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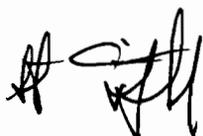
# FLUOR

## Memorandum

M4W41-SLF-08-857

To: H. Hampt E6-35 Date: August 19, 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: CYANIDE DATA REQUESTED FOR SAMPLE DELIVERY GROUP WSCF20081481 – SAF NUMBER F08-043

- Reference:
- (1) Memo, SL Fitzgerald to H Hampt, Final Results for SDG WSCF20081481 (M4W41-SLF-08-838), dated August 18, 2008
  - (2) Groundwater Protection Program-Letter of Instruction, FH-EIS-2003-MEM-001, October 31, 2002
  - (3) HNF-SD-CD-QAPP-017, Rev. 8, Waste Sampling & Characterization Facility Quality Assurance Plan

Compliant to your request, cyanide data are included in this submittal. This submittal contains the following information:

- Cover Sheet (Attachment 1)
- Narrative (Attachment 2)
- E-mail, dated July 2, 2008, from the WSCF Client Services Scientist to the WSCF Sample Custodians, documenting client request for cyanide analysis (Attachment 3)
- Analytical Results (Attachment 4)
- Sample Receipt Acknowledgement (Attachment 5)

If you have any questions, don't hesitate to call on Andy Kopriva, telephone 373-1613, for assistance.

SLF/grf

Attachments 5

M4W41-SLF-08-857

ATTACHMENT 1

**COVER SHEET**

Consisting of 2 pages  
Including cover page

# WSCF SAF NUMBER CROSS REFERENCE

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Group#: WSCF20081481  
Data Deliverable Date: 31-jul-2008  
Data Deliverable: Cover Sheet

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SAF#	Sample ID	WSCF#	Matrix
F08-043	B1TDC4	W08GR02635	SOIL
	B1TDC7	W08GR02636	SOIL
	B1TDD3	W08GR02637	SOIL
	B1TDD9	W08GR02640	SOIL
	B1TDF2	W08GR02642	SOIL
	B1TV15	W08GR02638	SOIL
	B1TV19	W08GR02639	SOIL
	B1V2L5	W08GR02641	SOIL

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M4W41-SLF-08-857

ATTACHMENT 2

**NARRATIVE**

Consisting of 2 pages  
Including cover page

## Introduction

Eight S&GRP samples were received at the WSCF Laboratory during the March 2008 timeframe and all data deliverables were submitted to the client within the requested turnaround time (TAT). In the early July 2008 timeframe, the client requested cyanide analysis on these samples.

The narrative (Attachment 2) will address sample characteristics, analyses requested and general information in performance of the analytical methods. A copy of an e-mail, dated July 2, 2008, from the WSCF Client Services Scientist to the WSCF Sample Custodians, documenting client request to for cyanide analysis, is included in Attachment 3. 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. Copy of the Sample Receipt Acknowledgement is included as Attachment 5.

## Analytical Methodology for Requested Analyses

Refer to *WSCF Method References Report*, page 11, for a complete listing of approved analytical methods.

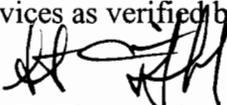
## Inorganic Comments

**Cyanide** – Due to late nature of the request, the hold time requirement for this analysis does not apply. A Matrix Spike, Matrix Spike Duplicate, Blank and Laboratory Control Sample were analyzed with this delivery group per GRP Letter of Instruction. See page 20 for QC details. Analytical Note(s):

- Matrix Spikes and Matrix Spike Duplicates were analyzed on samples B1VDX3 (SDG# 20081399, SAF# F08-101) and B1WB32 (SDG# 20081670, SAF# F08-093).
- Batch QC - B1WB32 – Matrix Spike Duplicate recovery was slightly less than established laboratory limits. Affected sample results were N flagged.

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

  
Pauline D. Mix  
WSCF Client Services

M4W41-SLF-08-857

ATTACHMENT 3

**E-MAIL, DATED JULY 2, 2008, FROM THE WSCF CLIENT SERVICES SCIENTIST TO THE  
WSCF SAMPLE CUSTODIANS, DOCUMENTING CLIENT REQUEST FOR CYANIDE  
ANALYSIS**

Consisting of 2 pages  
Including cover page

**Frazier, Teresa A**

**From:** Kopriva, Andrew  
**Sent:** Wednesday, July 02, 2008 11:15 AM  
**To:** Beebe, Kevin L; Frazier, Teresa A; Hudon, Carrie A; Sims, Vic T  
**Cc:** Mix, Pauline D; Kopriva, Andrew; ^CPP Sample Management; Anastos, Heather L; Ayres, Doris E; Trent, Stephen J; Widrig, Dana L; Hampt, Heidi; Lynch, Sherry A; Hamlin, Ty R; Ross, Gerald A; Stauffer, Markus; Trechter, John E Jr; Dale, Troy F  
**Subject:** Additional Sample Analyses - SAFs F08-066 and F08-043

Please analyze the following samples for antimony, manganese, thallium (6010) and cyanide.

SAF F08-066

CLIENT ID	LAB ID	SDG
B1TFC0	W08GR00913	20080715
B1TFC3	W08GR01029	20080797
B1TFC6	W08GR01053	20080813
B1TFC9	W08GR01054	20080813
B1TFD2	W08GR01066	20080830
B1TFD9	W08GR01079	20080830
B1TFF2	W08GR01075	20080847
B1TFF5	W08GR01078	20080847
B1TFF8	W08GR01080	20080847
B1TFH1	W08GR01082	20080847

Primary / Waste Sampling & Characterization / 8N / 45 Days / 45 Days / Summary

Please analyze the following samples for Antimony, Cobalt, Manganese, Thallium (6010), Chloride, Fluoride (Anions), and Cyanide.  
 SAF F08-043.

CLIENT ID	LAB ID	SDG
B1TDC4	W08GR00628	20080543
B1TDC7	W08GR00630	20080543
B1TDD3	W08GR00663	20080561
B1TV15	W08GR01036	20080801
B1TV19	W08GR01037	20080801
B1TDD9	W08GR00954	20080746
B1V2L5	W08GR01038	20080801
B1TDF2	W08GR01033	20080801

Primary / Waste Sampling & Characterization / 8N / 45 Days / 45 Days / Summary

Thank you,

Andrew Kopriva  
 WSCF Client Services  
 373-1613  
 MSIN S3-30

M4W41-SLF-08-857

ATTACHMENT 4

**ANALYTICAL RESULTS**

Consisting of 13 pages  
Including cover page

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

**for**  
**Groundwater Remediation Program**

**Richland, WA 99354**

**Attention: Steve Trent**

Analytical:  S. Fitzgerald 8/19/08  
Client Services:  P.D. Mix 8/19/2008

*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.

Contract#: FH-EIS-2003-MEM-001  
Report#: WSCF20081481  
Report Date: 18-aug-2008  
Report WGPP/ver. 5.2  
Groundwater Remediation Program

Department: Inorganic

## W13q Worklist/Batch/QC Report for Group# WSCF20081481

WL#	S#	Batch	QC#	Tray Type	Sample#	Test
37124	1	37550	41892	BLANK		Cyanide by Midi/Spectrophotom
37124	2	37550	41892	LCS		Cyanide by Midi/Spectrophotom
37124	4	37550	41892	MS	W08GR02382	Cyanide by Midi/Spectrophotom
37124	5	37550	41892	MSD	W08GR02382	Cyanide by Midi/Spectrophotom
37124	5	37550	41892	SPK-RPD	W08GR02382	Cyanide by Midi/Spectrophotom
37124	7	37550	41892	SAMPLE	W08GR02635	Cyanide by Midi/Spectrophotom
37124	8	37550	41892	SAMPLE	W08GR02636	Cyanide by Midi/Spectrophotom
37124	9	37550	41892	SAMPLE	W08GR02637	Cyanide by Midi/Spectrophotom
37124	10	37550	41892	SAMPLE	W08GR02640	Cyanide by Midi/Spectrophotom
37124	11	37550	41892	SAMPLE	W08GR02641	Cyanide by Midi/Spectrophotom
37124	12	37550	41892	SAMPLE	W08GR02642	Cyanide by Midi/Spectrophotom
37586	10	38026	42422	BLANK		Cyanide by Midi/Spectrophotom
37586	11	38026	42422	LCS		Cyanide by Midi/Spectrophotom
37586	18	38026	42422	SAMPLE	W08GR02638	Cyanide by Midi/Spectrophotom
37586	19	38026	42422	SAMPLE	W08GR02639	Cyanide by Midi/Spectrophotom
37586	13	38026	42422	MS	W08GR03258	Cyanide by Midi/Spectrophotom
37586	14	38026	42422	MSD	W08GR03258	Cyanide by Midi/Spectrophotom
37586	14	38026	42422	SPK-RPD	W08GR03258	Cyanide by Midi/Spectrophotom

# 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-695-402</b>	<b>LA-695-402: DETERMINATION OF CYANIDE BY MIDDISTILLATION AND SPECTROPHOTOMETRIC Cyanide, Total</b>
<b>EPA-600/4-79-020 335.2</b>	<b>Cyanide, Total</b>
<b>HEIS 335.2_CYANIDE</b>	<b>Cyanide, Total</b>

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: 18-aug-2008  
Report#: WSCF20081481  
Report WGPMM/5.2

# WSCF ANALYTICAL RESULTS REPORT

**Attention:** Steve Trent  
**SAF Number:** F08-043  
**Sample #** W08GR02635  
**Client ID:** BITDC4

**Group #:** WSCF20081481  
**Department:** Inorganic  
**Sampled:** 03/04/08  
**Received:** 03/17/08

**CN-02**  
**Matrix:** SOIL  
**WSCF**

**Test Performed**      **CAS #**      **Method**      **RQ**      **Result**      **Unit**      **TP Err**      **Unit**      **DF**      **MDL**      **PQL**      **Analysis Date**

Cyanide      57-12-5      LA-695-402      U      < 0.184      mg/kg                          0.92      0.18           07/15/08

**MDL = Minimum Detection Limit**      N - Spike sample recovery is outside control limits. (inorg)      U - Analyzed for but not detected above limiting criteria (inorg)

**RQ = Result Qualifier**

**TP Err = Total Propagated Error**

**DF = Dilution Factor**

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

*Report WGPP/ver. 5.2*

*Groundwater Remediation Program*

# WSCF ANALYTICAL RESULTS REPORT

**Attention:** Steve Trent  
**SAF Number:** F08-043  
**Sample #** W08GR02636  
**Client ID:** BITDC7

**Group #:** WSCF20081481  
**Department:** Inorganic  
**Sampled:** 03/05/08  
**Received:** 03/17/08

**CN-02**  
**WSCF**

**Matrix:** SOIL

**Test Performed**    **CAS #**    **Method**    **RQ**    **Result**    **Unit**    **TP Err**    **Unit**    **DF**    **MDL**    **PQL**    **Analysis Date**

Cyanide    57-12-5    LA-695-402    U    < 0.196    mg/kg                0.98    0.20       07/15/08

**MDL = Minimum Detection Limit**    N - Spike sample recovery is outside control limits. (inorg)    U - Analyzed for but not detected above limiting criteria.(inorg)  
**RQ = Result Qualifier**  
**TP Err = Total Propagated Error**  
**DF = Dilution Factor**  
 \* - Indicates results that have NOT been validated;    + - Indicates more than six qualifier symbols  
**Report WGPP/ver. 5.2**  
**Groundwater Remediation Program**

# WSCF ANALYTICAL RESULTS REPORT

**Attention:** Steve Trent  
**SAF Number:** F08-043  
**Sample #** W08GR02637  
**Client ID:** BITDD3

**Group #:** WSCF20081481  
**Department:** Inorganic  
**Sampled:** 03/06/08  
**Received:** 03/19/08

**CN-02**  
**Matrix:** SOIL

**Test Performed**      **CAS #**      **Method**      **RQ**      **Result**      **Unit**      **TP Err**      **Unit**      **DF**      **MDL**      **PQL**      **Analysis Date**

Cyanide      57-12-5      LA-695-402      U      < 0.219      mg/kg                     1.10      0.22           07/15/08

**MDL = Minimum Detection Limit**      N - Spike sample recovery is outside control limits. (inorg)      U - Analyzed for but not detected above limiting criteria(inorg)

**RQ = Result Qualifier**

**TP Err = Total Propagated Error**

**DF = Dilution Factor**

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*Report WGPP/ver. 5.2*

*Groundwater Remediation Program*

# WSCF ANALYTICAL RESULTS REPORT

**Attention:** Steve Trent  
**SAF Number:** F08-043  
**Sample #** W08GR02638  
**Client ID:** BITV15

**Group #:** WSCF20081481  
**Department:** Inorganic  
**Sampled:** 03/11/08  
**Received:** 04/15/08

**Matrix:** SOIL  
**CAS #** CN-02  
**Method** WSCF

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Cyanide	57-12-5	LA-695-402	N	0.212	mg/kg			0.89	0.18		08/14/08

**MDL = Minimum Detection Limit**    N - Spike sample recovery is outside control limits. (inorg)    U - Analyzed for but not detected above limiting criteria. (inorg)  
**RQ = Result Qualifier**  
**TP Err = Total Propagated Error**  
**DF = Dilution Factor**  
 \* - Indicates results that have NOT been validated;    + - Indicates more than six qualifier symbols  
*Report WGPP/ver. 5.2*  
*Groundwater Remediation Program*

# WSCF ANALYTICAL RESULTS REPORT

**Attention:** Steve Trent  
**SAF Number:** F08-043  
**Sample #** W08GR02639  
**Client ID:** BITV19

**Group #:** WSCF20081481  
**Department:** Inorganic  
**Sampled:** 03/12/08  
**Received:** 03/15/08

**CN-02**  
**WSCF**

**Matrix:** SOIL

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Cyanide	57-12-5	LA-695-402	NU	< 0.194	mg/kg			0.97	0.19		08/14/08

**MDL = Minimum Detection Limit**    N - Spike sample recovery is outside control limits. (inorg)    U - Analyzed for but not detected above limiting criteria(inorg)

**RQ = Result Qualifier**

**TP Err = Total Propagated Error**

**DF = Dilution Factor**

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

*Report WGPP/ver. 5.2*

*Groundwater Remediation Program*

# WSCF ANALYTICAL RESULTS REPORT

**Attention:** Steve Trent  
**SAF Number:** F08-043  
**Sample #** W08GR02640  
**Client ID:** BITDD9

**Group #:** WSCF20081481  
**Department:** Inorganic  
**Sampled:** 03/19/08  
**Received:** 04/18/08

**Matrix:** SOIL

**CN-02**  
**WSCF**

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Cyanide	57-12-5	LA-695-402	U	< 0.172	mg/kg			1.10	0.22		07/15/08

MDL = Minimum Detection Limit    N - Spike sample recovery is outside control limits. (inorg)

RQ = Result Qualifier    U - Analyzed for but not detected above limiting criteria (inorg)

TP Err = Total Propagated Error

DF = Dilution Factor

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Report WGPP/ver. 5.2

Groundwater Remediation Program

# WSCF ANALYTICAL RESULTS REPORT

**Attention:** Steve Trent  
**SAF Number:** F08-043  
**Sample #** W08GR02641  
**Client ID:** B1V2L5

CN-02  
 WSCF

**Test Performed** Cyanide      **CAS #** 57-12-5      **Method** LA-695-402      **RQ** U      **Result** < 0.220      **Unit** mg/kg      **TP Err**      **Unit**      **DF** 0.94      **MDL** 0.19      **PQL**      **Analysis Date** 07/15/08

**Matrix:** SOIL

**Group #:** WSCF20081481  
**Department:** Inorganic  
**Sampled:** 03/26/08  
**Received:** 04/15/08

**MDL = Minimum Detection Limit**      N - Spike sample recovery is outside control limits. (inorg)      U - Analyzed for but not detected above limiting criteria (inorg)

**RQ = Result Qualifier**

**TP Err = Total Propagated Error**

**DF = Dilution Factor**

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*Report WGPP/ver. 5.2*

*Groundwater Remediation Program*

# WSCF ANALYTICAL RESULTS REPORT

**Attention:** Steve Trent  
**SAF Number:** F08-043  
**Sample #** W08GR02642  
**Client ID:** BITDF2

**Group #:** WSCF20081481  
**Department:** Inorganic  
**Sampled:** 03/31/08  
**Received:** 04/15/08

**Matrix:** SOIL  
**CAS #** CN-02  
**Method** WSCF

Test Performed	CAS #	Method	RQ	Result	Unit	TP Err	Unit	DF	MDL	PQL	Analysis Date
Cyanide	57-12-5	LA-695-402	U	< 0.203	mg/kg			1.04	0.21		07/15/08

**MDL = Minimum Detection Limit**    N - Spike sample recovery is outside control limits. (inorg)    U - Analyzed for but not detected above limiting criteria (inorg)

**RQ = Result Qualifier**

**TP Err = Total Propagated Error**

**DF = Dilution Factor**

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*Report WGPP/ver. 5.2*

*Groundwater Remediation Program*

# WSCF ANALYTICAL LABORATORY QC REPORT

Department: Inorganic

SDG Number: WSCF20081481  
 Matrix: SOLID  
 Test: Cyanide by Midi/Spectrophotom

Sample Date: 07/09/08  
 Receive Date: 07/10/08

QC Type	Analyte	CAS #	QC Found	QC Yield	Units	Lower Limit	Upper Limit	RPD(%)	RPD Limit	RQ	Analysis Date
<b>Lab ID: W08GR02382</b>											
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>											
MS	Cyanide by Midi/Spectrophotom	57-12-5	1.76	93.617	% Recov	75.000	125.000				07/15/08
MSD	Cyanide by Midi/Spectrophotom	57-12-5	1.73	98.857	% Recov	75.000	125.000				07/15/08
SPK-RPD	Cyanide by Midi/Spectrophotom	57-12-5	98.857		RPD			5.445	20.000		07/15/08
<b>BATCH QC</b>											
BLANK	Cyanide by Midi/Spectrophotom	57-12-5	< 4	n/a	ug/L	-4.000	4.000			U	07/15/08
LCS	Cyanide by Midi/Spectrophotom	57-12-5	48	96.000	% Recov	85.000	115.000				07/15/08
<b>Lab ID: W08GR03258</b>											
<b>BATCH QC ASSOCIATED WITH SAMPLE</b>											
MS	Cyanide by Midi/Spectrophotom	57-12-5	1.88	94.000	% Recov	75.000	125.000				08/14/08
MSD	Cyanide by Midi/Spectrophotom	57-12-5	1.36	69.388	% Recov	75.000	125.000				08/14/08
SPK-RPD	Cyanide by Midi/Spectrophotom	57-12-5	69.388		RPD			30.127	20.000		08/14/08
<b>BATCH QC</b>											
BLANK	Cyanide by Midi/Spectrophotom	57-12-5	< 4	n/a	ug/L	-4.000	4.000			U	08/14/08
LCS	Cyanide by Midi/Spectrophotom	57-12-5	43	86.000	% Recov	85.000	115.000				08/14/08

M4W41-SLF-08-857

ATTACHMENT 5

**SAMPLE RECEIPT ACKNOWLEDGEMENT**

Consisting of 2 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

ACKNOWLEDGMENT OF SAMPLES RECEIVED 0800717WSCF-RCW.FO

Groundwater Remediation Program

Richland, WA 99354  
 Attn: Steve Trent

Customer Code: GPP  
 PO#: 123215/ES20  
 Group#: 20081481  
 Project#: F08-043  
 Proj Mgr: Steve Trent E6-35  
 Phone: 373-5869

*File*  
*07/31/08*  


The following samples were received from you on 03/17/08. 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
W08GR02635	B1TDC4	CN-02	Solid, or handle as if solid	03/04/0
		CN-02		
W08GR02636	B1TDC7	CN-02	Solid, or handle as if solid	03/05/0
		CN-02		
W08GR02637	B1TDD3	CN-02	Solid, or handle as if solid	03/06/0
		CN-02		
W08GR02638	B1TV15	CN-02	Solid, or handle as if solid	03/11/0
		CN-02		
W08GR02639	B1TV19	CN-02	Solid, or handle as if solid	03/12/0
		CN-02		
W08GR02640	B1TDD9	CN-02	Solid, or handle as if solid	03/19/0
		CN-02		
W08GR02641	B1V2L5	CN-02	Solid, or handle as if solid	03/26/0
		CN-02		
W08GR02642	B1TDF2	CN-02	Solid, or handle as if solid	03/31/0
		CN-02		

Test Acronym Description

Test Acronym	Description
CN-02	Cyanide by Midi/Spectrophotom