38204	21	38630	43065	DUP	W08GR03883	Anions by Ion Chromatography
38204	22	38630	43065	MS	W08GR03883	Anions by Ion Chromatography
38204	23	38630	43065	MSD	W08GR03883	Anions by Ion Chromatography
38204	23	38630	43065	SPK-RPD	W08GR03883	Anions by Ion Chromatography
38235	1	38656	43078	LCS		Total Alkalinity as mg/L CaCO3
38235	14	38656	43078	LCS		Total Alkalinity as mg/L CaCO3
38235	25	38656	43078	LCS		Total Alkalinity as mg/L CaCO3
38235	3	38656	43078	DUP	W08GR03862	Total Alkalinity as mg/L CaCO3
38235	5	38656	43078	SAMPLE	W08GR03864	Total Alkalinity as mg/L CaCO3
38235	7	38656	43078	DUP	W08P004444	Total Alkalinity as mg/L CaCO3
38173	1	38577	43108	BLANK		ICP Metals Analysis, Grd H2O P
38173	2	38577	43108	LCS		ICP Metals Analysis, Grd H2O P
38173	4	38577	43108	MS	W08GR03841	ICP Metals Analysis, Grd H2O P
38173	5	38577	43108	MSD	W08GR03841	ICP Metals Analysis, Grd H2O P
38173	5	38577	43108	SPK-RPD	W08GR03841	ICP Metals Analysis, Grd H2O P
38173	11	38577	43108	MS	W08GR03858	ICP Metals Analysis, Grd H2O P
38173	12	38577	43108	MSD	W08GR03858	ICP Metals Analysis, Grd H2O P
38173	12	38577	43108	SPK-RPD	W08GR03858	ICP Metals Analysis, Grd H2O P
38173	15	38577	43108	SAMPLE	W08GR03864	ICP Metals Analysis, Grd H2O P
38272	1	38693	43129	BLANK		Total Organic Carbon
38272	2	38693	43129	METHSPIKE		Total Organic Carbon
38272	3	38693	43129	SPK-RSD		Total Organic Carbon
38272	4	38693	43129	MS	W08GR03783	Total Organic Carbon
38272	5	38693	43129	MSD	W08GR03783	Total Organic Carbon
38272	5	38693	43129	SPK-RPD	W08GR03783	Total Organic Carbon
38272	8	38693	43129	SAMPLE	W08GR03864	Total Organic Carbon
38296	3	38716	43148	BLANK		Ammonia (N) by IC
38296	10	38716	43148	BLANK		Ammonia (N) by IC
38296	1	38716	43148	LCS		Ammonia (N) by IC

38296	6	38716	43148	DUP	W08GR03862	Ammonia (N) by IC
38296	7	38716	43148	MS	W08GR03862	Ammonia (N) by IC
38296	8	38716	43148	MSD	W08GR03862	Ammonia (N) by IC
38296	8	38716	43148	SPK-RPD	W08GR03862	Ammonia (N) by IC
38296	4	38716	43148	SAMPLE	W08GR03864	Ammonia (N) by IC

Department: Radiochemistry

## W13q Worklist/Batch/QC Report for Group# WSCF20082062

WL#	S#	Batch	QC#	Tray Type	Sample#	Test
38433	1	38855	43335	BLANK		Gross Alpha/Gross Beta (AB32)
38433	2	38855	43335	LCS		Gross Alpha/Gross Beta (AB32)
38433	3	38855	43335	DUP	W08GR03830	Gross Alpha/Gross Beta (AB32)
38433	14	38855	43335	SAMPLE	W08GR03864	Gross Alpha/Gross Beta (AB32)
38264	1	38685	43354	BLANK		Tritium by Liq Sct column prep
38264	2	38685	43354	LCS		Tritium by Liq Sct column prep
38264	4	38685	43354	DUP	W08GR03864	Tritium by Liq Sct column prep
38264	3	38685	43354	MS	W08GR03864	Tritium by Liq Sct column prep
38264	5	38685	43354	SAMPLE	W08GR03864	Tritium by Liq Sct column prep
38439	1	38861	43359	BLANK		Gross Alpha on Alpha Plateau
38439	2	38861	43359	LCS		Gross Alpha on Alpha Plateau
38439	3	38861	43359	DUP	W08GR03830	Gross Alpha on Alpha Plateau
38439	14	38861	43359	SAMPLE	W08GR03864	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.

<b>LA-212-402</b>	Determination of pH Direct Measurement
EPA SW-846 9040B	pH ELECTROMETRIC MEASUREMENT
EPA-600/4-79-020 150.1	pH
HEIS 150.1_PH	pH
Standard Methods 4500	Determination of pH Direct Measurement - WSCF
<b>LA-344-406</b>	LA-344-406: TOTAL ORGANIC CARBON (TOC) BASED ON SW-846
EPA SW-846 9060	TOTAL ORGANIC CARBON
HEIS 9060_TOC	Total Organic Carbon
<b>LA-503-401</b>	LA-503-401: ANALYSIS OF CATIONS BY ION CHROMATOGRAPHY
EPA-600/4-86-024 300.7	Dissolved Sodium, Ammonium, Potassium, and Calcium in Wet Deposition by Chemical
HEIS 300.7_CATIONS_IC	Determination of Ammonium by Ion Chromatography
<b>LA-505-411</b>	LA-505-411: ELEMENTAL ANALYSIS BY INDUCTIVELY COUPLED PLASMA ATOMIC EMISSION SPE
HEIS 6010_METALS_ICP	Inductively Coupled Plasma-Atomic Emission Spectrometry
<b>LA-519-422</b>	LA-519-422: TOTAL DISSOLVED SOLIDS DRIED AT 180 C
EPA-600/4-79-020 160.1	Residual, Filterable
HEIS 160.1_TDS	Residual, Filterable
<b>LA-531-411</b>	LA-531-411: ALKALINITY (TITRIMETRIC)
HEIS 2320B	Alkalinity
Standard Methods 2320B	Alkalinity

Note: A complete list of WSCF analytical procedures and referenced regulatory or industry methods is available online at <http://www2.rl.gov/phmc/as-dol>.

Report Date: 23-oct-2008

Report#: WSCF20082062

Report WGPPM/5.2

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# WSCF

## METHOD REFERENCES REPORT

Department: Inorganic

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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.

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<b>LA-533-410</b>	<b>LA-533-410: ANION ANALYSIS BY ION CHROMATOGRAPHY</b>
<b>EPA-600/R-94-111 300.0</b>	<b>DETERMINATION OF INORGANIC ANIONS BY ION CHROMATOGRAPHY</b>
<b>HEIS 300.0_ANIONS_IC</b>	<b>Determination of Inorganic Anions by Ion Chromatography</b>

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Note: A complete list of WSCF analytical procedures and referenced regulatory or industry methods is available online at <http://www2.rl.gov/phmc/as-dol>.

Report Date: 23-oct-2008

Report#: WSCF20082062

Report WGPPM/5.2

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# 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.

<b>LA-508-415</b>	<b>LA-508-415: OPERATION OF THE PROTEAN 2-INCH ALPHA/BETA COUNTING SYSTEM FOR GROSS</b>
<b>HEIS ALPHA_GPC</b>	GROSS ALPHA GPC
<b>HEIS BETA_GPC</b>	GROSS BETA GPC
<b>HEIS SRTOT_SEP_PRECIP_GPC</b>	Protium 89/90
<b>LA-508-421</b>	<b>LA-508-421: OPERATION OF THE TRI-CARB MODEL 2500TR LIQUID SCINTILLATION ANALYZER</b>
<b>HEIS ALPHA_LSC</b>	A/B Liquid Scintillation
<b>HEIS BETA_LSC</b>	A/B Liquid Scintillation
<b>HEIS TC99_3MDSK_LSC</b>	TC99 by Liquid Scintillation
<b>HEIS TRITIUM_EIE_LSC</b>	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>.

Report Date: 23-oct-2008

Report#: WSCF20082062

Report WGPPM/5.2

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# WSCF

## ANALYTICAL RESULTS REPORT

**Attention:** Steve Trent  
**SAF Number:** F08-154  
**Sample #** W08GR03864  
**Client ID:** B1WPV6

**Group #:** WSCF20082062  
**Department:** Inorganic  
**Sampled:** 09/24/08  
**Received:** 09/24/08

TRENT  
WSCF

**Matrix:** WATER

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
<b>Anions by Ion Chromatography</b>											
Chloride	16887-00-6	LA-533-410	D	25.7	mg/L			51.00	2.4		09/25/08
Nitrogen in Nitrite	NO2-N	LA-533-410	DU	< 0.653	mg/L			51.00	0.65		09/25/08
Nitrogen in Nitrate	NO3-N	LA-533-410	BD	4.18	mg/L			51.00	0.62		09/25/08
Sulfate	14808-79-8	LA-533-410	D	84.9	mg/L			51.00	6.7		09/25/08
<b>ICP Metals Analysis, Grd H2O P Prep</b>											
<b>ICP Metals Analysis, Grd H2O P</b>											
Manganese	7439-98-5	LA-505-411		444	ug/L			1.00	4.0		09/29/08
Potassium	7440-09-7	LA-505-411		9.26e+03	ug/L			1.00	1.7e+02		09/29/08
Sodium	7440-23-5	LA-505-411		2.51e+04	ug/L			1.00	51		09/29/08
Calcium	7440-70-2	LA-505-411		4.91e+04	ug/L			1.00	73		09/29/08
<b>Nitrogen in ammonium</b>											
Nitrogen in ammonium	NH4-N	LA-503-401	DU	< 0.186	mg/L			20.00	0.19		10/02/08
<b>Total Alkalinity as mg/L CaCO3</b>											
Total Alkalinity as mg/L CaCO3	ALKALINITY	LA-531-411		98.0	mg/L			1.00	1.0		09/26/08
<b>Total dissolved solids</b>											
Total dissolved solids	TDS	LA-519-422		352	mg/L			1.00	9.0		09/24/08
<b>Total organic carbon</b>											
Total organic carbon	TOC	LA-344-406	D	38.4	mg/L			2.00	0.80		09/29/08
<b>pH Measurement</b>											
pH Measurement	PH	LA-212-402		7.87	unitless			1.00	0.010		09/24/08

**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(inorg)

U - Analyzed for but not detected above limiting criteria.

D - Analyte was identified at a secondary dilution factor

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

\* - Indicates results that have NOT been validated;

+ - Indicates more than six qualifier symbols

Report WGPP/ver. 5.2

Groundwater Remediation Program

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# WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20082062  
 Matrix: WATER  
 Test: Ammonia (N) by IC

Sample Date: 09/23/08  
 Receive Date: 09/23/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
<b>Lab ID: W08GR03862</b>											
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>											
DUP	Ammonia (N) by IC	7664-41-7	0.2726		RPD			5.286	20.000		10/02/08
MS	Ammonia (N) by IC	7664-41-7	0.4942	99.237	% Recov	80.000	120.000				10/02/08
MSD	Ammonia (N) by IC	7664-41-7	0.47775	95.934	% Recov	80.000	120.000				10/02/08
SPK-RPD	Ammonia (N) by IC	7664-41-7	95.934		RPD			3.385	20.000		10/02/08
<b>BATCH QC</b>											
BLANK	Ammonia (N) by IC	7664-41-7	<9.32e-3	n/a	mg/L	0.000	0.002			U	10/02/08
BLANK	Ammonia (N) by IC	7664-41-7	<9.32e-3	n/a	mg/L	0.000	0.002			U	10/02/08
LCS	Ammonia (N) by IC	7664-41-7	100.0361	100.036	% Recov	80.000	120.000				10/02/08

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20082062  
 Matrix: WATER  
 Test: Anions by Ion Chromatography

Sample Date: 09/21/08  
 Receive Date: 09/24/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
<b>Lab ID: W08GR03882</b>											
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>											
DUP	Chloride	16887-00-6	5.7656		RPD			1.023	20.000		09/25/08
DUP	Nitrogen in Nitrite	NO2-N	<0.128		RPD			n/a	20.000	U	09/25/08
DUP	Nitrogen in Nitrate	NO3-N	<0.121		RPD			n/a	20.000	U	09/25/08
DUP	Sulfate	14808-79-8	1.6407		RPD			13.164	20.000		09/25/08
MS	Chloride	16887-00-6	0.94573	95.048	% Recov	80.000	120.000				09/25/08
MS	Nitrogen in Nitrite	NO2-N	0.4791	97.378	% Recov	80.000	120.000				09/25/08
MS	Nitrogen in Nitrate	NO3-N	0.43432	97.381	% Recov	80.000	120.000				09/25/08
MS	Sulfate	14808-79-8	1.92984	98.461	% Recov	80.000	120.000				09/25/08
MSD	Chloride	16887-00-6	0.94815	95.291	% Recov	80.000	120.000				09/25/08
MSD	Nitrogen in Nitrite	NO2-N	0.48374	98.321	% Recov	80.000	120.000				09/25/08
MSD	Nitrogen in Nitrate	NO3-N	0.44415	99.585	% Recov	80.000	120.000				09/25/08
MSD	Sulfate	14808-79-8	1.96207	100.106	% Recov	80.000	120.000				09/25/08
SPK-RPD	Chloride	16887-00-6	95.291		RPD			0.255	20.000		09/25/08
SPK-RPD	Nitrogen in Nitrite	NO2-N	98.321		RPD			0.964	20.000		09/25/08
SPK-RPD	Nitrogen in Nitrate	NO3-N	99.585		RPD			2.238	20.000		09/25/08
SPK-RPD	Sulfate	14808-79-8	100.106		RPD			1.657	20.000		09/25/08
<b>Lab ID: W08GR03883</b>											
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>											
DUP	Chloride	16887-00-6	22.772		RPD			0.954	20.000		09/25/08
DUP	Nitrogen in Nitrite	NO2-N	<0.128		RPD			n/a	20.000	U	09/25/08
DUP	Nitrogen in Nitrate	NO3-N	<0.121		RPD			n/a	20.000	U	09/25/08
DUP	Sulfate	14808-79-8	20.9445		RPD			11.761	20.000		09/25/08
MS	Chloride	16887-00-6	0.90078	90.531	% Recov	80.000	120.000				09/25/08
MS	Nitrogen in Nitrite	NO2-N	0.51617	104.913	% Recov	80.000	120.000				09/25/08
MS	Nitrogen in Nitrate	NO3-N	0.45984	103.103	% Recov	80.000	120.000				09/25/08

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20082062  
 Matrix: WATER  
 Test: Anions by Ion Chromatography

Sample Date: 09/21/08  
 Receive Date: 09/24/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
MS	Sulfate	14808-79-8	1.91527	97.718	% Recov	80.000	120.000				09/25/08
MSD	Chloride	16887-00-6	0.9058	91.035	% Recov	80.000	120.000				09/25/08
MSD	Nitrogen in Nitrite	NO2-N	0.51275	104.217	% Recov	80.000	120.000				09/25/08
MSD	Nitrogen in Nitrate	NO3-N	0.461	103.363	% Recov	80.000	120.000				09/25/08
MSD	Sulfate	14808-79-8	1.95692	99.843	% Recov	80.000	120.000				09/25/08
SPK-RPD	Chloride	16887-00-6	91.035		RPD			0.555	20.000		09/25/08
SPK-RPD	Nitrogen in Nitrite	NO2-N	104.217		RPD			0.666	20.000		09/25/08
SPK-RPD	Nitrogen in Nitrate	NO3-N	103.363		RPD			0.252	20.000		09/25/08
SPK-RPD	Sulfate	14808-79-8	99.843		RPD			2.151	20.000		09/25/08

## BATCH QC

BLANK	Chloride	16887-00-6	<4.69e-2	n/a	mg/L	0.000	0.030			U	09/25/08
BLANK	Chloride	16887-00-6	<4.69e-2	n/a	mg/L	0.000	0.030			U	09/25/08
BLANK	Chloride	16887-00-6	<4.69e-2	n/a	mg/L	0.000	0.030			U	09/25/08
BLANK	Nitrogen in Nitrite	NO2-N	<1.28e-2	n/a	mg/L	0.000	0.020			U	09/25/08
BLANK	Nitrogen in Nitrite	NO2-N	<1.28e-2	n/a	mg/L	0.000	0.020			U	09/25/08
BLANK	Nitrogen in Nitrite	NO2-N	<1.28e-2	n/a	mg/L	0.000	0.020			U	09/25/08
BLANK	Nitrogen in Nitrate	NO3-N	<1.21e-2	n/a	mg/L	0.000	0.040			U	09/25/08
BLANK	Nitrogen in Nitrate	NO3-N	<1.21e-2	n/a	mg/L	0.000	0.040			U	09/25/08
BLANK	Nitrogen in Nitrate	NO3-N	<1.21e-2	n/a	mg/L	0.000	0.040			U	09/25/08
BLANK	Sulfate	14808-79-8	<0.132	n/a	mg/L	0.000	0.200			U	09/25/08
BLANK	Sulfate	14808-79-8	<0.132	n/a	mg/L	0.000	0.200			U	09/25/08
BLANK	Sulfate	14808-79-8	<0.132	n/a	mg/L	0.000	0.200			U	09/25/08
LCS	Chloride	16887-00-6	198.5478	98.780	% Recov	80.000	120.000				09/25/08
LCS	Chloride	16887-00-6	198.8112	98.812	% Recov	80.000	120.000				09/25/08
LCS	Nitrogen in Nitrite	NO2-N	101.2569	101.868	% Recov	80.000	120.000				09/25/08
LCS	Nitrogen in Nitrite	NO2-N	101.473	102.086	% Recov	80.000	120.000				09/25/08
LCS	Nitrogen in Nitrate	NO3-N	93.9783	104.304	% Recov	80.000	120.000				09/25/08
LCS	Nitrogen in Nitrate	NO3-N	94.6755	105.078	% Recov	80.000	120.000				09/25/08
LCS	Sulfate	14808-79-8	399.1908	100.806	% Recov	80.000	120.000				09/25/08

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20082062  
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
LCS	Sulfate	14808-79-8	401.1801	101.308	% Recov	80.000	120.000				09/25/08

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20082062  
 Matrix: WATER  
 Test: ICP Metals Analysis, Grd H2O P

Sample Date: 09/22/08  
 Receive Date: 09/22/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
<b>Lab ID: W08GR03841</b>											
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>											
MS	Calcium	7440-70-2	3600	360.000	% Recov	75.000	125.000			•	09/29/08
MS	Potassium	7440-09-7	9662	96.620	% Recov	75.000	125.000				09/29/08
MS	Manganese	7439-96-5	1022	102.200	% Recov	75.000	125.000				09/29/08
MS	Sodium	7440-23-5	-4980	-498.000	% Recov	75.000	125.000			•	09/29/08
MSD	Calcium	7440-70-2	450	45.000	% Recov	75.000	125.000			•	09/29/08
MSD	Potassium	7440-09-7	9802	98.020	% Recov	75.000	125.000				09/29/08
MSD	Manganese	7439-96-5	1002	100.200	% Recov	75.000	125.000				09/29/08
MSD	Sodium	7440-23-5	-1880	-188.000	% Recov	75.000	125.000			•	09/29/08
SPK-RPD	Calcium	7440-70-2	45.000		RPD			155.558	20.000	•	09/29/08
SPK-RPD	Potassium	7440-09-7	98.020		RPD			1.439	20.000		09/29/08
SPK-RPD	Manganese	7439-96-5	100.200		RPD			1.976	20.000		09/29/08
SPK-RPD	Sodium	7440-23-5	-188.000		RPD			-90.379	20.000	•	09/29/08
<b>Lab ID: W08GR03858</b>											
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>											
MS	Manganese	7439-96-5	1007	100.700	% Recov	75.000	125.000				09/29/08
MSD	Manganese	7439-96-5	1027	102.700	% Recov	75.000	125.000				09/29/08
SPK-RPD	Manganese	7439-96-5	102.700		RPD			1.967	20.000		09/29/08
<b>BATCH QC</b>											
BLANK	Calcium	7440-70-2	<73	n/a	ug/L					U	09/29/08
BLANK	Potassium	7440-09-7	<170	n/a	ug/L					U	09/29/08
BLANK	Manganese	7439-96-5	<4	n/a	ug/L					U	09/29/08
BLANK	Sodium	7440-23-5	<51	n/a	ug/L					U	09/29/08
LCS	Calcium	7440-70-2	1174	117.400	% Recov	80.000	120.000				09/29/08
LCS	Potassium	7440-09-7	10290	102.900	% Recov	80.000	120.000				09/29/08

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20082062  
Matrix: WATER  
Test: ICP Metals Analysis, Grd H2O 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	Manganese	7439-96-5	988	98.800	% Recov	80.000	120.000				09/29/08
LCS	Sodium	7440-23-5	1051	105.100	% Recov	80.000	120.000				09/29/08

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20082062  
 Matrix: WATER  
 Test: pH Direct Measurement

Sample Date: 09/24/08  
 Receive Date: 09/24/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
<b>Lab ID: W08W000247</b>											
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>											
DUP	pH Direct Measurement	PH	7.75		RPD			0.129	20.000		09/24/08
<b>BATCH QC</b>											
LCS	pH Direct Measurement	PH	8.05	1.006	Ratio	0.900	1.100				09/24/08

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20082062  
 Matrix: WATER  
 Test: Total Alkalinity as mg/L CaCO3

Sample Date: 09/23/08  
 Receive Date: 09/23/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
<b>Lab ID: W08GR03862</b>											
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>											
DUP	Total Alkalinity as mg/L CaCO3	ALKALINITY	84.03		RPD			4.103	20.000		09/26/08
<b>Lab ID: W08P004444</b>											
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>											
DUP	Total Alkalinity as mg/L CaCO3	ALKALINITY	76.72		RPD			0.714	20.000		09/26/08
<b>BATCH QC</b>											
LCS	Total Alkalinity as mg/L CaCO3	ALKALINITY	32.06	107.584	%Recover	80.000	120.000				09/26/08
LCS	Total Alkalinity as mg/L CaCO3	ALKALINITY	32.28	108.322	%Recover	80.000	120.000				09/26/08
LCS	Total Alkalinity as mg/L CaCO3	ALKALINITY	31.45	105.537	%Recover	80.000	120.000				09/26/08

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20082062  
 Matrix: WATER  
 Test: Tot Dissolved Solids 180C Dry

Sample Date: 09/18/08  
 Receive Date: 09/18/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
<b>Lab ID: W08GR03782</b>											
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>											
DUP	Tot Dissolved Solids 180C Dry	TDS	14310		RPD			2.689	5.000		09/24/08
<b>BATCH QC</b>											
BLANK	Tot Dissolved Solids 180C Dry	TDS	<9	n/a	mg/L	0.000	300.000			U	09/24/08
LCS	Tot Dissolved Solids 180C Dry	TDS	592	95.484	%rec	80.000	120.000				09/24/08

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20082062  
 Matrix: WATER  
 Test: Total Organic Carbon

Sample Date: 09/18/08  
 Receive Date: 09/18/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
<b>Lab ID: W08GR03783</b>											
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>											
MS	Total Organic Carbon	TOC	1.507	100.487	% Recov	75.000	125.000				09/29/08
MSD	Total Organic Carbon	TOC	1.485	99.000	% Recov	75.000	125.000				09/29/08
SPK-RPD	Total Organic Carbon	TOC	99.000		RPD			1.471	20.000		09/29/08
<b>BATCH QC</b>											
BLANK	Total Organic Carbon	TOC	<0.045	n/a	mg/L	0.000	300.000			U	09/29/08
METHSPIKE	Total Organic Carbon	TOC	2.129	106.450	% Recov	80.000	120.000				09/29/08
SPK-RSD	Total Organic Carbon	TOC	0.7810	0.781	% RSD	0.000	20.000				09/29/08

# WSCF ANALYTICAL COMMENT REPORT

Attention: Steve Trent  
Project Number F08-154

Group #: WSCF20082062  
Department: Inorganic

Sample #	Client ID	Lab Area	Test	Comment
		VALGROUP		ICP-AES: [Sample W08GR3864] No zirconium present in the LCS standard. Sample results < 5X MDL; "B" flag. Check standard used to ensure 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  
**SAF Number:** F08-154  
**Sample #** W08GR03864  
**Client ID:** B1WPV6

**TRENT  
WSCF**

**Matrix:** WATER

**Group #:** WSCF20082062  
**Department:** Radiochemistry  
**Sampled:** 09/24/08  
**Received:** 09/24/08

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
<b>Gross Alpha on Alpha Plateau</b>											
Gross alpha on alpha plateau	12587-48-1	LA-508-415		1.40	pCi/L	+0.910	pCi/L	1.00	1.1		10/20/08
<b>Gross Alpha/Gross Beta (AB32)</b>											
Gross beta	12587-47-2	LA-508-415		9.40	pCi/L	+1.97	pCi/L	1.00	2.0		10/16/08
<b>Tritium by Liq Sct column prep</b>											
Tritium	10028-17-8	LA-508-421		220	pCi/L	+143	pCi/L	1.00	2.0e+02		10/21/08

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

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

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

Report WGPP/ver. 5.2  
 Groundwater Remediation Program

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Radiochemistry**

SDG Number: WSCF20082062  
 Matrix: WATER  
 Test: Gross Alpha on Alpha Plateau

Sample Date: 09/22/08  
 Receive Date: 09/22/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
<b>Lab ID: W08GR03830</b>											
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>											
DUP	Gross alpha on alpha plateau	12587-46-1	2.0		RPD			13.953	20.000		10/20/08
<b>BATCH QC</b>											
BLANK	Gross alpha on alpha plateau	12587-46-1-ap	U2.7	n/a	pCi/L	-100.000	100.000				10/20/08
LCS	Gross alpha on alpha plateau	12587-46-1-ap	38.8	100.155	% Recov	80.000	120.000				10/20/08

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: **Radiochemistry**

SDG Number: WSCF20082062  
 Matrix: WATER  
 Test: Gross Alpha/Gross Beta (AB32)

Sample Date: 09/22/08  
 Receive Date: 09/22/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
Lab ID: W08GR03830											
BATCH QC ASSOCIATED WITH SAMPLE											
DUP	Gross beta	12587-47-2	13.4		RPD			6.498	20.000		10/16/08
BATCH QC											
BLANK	Gross beta	12587-47-2	U-1.0E-01	n/a	pCi/L	-10.000	10.000				10/16/08
LCS	Gross beta	12587-47-2	123	109.626	% Recov	80.000	120.000				10/16/08

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: Radiochemistry

SDG Number: WSCF20082062  
 Matrix: WATER  
 Test: Tritium by Liq Sct column prep

Sample Date: 09/24/08  
 Receive Date: 09/24/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
<b>Lab ID: W08GR03864</b>											
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>											
DUP	Tritium	10028-17-8	2.2E+02		RPD			0.000	20.000		10/21/08
MS	Tritium	10028-17-8	21984	98.098	% Recov	75.000	125.000				10/21/08
<b>BATCH QC</b>											
BLANK	Tritium	10028-17-8	U9.7E+01	n/a	pCi/L	-10.000	1000.000				10/21/08
LCS	Tritium	10028-17-8	3060	90.645	% Recov	80.000	120.000				10/21/08

M4W41-SLF-08-1193

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*  
11/06/08  
*tdj*

ACKNOWLEDGMENT OF SAMPLES RECEIVED

Groundwater Remediation Program

Richland, WA 99354  
Attn: Steve Trent

Customer Code: GPP  
PO#: 122543/ES10  
Group#: 20082062  
Project#: F08-154  
Proj Mgr: Steve Trent E6-35  
Phone: 373-5869

The following samples were received from you on 09/24/08. 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
W08GR03864	B1WPV6	TRENT @AB-32 ALKALI	Water @ALPHA NH4-IC @GPP6010 PH-30	09/24/08 @H3-33 TDS-30 @IC-30 TOC-30

Test Acronym Description

Test Acronym	Description
@AB-32	Gross Alpha/Gross Beta (AB32)
@ALPHA	Gross Alpha on Alpha Plateau
@GPP6010	ICP Metals Analysis, Grd H2O P
@H3-33	Tritium by Liq Sct column prep
@IC-30	Anions by Ion Chromatography
ALKALI	Total Alkalinity as mg/L CaCO3
NH4-IC	Ammonia (N) by IC
PH-30	pH Direct Measurement
TDS-30	Tot Dissolved Solids 180C Dry
TOC-30	Total Organic Carbon

Fluor Hanford Inc. 11/06/08

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F08-154-034

PAGE 1 OF 1

<b>COLLECTOR</b> WEBB Brotherton	<b>COMPANY CONTACT</b> TRENT, SJ	<b>TELEPHONE NO.</b> 373-5869	<b>PROJECT COORDINATOR</b> WIDRIG, DL	<b>PRICE CODE</b> 7N	<b>DATA TURNAROUND</b> 45 Days / 45 Days
<b>SAMPLING LOCATION</b> C6826, I-002	<b>PROJECT DESIGNATION</b> Liquid Effluent Retention Facility (LERF) Sampling		<b>SAF NO.</b> F08-154	<b>AIR QUALITY</b> <input type="checkbox"/>	
<b>ICE CHEST NO.</b>	<b>FIELD LOGBOOK NO.</b> HNF-1-481-2	<b>ACTUAL SAMPLE DEPTH</b> 224'	<b>COA</b> 122543E510	<b>METHOD OF SHIPMENT</b> GOVERNMENT VEHICLE	
<b>SHIPPED TO</b> Waste Sampling & Characterization 20082062	<b>OFFSITE PROPERTY NO.</b> N/A		<b>BILL OF LADING/AIR BILL NO.</b> N/A		

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	HNO3 to pH <2	Cool~4C	H2SO4 to pH <2	Cool~4C	Cool~4C	None	HCl or H2SO4 to pH <2/Cool~4C	HNO3 to pH <2	None
A=Air DL=Drum L=Liquid DS=Drum S=Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegetation W=Water WI=Wipe X=Other	Contains Radioactive Material at concentrations that may or may not be regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 5400.5 (1990/1993)	<b>TYPE OF CONTAINER</b>	G/P	P	G/P	G/P	G/P	G/P	aGs*	G/P	P
		<b>NO. OF CONTAINER(S)</b>	1	1	1	1	1	1	1	1	1
		<b>VOLUME</b>	500mL	500mL	250mL	250mL	500mL	125mL	250mL	500mL	250mL
	<b>SPECIAL HANDLING AND/OR STORAGE</b> Radioactive Tie To: B1WPV3	<b>SAMPLE ANALYSIS</b>	SEE ITEM (1) IN SPECIAL INSTRUCTIONS	SEE ITEM (2) IN SPECIAL INSTRUCTIONS	Cations (IC - 300.7 (Nitrogen in ammonium))	2320_ALKALINITY (Alkalinity)	TDS (Total dissolved solids)	pH - 150.1;	TOC - 9060;	Gross Alpha (Gross alpha) Gross Beta (Gross beta)	Tritium - H3;

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME								
B1WPV6 W086A03864	WATER	9/24/08	09:30	✓	✓	✓	✓	✓	✓	✓	✓

CHAIN OF POSSESSION	SIGN/ PRINT NAMES
RELINQUISHED BY/REMOVED FROM Brotherton 9/24/08	RECEIVED BY/STORED IN Trent 9-24-08 1045
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN
RELINQUISHED BY/REMOVED FROM	RECEIVED BY/STORED IN

**SPECIAL INSTRUCTIONS**  
 \*\* The 200 Area S&GRP Characterization and Monitoring Sampling and Analysis GKI applies to this SAF.  
 (1) ICP Metals - 6010B (TAL) (Calcium, Magnesium, Potassium, Sodium)  
 (2) IC Anions - 300.0 (Chloride, Nitrogen In Nitrate, Nitrogen In Nitrite, Sulfate)

**ICED**

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

34 of 34